DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: On-site Inspection

N683872891

FACILITY: Vector Pipeline L.P., Highland Compressor Station		**SRN / ID:** N6838
LOCATION: 2282 South Duck Lake Road, HIGHLAND		**DISTRICT:** Warren
CITY: HIGHLAND		**COUNTY:** OAKLAND
CONTACT: Jennifer Brennan , Sr. Environment Advisor		**ACTIVITY DATE:** 07/31/2024
STAFF: Owen Pierce	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT: FY 24 Compliance Inspection		
RESOLVED COMPLAINTS:		

On July 31, 2024, I (Owen Pierce EGLE - Air Quality Division) performed a scheduled targeted inspection of Vector Pipeline L.P.- Highland Compressor Station located at 2282 South Duck Lake Road, Highland, Michigan. The purpose of the inspection was to determine the facility's compliance with the Federal Clean Air Act; and Article II, Part 55, Air Pollution Control of Natural Resources and Environmental Protection Act, 1994 Public Act 451 and the conditions of Renewal Operating Permit (ROP) MI-ROP-N6838-2024. Upon arrival, I met with Kurt Kindt, Multi-technician and Alan Shaw, Instrument and Operations Technician, and conducted a pre-inspection meeting where I introduced myself, presented my credentials, and stated the purpose of the inspection. Matt DiPaola, Area Supervisor, and Jennifer Brennan, Senior Advisor Environment, briefly joined the pre-inspection meeting via video call.

Vector Pipeline began operation on December 1, 2000 as a strategic link in the transportation of natural gas produced in the Appalachian region and West Canada, and is a joint venture between DT Midstream and Enbridge Inc. where Enbridge Inc. owns 60% and DT Midstream owns 40% of the pipeline. The pipeline is a 348-mile natural gas pipeline between Joliet, Illinois and Dawn, Ontario. There are 274 miles of 42-inch diameter pipeline, 59 miles of 36-diameter pipeline (leased from DTE Energy), and an additional 15 miles of 42-inch pipeline in Canada.

The Highland Compressor Station is one of five compressor stations located along the Vector Pipeline. Each compressor station operates a pair of turbines that each drive a compressor. The turbines at the Highland Compressor Station are Solar Mars 100 natural gas fired turbines that drive Solar C65 compressors, rated at 15,000 HP. The compressors are equipped with dry low NOx emissions controls (SoloNOx). The entire facility including the compressors are remotely controlled by the Vector Pipeline headquarters in Houston, Texas, and occasionally the facility is unmanned. If the compressors are operating below the SoloNOx levels, then an audible and visual alarm is generated in the Houston, Texas control room and Highland area Vector Pipeline representatives are contacted.

The turbine powered compressors move natural gas from one side of the pipeline, increase the pressure, then re-injects the gas back into the other side of the pipeline at an increased pressure. The compressors at this station are capable of sending natural gas in either direction (toward Canada or toward Illinois) depending on customer demand.

There is a natural gas fired standby power generating unit (EUSPU3), rated at 9.654 MMBTU/hr maximum heat release. This unit will automatically start in the event of a local utility power interruption. This generator is capable of starting and running both turbines as well as other important electronics at the facility.

The facility is a major source for carbon monoxide (CO) and oxides of nitrogen (NOx) and is subject to Title V of the Clean Air Act of 1990 because the potential to emit (PTE) of CO and NOx exceed 100 tons per year. The facility is a true minor source for HAP emissions and is therefore not subject to the National Emission Standard for Hazardous Air Pollutants (NESHAP) for turbines.

The facility is considered a "synthetic minor" source in regards to the Prevention of Significant Deterioration regulations of 40 CFR 52.21 because the facility accepted legally enforceable permit conditions limiting the potential to emit of CO to less than 250 tons per year (tpy).

The facility is subject to the Standards of Performance for Stationary Gas Turbines promulgated in 40 CFR Part 60, Subparts A and GG for the two permitted compressor turbines(EUTURBINE1 and EUTURBINE2).

According to Kurt, there have been no recent process or equipment changes, and there are no boilers or cold cleaners at the facility. Following the pre-inspection meeting, Kurt lead me on an inspection of the facility.

Facility Walk-through Observations

During the facility walk-through, Kurt first lead me to the EUSPU3, which is in the same building as the main office and control room. The emergency generator was not operating at the time of my inspection. The EUSPU3 is equipped with a non-resettable hours meter, as required by 40 CFR, Part 63, Subpart ZZZZ, NESHAP for Stationary Reciprocating Internal Combustion Engines. At the time of the inspection, the hours meter read 1,484.6 hours.

Next we went to the building where EUTURBINE1 and EUTURBINE2 are housed. Neither of the two turbines were operating at the time of the inspection. The turbines are equipped with SoLoNOx, which is a low emissions technology that allows for the turbine to combust at a lower temperature, resulting in lower NOx emissions. Kurt explained that it takes less than 10 minutes for each turbine to start-up and the facility is able to alter the pilot and main gas to regulate temperature and emissions. According to Kurt, both turbines are the same, and parts on each turbines get swapped out with parts that are stored on-site, in a nearby storage building, every 30,000 operating hours. According to the hours meter for each turbine, Turbine 1 has operated 7,351 hours and Turbine 2 has operated 14,945 hours.

Finally, Kurt showed me the blowdown vents (blowdown 100 and 200) for each turbine. These are used when there is excess natural gas that needs to be removed from the compressor station lines for maintenance tasks, turbine shut-down, emergency shut-down events, etc.

ROP No. MI-ROP-N6838-2024 Compliance Evaluation

The facility was issued ROP No. MI-ROP-N6838-2024 for two Solar MARS 100 natural gas fired turbine driven Solar C65 compressors and one natural gas fired Cummins GTA50G2 internal combustion engine standby power unit, and all emission units that emit air contaminants and are exempt from the requirements of Rule 201 pursuant to Rules 278 and 285(2)(mm). Recordkeeping requirements from September 2022 through June 2024 were submitted to me via email from Jennifer Brennan, Senior Environment Advisor for Enbridge. Records can be located internally at the following link: S:\Air Quality Division\STAFF\Owen Pierce\FY 24\Vector Pipeline - Highland Compressor Station.

Source-WIde Conditions

Special condition (SC) I.1 sets a CO emission limit at 224 tons/year (tpy) based off a 12-month rolling time period as determined at the end of each calendar month. In order to comply with these emission limits, SC VI. 2 states that the permittee shall keep in a satisfactory manner, records of monthly and 12-month rolling total CO emissions from SOURCE-WIDE. After a review of the records, the highest 12-month rolling CO emissions from September 2022 through June 2024 were 9.71 tpy as recorded at the end of May 2024.

SC VI.1 requires the permittee to monitor and record the usage of natural gas fired in FGTURBINES and EUSPU3 during each day. These records were made available to me via email prior to the inspection. Natural gas usage is monitored by flow meters located near the turbines and the emergency generator.

SC VII.1 - 3 requires the facility to submit annual and semi-annual reports that certify compliance and report any deviations. This compressor station has been submitting these reports in a timely manner based on the reports I have seen, and no deviations have been reported from September 2022 through June 2024.

SC IX.1 states that the permittee shall comply with all applicable requirements of Consent Agreement and Final Order (CAFO), Clean Air Docket No. CAA-05-2005 0014, filed on February 11, 2005. During the previous inspection in February 2020, EGLE-AQD staff Adam Bognar determined that the consent order had been resolved as it imposed no on-going operational requirements and/or conditions that Vector Pipeline must follow.

EUSPU3

SC I.1 through I.3 establishes emission limits for EUSPU3. Hourly NOx and CO emissions are limited to 39.4 lb/hr and 3.06 lb/hr, respectively. NOx emissions are further limited to 9.85 tpy based off a 12-month rolling time period as determined at the end of each month. Compliance with these emission limits is based on SC VI.1 which states that the permittee shall calculate NOx and CO emissions in tons based on a 12-month rolling time period, and SC VI.2 which states that the permittee shall record the total operating hours for EUSPU3 on a calendar year basis. After a review of the records, the highest 12-month rolling NOx emissions from September 2022 - June 2024 were 1.384 tpy as recorded at the the end of April 2023.

The facility is not required to maintain hourly emission (in lb/hour) calculations for EUSPU3. Based on the provided fuel usage, operational hours, and monthly emission records provided, Vector Pipeline is operating in compliance with the hourly emission rates.

SC III.2 states that the permittee shall not operate ESPU3 for more than 500 hours per calendar year. The facility provided monthly and 12-month rolling logs of the ESPU3 operating hours. After a review of the records, the highest 12-month rolling ESPU3 operating hours total from September 2022 - June 2024 was 70.25 hours as recorded at the the end of April 2023.

SC III.3 states that the permittee shall maintain on site and implement a Preventative Maintenance Plan (PMP) that ensures EUSPU3 can operate in compliance with the above emission limits. The facility provided a copy of the PMP via email and after review of the PMP, I have found it to be acceptable. Routine maintenance included in the PMP includes filter changes, fluid level checks, battery checks, and belt replacements as recommended by the manufacturer. Maintenance records from September 2022 through June 2024 provided by the facility show that routine maintenance items have been properly carried out according to the manufacturer recommendations, as included in the PMP.

SC VII.1, VII.2, & VII.3 specify reporting requirements for EUSPU3. Vector Pipeline is required to submit annual and semi-annual reports that certify compliance and report any deviations. This compressor station has been submitting these reports in a timely manner based on the reports that I have seen, and no deviations have been reported from September 2022 through June 2024.

SC VIII.1 & 2 specifies stack height requirements. I did not take measurements of stack dimensions during this inspection, however the stacks appeared to be discharged unobstructed vertically upwards to the ambient air.

SC IX.1 requires that the permittee shall comply with all applicable requirements of the National Emission Standards for Hazardous Air Pollutants, as specified in 40 CFR Part 63, Subparts A and ZZZZ for Stationary Reciprocating Internal Combustion Engines. Based on this inspection and a review of the provided records, Vector Pipeline is in compliance with 40 CFR Part 63, Subparts A and ZZZZ.

FGTURBINES (EUTURBINE1 & EUTURBINE2)

All permitted emission limits for this flexible group are combined for both turbines. Emission limits for each individual turbine is half of the hourly and 12-month emission limits for NOx, CO, and SO_2 as explained in SC IV.1.

SC I.1 through SC I.7 sets the emission limits for FGTURBINES: For SC I.2 and I.5 NOx and SO_2 emissions are limited to 126.7 tons/year and 59.21 tons/year, respectively, based off a 12-month rolling time period; For SC I.1, I.4, and I.6 & I.7, NOx, SO_2, and CO emissions are limited to 37.9 lbs/hr, 13.52 lbs/hr, and 25.14 lbs/hr and 800 lb/hr, respectively. The 25.14 lb/hr CO limit only applies when a turbine

is operating above 92% Natural Gas Production (NGP) speed. When the turbine is operating between 86% and 92%, the CO emission limit is 800 lbs/hr. Compliance with these emission limits is based on recordkeeping requirements in SC VI.1 through VI.5 and testing requirements in SC V.1 and V.2.

According to the provided records from September 2022 through June 2024, the highest NOx emission recorded was 24.45 tons/year as determined at the end of December 2023 and the highest SO_2 emission recorded was 0.1729 tons/year as determined at the end of December 2023. The provided records indicate that both Turbines, collectively, are in compliance with the 12-month rolling NOx and SO_2 emission limits.

Records for hourly emissions for NOx, SO_2, and CO were recorded individually for Turbine 1 and Turbine 2. Per SC IV.1, hourly and 12-month rolling emission limits for NOx, SO_2, and CO are one-half of the listed values. Therefore the hourly emission limits for Turbine 1 and 2 individually are 18.95 lb/hr of NOx, 6.76 lb/hr of SO_2, 12.57 lb/hr of CO when operating above 92% NGP, and 400 lb/hr of CO when operating between 86% and 92% NGP.

After a review of the provided records for Turbine 1, maximum NOx emissions were reported as 15.3 lb/hr, maximum SO_2 emissions were reported as 0.3622 lb/hr, and maximum CO emissions were reported as 4.5 lb/hr when operating above 92% NGP and 303.2 lb/hour when operating from start-up up until 92% NGP is reached. The provided records indicate that Turbine 1 is in compliance with the hourly NOx, SO_2, and CO emission limits set in the permit.

After a review of the provided records for Turbine 2, maximum NOx emissions were reported as 14.1 lb/hr, maximum SO_2 emissions were reported as 0.1593 lb/hr, and maximum CO emissions were reported as 11.0 lb/hr when operating above 92% NGP and 291.7 lb/hr when operating from start-up up until 92% NGP is reached. The provided records indicate that Turbine 2 is in compliance with the hourly NOx, SO_2, and CO emission limits set in the permit.

In addition to the hourly SO_2 emission limit, SC I.3 establishes an instantaneous SO_2 emission limit of 150 ppm, by volume at 15% oxygen and on a dry gas basis and at 100% load. Compliance with this limit is determined by compliance with the Custom Fuel Monitoring Plan (CFMP), contained in Appendix 3 of the permit, as required in SC VI.2 and VI.3. According to the requirements outlined in the CFMP, the facility does not have to conduct sulfur content monitoring as long as it maintain a valid (Federal Energy Regulatory Commission) FERC tariff indicating that the sulfur content is less than 20 grains per 100 standard cubic feet of natural gas. Vector Pipeline holds a current and valid tariff for the facility and therefore does not have to conduct sulfur content monitoring of fuels, and therefore is in compliance with SC I.3, SC VI.2 and SC VI.3.

SC III.1 states that the permittee shall not operate the turbines at loads less than 86% NGP except during periods of startup or shutdown. NGP is defined as the rotational speed of the gas producer in RPM. Vector Pipeline maintains records of the NGP speed on an hourly basis. Based on the records I reviewed during this inspection period, the NGP speed is maintained above 86% during all periods of operation.

SC III.2 states that the permittee shall only fire natural gas in the turbines. Both turbines are intrinsically designed to burn natural gas right from the Vector Pipeline. No other fuel is used.

SC III.3 limits the sulfur content of the natural gas to 0.8% by weight. As previously stated, Vector Pipeline maintains a current and valid tariff from the Federal Energy Regulatory Commission. This tariff states that the natural gas transported by this pipeline shall contain no more than ¼ grain of hydrogen sulfide per 100 cubic feet of gas nor more than 20 grains of total sulfur per 100 cubic feet of gas. The sulfur limits of this tariff are more stringent than the 0.8% sulfur by weight limit promulgated in this permit.

SC III.4 states that the turbines shall be operated within the range of gas producer speed established by the permittee. The permittee established a minimum NGP speed of 86% in the ROP. Based on the records I reviewed the turbines are always operated above 86%, except during startup and shutdown.

SC V.1, V.2, V.3, V.4, & V.5 specify testing/sampling requirements for the turbines. The permittee must verify NOx and CO emission rates from both turbines by testing at the owner's expense. This testing must be performed every 5 years at a minimum. The most recent testing was performed on March 6, 2024 by Barr Engineering Co. NOx emission rates for Turbine 1 were recorded as 8.25 lb/hr for 90% NGP, 7.22 lb/hr for 94% NGP, 7.42 lb/hr for 98% NGP, and 14.99 lb/hr for 103% NGP. NOx emission rates for Turbine 2 were recorded as 14.77 lb/hr for 90% NGP, 3.73 lb/hr for 94% NGP, 3.07 lb/hr for 98% NGP, and 3.54 lb/hr for 103% NGP.

CO emission rates for Turbine 1 were recorded as 0.83 lb/hr for 90% NGP, 0.08 lb/hr for 94% NGP, 0.09 lb/hr for 98% NGP, and 10.37 lb/hr for 103% NGP. CO emission rates for Turbine 2 were recorded as 14.07 lb/hr for 90% NGP, 0.07 lb/hr for 94% NGP, 0.09 lb/hr for 98% NGP, and 0.13 lb/hr for 103% NGP. Based on the results of the 2024 emissions testing, emission rates in lb/hr of NOx and CO for both turbines were under the emission limits established in the permit. Therefore the facility is in compliance with the testing/sampling requirements required in the permit.

SC VI.1, VI.4, & VI.5 specifies recordkeeping requirements for FGTURBINES. For each turbine individually, the permittee must keep records of the hourly average %NGP, an indicator as to whether SoloNOx is "on" or "off", the hourly and 12-month rolling CO and NOx emission rates, a current and valid FERC Gas Tariff for the facility, and the hourly and tons/year SO2 emissions. These records are maintained, and performance test results are used to calculate reportable emissions.

SC VII.1, VII.2, VII.3, & VII.4 details reporting requirements for FGTURBINES. Vector Pipeline is required to submit annual and semi-annual reports that certify compliance and report any deviations. In addition, all performance test reports must be sent to the AQD District Office and Technical Programs Unit. This facility has been submitting these reports in a timely manner based on the reports I have seen, and no deviations have been reported from September 2022 through June 2024.

SC VIII.1 & VIII.2 outlines stack parameters. I did not take measurements of stack dimensions during this inspection. Stacks were observed as being discharged unobstructed vertically upwards to the ambient air.

SC IX.1 requires FGTURBINES to operate in compliance with 40 CFR Part 60, Subpart GG. Vector Pipeline is in compliance with these standards based on my inspection and record review.

SC IX.2 requires the permittee to maintain records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of FGTURBINES, any malfunction of the air pollution control equipment, or any periods during which a continuous monitoring system or monitoring device is inoperative. These records are kept and maintain onsite by the facility.

FGRULE 285(2)(mm)

SC III. 1 requires that the facility take measures to assure the safety of employees, the public, and minimize the impacts to the environment during venting of natural gas for routine maintenance or relocation of transmission and distribution systems in amounts greater than 1,000,000 standard cubic feet.

SC VII.4 & VII.5 state that for venting of natural gas for routine maintenance or relocation of transmission and distribution systems in amounts greater than 1,000,000 standard cubic feet, the permittee shall notify the AQD District Supervisor prior to a scheduled piping event, and provide necessary notification in accordance with the Michigan gas safety standards, the federal pipeline and hazardous materials safety administration standards, and the federal energy regulatory commission standards, as applicable.

SC VII.6 requires that the permittee notify the pollution emergency alert system (PEAS) within 24 hours of an emergency pipeline venting for venting of natural gas in amounts greater than 1,000,000 standard cubic feet per event.

From September 2022 through June 2024, the facility conducted four station blowdowns in amounts greater than 1,000,000 standard cubic feet: three unplanned blowdowns occurred on November 16, 2022 (vented 1.187 million standard cubic feet of natural gas), September 26, 2023 (vented 1.3 million standard cubic feet of natural gas), and November 7, 2023 (vented 1.1 million standard cubic feet of natural gas), and one planned blowdown occurred on September 19, 2022 (vented 1.07873 million standard cubic feet of natural gas). Email records from the facility show that proper notification was provided to AQD prior to the planned blowdown on September 19, 2022, and proper notification was provided to AQD following the three unplanned blowdowns on November 16, 2022, September 26, 2023, and November 7, 2023.

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All conditions in this section of the permit pertain to the EUSPU3. SC III.1 through III.6 outline process/operational restrictions for the EUSPU3 such as:

- changing the oil and filter every 500 hours of operation or annually, except if the permittee utilizes an oil analysis program to extend the oil change requirement;
- inspect spark plugs every 1,000 hours or operation or annually whichever comes first;
- inspect all hoses and belts every 500 hours of operation or annually whichever comes first;
- maintain each engine according to the manufacturers written instructions or develop a maintenance plan for the engine;
- minimize the idle time during startup;
- limit operation of the engine to not more than 100 hours per year for necessary maintenance checks and readiness testing, and limit the operation of the engine to no more than 50 hours per year for non-emergency situations.

SC VI.1 through VI.6 requires that the permittee keep recordkeeping items such as: malfunction records, records of performance tests and evaluations, maintenance records, corrective action records, total hours of operation, and records to demonstrate continuous compliance with the operation and maintenance of the engine.

After a review of all required records from September 2022 through June 2024, Vector Pipeline is in compliance with the requirements in SC III.1 through III.6 and VI.1 through VI.6. Also, as stated earlier in this report, the EUSPU3 is equipped with a non-resettable hours meter as required in SC IV.1.

Conclusion

Based on the information obtained during the inspection and a review of the requested records, Vector Pipeline L.P. - Highland Compressor Station is in compliance with the conditions and requirements in MI-ROP-N6838-2024.

NAME Owen Pierce DATE 8/27/2024 SUPERVISOR K. Kelly