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

N683853067

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: Matt DiPaola , Pipeline Operations Coordinator		ACTIVITY DATE: 02/27/2020
STAFF: Adam Bognar	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Scheduled Inspection		
RESOLVED COMPLAINTS:		

On Thursday, February 27, 2020, Michigan Department of Environment, Great Lakes, and Energy-Air Quality Division (EGLE-AQD) employee Adam Bognar conducted a scheduled inspection of Vector Pipeline L.P., Highland Compressor Station (the "Facility" or "Station") located at 2282 South Duck Lake Road, Highland, MI 48356. The purpose of this inspection was to determine the facility's compliance status with the Federal Clean Air Act; Article II, Part 55, Air Pollution Control of Natural Resources and Environmental Protection Act, 1994 Public Act 451; Michigan Department of Environment, Great Lakes, and Energy-Air Quality Division (EGLE-AQD) rules; and the requirements of Renewable Operating Permit No. MI-ROP-N6838-2019.

I arrived at the facility at around 1 pm. I met with Mr. Matt DiPaola, Pipeline Operations Coordinator, and Mr. Alan Shaw, I&O Technician. I introduced myself, provided credentials, and stated the purpose of the inspection.

Occasionally, this facility is unmanned. Upon request, a Vector Pipeline representative is available to meet on-site. I called Mr. Shaw a few hours prior to conducting this inspection to make sure someone would be there. Current Vector Pipeline – Highland Compressor Station contacts are:

Matt DiPaola – Operations Coordinator
Desk: 248-889-2798
Cell: 219-218-4807
Matthew.dipaola@enbridge.com

Alan Shaw – Instrument and Operations Technician
Desk: 248-889-2798
Cell: 248-534-6785
Alan.shaw@enbridge.com

I was given a contractor safety briefing in the form of a video and an explanation from Mr. DiPaola. After the safety briefing, we reviewed relevant records and paperwork in the main office. Mr. DiPaola and Mr. Shaw were able to show me all of the records I requested during this inspection. Records are kept online and are maintained by a corporate environmental person (Jim Snider – james.snider@enbridge.com) that manages the environmental recordkeeping for all Vector Pipeline facilities. Mr. DiPaola and Mr. Shaw explained how this facility operates and gave me a tour of the facility.

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

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 this station are Solar Mars 110S natural gas fired compressors rated at 15,000 HP and a maximum heat input of 120MMBTU/hr. The compressors are equipped with low NOx controls (SoloNOx). The entire facility including the compressors are remotely controlled by the Vector Pipeline headquarters in Houston, Texas. If the compressors are operating below the SoloNOx levels, then an audible and visual alarm is generated in the Houston, Texas control room.

The turbine powered compressors move natural gas from one side the pipeline, increase the pressure, then reinject 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) with a maximum capacity of 924 HP. 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 true minor source for HAP emissions and is therefore not subject to the National Emission Standards for Hazardous Air Pollutants for turbines. Based on their 2018 Michigan Air Emission Reporting System, the total VOC emissions in 2018 were 1900 lbs.

MI-ROP-N7624-2019

Vector Pipeline provided me with copies of the records I reviewed during this inspection. These records can be found in the AQD shared drive at: S:\Air Quality Division\STAFF\Bognar, Adam\Inspection Documents\Vector Pipeline - Highland Compressor Station

Source-Wide Conditions

Section I – SC 1,2: CO emissions are limited to 224 tons. Based on the records I reviewed during this inspection the facility is in compliance with these emission limits. CO emissions are reported at 5.42 tons for the 12-month period ending in December 2019. The highest reported 12-month average CO emissions in the past year was 9.73 tons during the 12-month period ending in May 2019.

Section VI – SC 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 during this inspection. Natural gas usage is monitored by flow meters located near the turbines and the emergency generator.

Section VII – SC 1,2,3: 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.

Section IX – SC 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. There are no on-going operational requirements and/or conditions that Vector Pipeline must follow as a result of this consent order. I spoke with the AQD enforcement section about this ROP condition. AQD enforcement section believes this CAFO was likely resolved between the company and the EPA. This condition should be removed during the next ROP renewal.

EUSPU3 – Emergency Generator

EUSPU3 is a Natural gas fired Cummins GTA50G2 internal combustion engine rated at 9.654MMBtu/hr maximum heat release. This unit is used for backup power generation in the event of a power interruption. The emergency generator is subject to the requirements of 40 CFR Part 63, Subpart ZZZZ – National Emissions Standards for

Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.

Section I – SC 1,2,3: Establishes emission limits for EUSPU3. Hourly NOx and CO emissions are limited to 39.4 lb/hr and 3.06 lb/hr, respectively. CO emissions are further limited to 9.85 tons per year. Based on the records I reviewed this facility is in compliance with these emission limits. CO emissions were reported at 0.44 tons for the 12-month period ending in December 2019. The highest reported CO emissions were 1.267 tons in the 12-month period ending in August 2019.

Section III – SC 2: States that the permittee shall not operate EUSPU3 for more than 500 hours per calendar year. Mr. DiPaola explained that this engine is only used for emergencies and for monthly testing. The records at the facility show that the engine was operated for a total of 22.3 hours in 2019. 14.4 of these hours were used for emergency purposes during power interruptions. The remaining 7.9 hours were used for testing purposes. Periodically, Vector Pipeline turns the engine on for 30 minutes to ensure that it is ready to function in the event of an emergency.

Section III – SC 3: Specifies the frequency at which maintenance activities shall be performed on EUSPU3. EUSPU3 maintenance records were made available to me during this inspection. These records show that maintenance activities are performed at the required frequencies. Oil is not changed every 500 hours, but instead changed according to the oil analysis program specified in Section V – SC 1.

Section III – SC 4,5: Require the facility to operate the engine in a manner consistent with good air pollution control practices for minimizing emissions, and in compliance with 40 CFR Part 63, Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. Based on this inspection and the records I reviewed, the facility is in compliance with these limits.

Section III – SC 6: Requires the permittee to minimize the time that EUSPU3 spends at idle during startup and minimize the engines startup time to 30 minutes or less. Mr. Shaw explained that the engine is only operated for approximately 30 minutes during monthly testing. The startup time for the engine is less than 30 minutes.

Section III – SC 7: Limits the amount of time the engine can operate for necessary maintenance checks and readiness testing to 100 hours per year. Based on the records I reviewed the engine was operated for 7.9 hours for these purposes in 2019.

Section III – SC 8: Limits the amount of time the engine can operate in non-emergency situations. According to facility personal, the engine has not been operated for "non-emergency" situations. It is only operated during a power interruption or during maintenance/readiness checks.

Section III – SC 9: Requires the permittee to operate EUSPU3 in accordance with an approvable maintenance plan. I reviewed this plan during my inspection and found it to be acceptable.

Section IV – SC 1: Requires the permittee to install a non-resettable hour meter on EUSPU3. I observed that the engine was equipped with a non-resettable hour meter. Engine operating hours were 1251.9 hours during this inspection.

Section V – SC 1: States that the permittee has the option of using the oil analysis program outlined in 40 CFR Part 63 Subpart ZZZZ. The facility has elected to use this program. The engine oil is checked annually and analyzed for total acid number, viscosity, and percent water content. If any of these measurables exceeds the condemnable limit, then the oil must be changed. Annual records of these analyses and any oil changes are maintained.

Section V – SC 2: States that upon request from the AQD District Supervisor the permittee shall verify NOx and CO emission rates from EUSPU3 by testing at the owner's expense. The AQD is not requesting

a performance test for EUSPU3 at this time.

Section VI – SC 1,2,3,4,5: Specifies recordkeeping requirements for EUSPU3. The permittee must keep records of rolling 12-month CO and NOx emissions, rolling 12-month total operating hours and fuel consumption, and records of any maintenance activities performed on the engine. Mr. DiPaola was able to show me all of these records during this inspection (see shared drive for copies). Records of maintenance activities are kept on logs in the same binder as the engine preventative maintenance plan.

Section VII – SC 1,2,3: 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 I have seen.

Section VIII – SC 1,2: Specifies stack parameters. I did not take measurements of stack dimensions during this inspection. Stacks appeared to be discharged unobstructed vertically upwards to the ambient air.

Section IX – SC 1,2: Require Vector Pipeline to maintain a Preventative Maintenance Plan (PMP) for EUSPU3. The facility maintains a PMP on-site. I reviewed the plan on-site and found it to be acceptable. Routine maintenance on EUSPU3 includes filter changes, fluid level checks, battery checks, and belt replacements as recommended by the manufacturer. Additionally, the facility must comply with 40 CFR Part 63 Subpart ZZZZ. Vector Pipeline is in compliance with ZZZZ based on this inspection and the records I reviewed.

FGTURBINES

This flexible group consists of two Solar brand MARS 100 natural gas fired turbines that operate two Solar C65 compressors. Each turbine is rated at 15,000 horsepower and is equipped with dry low NOx emission control (SoloNOx). Maximum heat input to each turbine is 112.35 MMBTU/hr.

Both turbines were off during this inspection. I observed the computer terminal that controls the turbines and noted the following values: Turbine unit 100 has operated for 15,406 hours and has been started 252 times. Turbine unit 200 has operated for 2,547 hours and has been started 28 times.

The turbines are completely replaced by the manufacturer every 30,000 operating hours or as needed. Solar inspects their installed turbines at least once per year to determine if the turbine or any parts need replacement. It is in the best interest of Solar to maintain these turbines correctly since they reuse as many components as possible when they decommission and disassemble the turbine. Turbine unit 200 was replaced in this manner in September 2019 due to a recall, not because 30,000 hours was exceeded.

Section I – SC 1,2,3,4,5,6,7: Establish emission limits for FGTURBINES. Nitrogen Oxides (NOx) and Sulfur Dioxide (SO2) emissions are limited to 126.7 tons/year and 59.21 tons/year, respectively. For the 12-month period ending in December 2019, the facility reported NOx emissions at 19.92 tons and SO2 emissions at 0.145 tons.

NOx, SO2, and CO emissions for both turbines combined are limited to 37.9 lbs/hr, 13.52 lbs/hr, and 25.14 lbs/hr, respectively. The 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. Based on the records I reviewed and the results of the September 2019 stack test, Vector Pipeline meets these emission limits.

In December 2019, Turbine 1 had hourly average CO emissions around 0.5 lbs/hour and hourly average

NOx emissions around 5.5 lbs/hour. Turbine 2 had hourly average CO emissions around 0.5 lbs/hour and hourly average NOx emissions around 3.5 lbs/hour. The CO and NOx emission rates vary during turbine operation and throughout the year depending on ambient temperature and pressure. In sum, if both turbines are operating, the hourly average CO emissions are approximately 1 lb/hour and the hourly average NOx emissions are approximately 9 lb/hour.

Sulfur emissions are determined using the total sulfur content of the fuel burned as measured by a gas chromatograph on-site. The sulfur content and total fuel burned are used to determine SO2 emissions. In the 12-month rolling period ending in December 2019, the facility-wide annual SO2 emissions were 0.1455 tons (291 lbs). Facility is in compliance with the sulfur emission limits.

Section III – SC 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. The turbines produce 100% NGP at 10,405 RPM. Vector Pipeline maintains records of the NGP speed on an hourly basis. Based on the records I reviewed during this inspection, the NGP speed is maintained above 86% during all periods of operation.

Section III – SC 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.

Section III – SC 3: Limits the sulfur content of the natural gas to 0.8% by weight. 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 significantly more stringent than the 0.8% sulfur by weight limit promulgated in this permit.

According to the gas chromatograph that continuously measures the natural gas composition, the total H2S in the gas stream was "Null" on the day of this inspection.

Section III – SC 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/shutdown).

Section IV – SC 1: This condition states that the emission limits for each individual turbine are one half the emission limits in this flexible group. The emissions from the turbines differ slightly despite the fact that they are identical units. Based on the records I reviewed in December 2019, the newer turbine, Turbine 200, has slightly lower NOx emissions on average (approximately 3.5 lb/hr versus 5.5 lb/hr).

Section V – SC 1,2,3,4,5: 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. This testing was performed on May 21-22, 2019 by Montrose Air Quality Services, LLC. The results of this stack test are summarized in the table below:

Facility appears to be in compliance with testing/sampling requirements based on the test report I reviewed.

Section VI – SC 1,2,3,4,5: Specifies recordkeeping requirements for FGTURBINES. For each turbine individually, the permittee must keep records of the hourly average %NGP, the hourly and 12-month rolling CO and NOx emission rates, the hourly and tons/year SO2 emissions, an indicator as to whether SoloNOx is "on" or "off", and a current and valid Federal Energy Regulatory Commission Gas Tariff for the facility. These records are maintained. Mr. DiPaola was able to show me all of this information

during this inspection.

Based on the records I reviewed, the %NGP while operating varies between approximately 93% and as high as 103%. The record sheets show that SoloNOx mode was always on except during periods of startup and shutdown. The NGP % where SoloNOx kicks on varies slightly depending on the ambient temperature and pressure. Vector Pipeline holds a current and valid Tariff for the facility. The tariff can be accessed online at http://www.vector-pipeline.com/Informational-Postings/Tariff.aspx. As required by these conditions, performance test results are used to calculate these reportable emissions.

The permittee is required to monitor the nitrogen and sulfur content of the natural gas by following an approved Custom Fuel Monitoring Plan (CFMP). This plan is outlined in Appendix 3. Vector Pipeline complies with the CFMP by only firing natural gas in the two turbines and maintaining a valid tariff from the Federal Energy Regulatory Commission.

Section VII – SC 1,2,3,4: Specifies 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 compressor station has been submitting these reports in a timely manner based on the reports I have seen.

Section VIII – SC 1,2: Specifies stack parameters. I did not take measurements of stack dimensions during this inspection. Stacks appeared to be discharged unobstructed vertically upwards to the ambient air.

Section IX – SC 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.

Section IX – SC 2,3: Requires the permittee to implement and maintain a Preventative Maintenance Plan (PMP) that ensures that FGTURBINES can operate in compliance with the applicable emission limits. Mr. DiPaola showed me this plan during my inspection. I reviewed the plan in my office. In the same binder as the PMP, the permittee maintains records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of FGTURBINES.

Routine maintenance on the turbines includes engine washes, filter replacements, coil cleaning, belt changing, bearing greasing, and oil analysis. All PM activities are recommended by Solar. Washing the turbine occurs four times annually. The turbine washing procedure is essentially to run soapy water through the turbine while the turbine internals are actuated by the electric starter. Turbine wash water is collected in a 2000-gallon floor drain tank that is emptied by a waste carrier service once per year. Any waste oil from filter changes or otherwise is also taken away by a waste carrier service as needed.

In the winter months, there is a risk of the soapy water freezing during this cleaning. To get around this issue, maintenance staff occasionally add isopropyl alcohol to the water. The isopropyl alcohol lowers the freezing point of the cleaning solution. The isopropyl alcohol is allowed to evaporate after the cleaning. Mr. DiPaola stated that Solar recently recommended that the turbines never be cleaned when the temperature is below freezing. It is likely that Vector Pipeline will never use isopropyl alcohol in their turbine cleaning process again.

Vector Pipeline maintains records of the date of these cleanings and the amount of isopropyl alcohol used. Less than one drum of isopropyl alcohol has been used since the facility began operation. This process appears to be exempt from Rule 201 requirements pursuant to Rule 291.

Attached to this report are copies of both the basic and comprehensive turbine inspection checklist used to conduct PM activities. The basic inspection is performed 4 times per year and the comprehensive inspection is performed 1 time per year.

FGRULE 285(2)(mm)

Section III – SC 1: Requires the station to notify the AQD of any planned or unplanned releases of natural gas above 1,000,000 cubic feet. Additionally, the facility must take measures to assure the safety of employees, the public, and minimize the impacts to the environment during these releases.

Emergency Shutdowns (ESD) are performed routinely to make sure the ESD system is functioning in the event of an actual emergency. In these emergency shutdown events, all natural gas tied up in the facility is vented to atmosphere. The ESD system automatically closes valves at the compressor station inlet and outlet to completely remove the compression station from the Vector Pipeline. The volume of natural gas vented is dependent on the volume of the piping within the facility and the pressure of the gas in the piping. Not all compressor stations regularly have releases greater than 1,000,000 cubic feet. The Highland Compressor Station is one of the compressor stations that tends to have natural gas releases in excess of 1,000,000 cubic feet.

The station reported a planned release greater than 1,000,000 cubic feet to the AQD on February 3, 2020. This release occurred on January 31, 2020 at approximately 9:30 pm CST.

All valves at this facility are designed to fail in their safest position in the event of a power interruption or other unforeseen event.

Section VII – SC 1,2,3,4: Specifies reporting requirements for FGRULE 285(2)(mm). Vector Pipeline is required to submit annual and semi-annual reports that certify compliance and report any deviations. The facility must report planned natural gas releases greater than 1,000,000 cubic feet to the AQD district supervisor. In the event of an emergency release greater than 1,000,000 cubic feet, the AQD Pollution Emergency Assistance System (PEAS) must be contacted. This compressor station has been submitting these reports in a timely manner based on the reports I have seen.

Compliance Determination

Vector Pipeline – Highland Compressor Station appears to be operating in compliance with the Federal Clean Air Act; Article II, Part 55, Air Pollution Control of Natural Resources and Environmental Protection Act, 1994 Public Act 451; Michigan Department of Environment, Great Lakes, and Energy, Air Quality Division (EGLE-AQD) rules; and ROP No. MI-ROP-N6838-2019.

NAME Adam Boger DATE 9/10/2020 SUPERVISOR Sebastian Kallumkal