

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

N762453414

FACILITY: VECTOR PIPELINE L.P. Washington Compressor Station		SRN / ID: N7624
LOCATION: 12708 30 MILE RD, WASHINGTON		DISTRICT: Warren
CITY: WASHINGTON		COUNTY: MACOMB
CONTACT: Matt DiPaola , Technical Supervisor		ACTIVITY DATE: 03/05/2020
STAFF: Adam Bognar	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Self-Initiated Inspection		
RESOLVED COMPLAINTS:		

On Thursday, March 5, 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. Washington Compressor Station (the "Facility" or "Station") located at 12708 30 Mile Road, Macomb Township, Michigan 48095. 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-N7624-2019.

I arrived at the facility at around 9 am. I met with Mr. Matt DiPaola, Pipeline Operations Coordinator, Mr. Zachary Szeplakay, Instrument and Operations Technician, Mr. Chad Desero, Instrument & Operations Technician, and Ms. Jennifer A. Calnen, Consultant. 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. Current Vector Pipeline – Washington Compressor Station contacts are:

Matt DiPaola – Operations Coordinator

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We held a meeting before the facility inspection where we reviewed relevant records and paperwork in the main office. Mr. DiPaola and his colleagues 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 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-inch 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 Washington 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 [ik1] [BA(2)] -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 1571 lbs.

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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 - Washington Compressor Station.

Source-Wide Conditions

Section I – SC 1,2: CO and NOx emissions are limited to 219.18 tons and 81.34 tons, respectively. Based on the records I reviewed during this inspection the facility is in compliance with these emission limits. CO emissions are reported at 2.75 tons for the 12-month period ending in December 2019. The highest reported 12-month rolling CO emissions in the past year was 3.27 tons during the 12-month period ending in June 2019. NOx emissions are reported at 15.99 tons for the 12-month rolling period ending in December 2019. The highest reported 12-month rolling NOx emissions in the past year was 16.04 tons in June 2019.

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 Washington Compressor Station occasionally has 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 September 27, 2019 for the required annual Department of Transportation ESD test. This release occurred on October 2, 2019 and ended up venting 1,200,000 cubic feet of natural gas.

If a valve malfunctions and fails such as in the event of a power interruption or other unforeseen event, all valves at this facility are designed to fail in their safest position. For example, if a pneumatic valve would be safer in the "closed" position, then pneumatic pressure would be applied to keep the valve open. That way if the pneumatic system fails, the valve will spring closed.

Section VII – SC 1,2,3,4,5: 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.

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. Section III – SC 1: 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 13.7 hours in 2019. Periodically, Vector Pipeline turns the engine on for 30 minutes to ensure that it is ready to function in the event of an emergency. The total engine run hours were 401.1 during this inspection.

Section III – SC 2: States that the permittee shall only fire natural gas in the emergency engine. EUSPU3 is intrinsically designed to burn natural gas right from the Vector Pipeline. No other fuel is used.

Section VI – SC 1,2: Specifies recordkeeping requirements. The permittee must keep records of the total operating hours per year and the amount of natural gas fired during each calendar day. Mr. DiPaola was able to show me these records during this inspection (see shared drive for copies).

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.

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.

Only turbine unit 200 was on during this inspection. I observed the computer terminal that controls the turbines and noted the following values: Turbine unit 100 has operated for 25,946 hours and has been started 270 times. Turbine unit 200 has operated for 2,331 hours and has been started 19 times. While running, Turbine Unit 200 was operating with SoloNOx "on", Natural Gas Producer Speed (NGP) was at 96.8%, and T5 average was 1312°F. T5 average is the average temperature at a point a few feet downstream from the turbine burners. The temperature is too high for any reasonable temperature monitor right at the burners.

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.

On this particular day, turbine 200 was increasing the pressure from 727 PSI on one side of the pipeline to 891 PSI on the other side of the pipeline.

Section I – SC 1,2,3,4: Establish emission limits for FGTURBINES. Hourly nitrogen oxide (NOx) emissions are limited to 25 ppm at 15% oxygen content. This facility meets this limit based on the results of the November 5, 2019 stack test. This test showed that the highest measured NOx emissions were 12.7 ppmv. This occurred when Turbine 2 was operating at 93% capacity.

CO emissions are limited to 18.8 lbs/hr anytime the engine is operating above 92% NGP. When the turbine is operating between 87% and 92%, the CO emission limit is 800 lbs/hr. Based on the records I reviewed and the results of the November 5, 2019 stack test, Vector Pipeline meets these emission limits.

In December 2019, Turbine 1 had hourly average CO emissions around 0.3 lbs/hour and hourly average NOx emissions around 2.9 lbs/hour. Turbine 2 had hourly average CO emissions around 0.3 lbs/hour and hourly average NOx emissions around 4.4 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 0.6 lb/hour and the hourly average NOx emissions are approximately 7.3 lb/hour.

Sulfur dioxide emissions are determined using the total sulfur content of the fuel burned as measured by a gas chromatograph on-site. Sulfur content of the fuel gas and total fuel flow are used in the calculation of sulfur dioxide emissions. In the 12-month rolling period ending in December 2019, the facility-wide annual sulfur dioxide emissions were 0.69 tons (1,380 lbs). Sulfur content of the burned fuel is limited to 0.06 lb/MMBTU. I observed live gas chromatograph data during this inspection. The GC showed a total sulfur content of 0.375 PPM or 0.022 grains/SCF. According to the vector pipeline website, the heat content of the pipeline natural gas is approximately 1060 BTU/SCF. Based on this heating value, sulfur content of the fuel is approximately 0.003 lb/MMBTU.

Section III – SC 1: 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 2: States that the permittee shall not operate the turbines at loads less than 87% 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, the NGP speed is maintained above 87% during all periods of operation.

Section III – SC 3: 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 87% in the ROP. Based on the records I reviewed the turbines are always operated above 87% (except during startup/shutdown).

Section III – SC 4: Requires the facility to operate the turbines in a manner consistent with good air pollution control practices for minimizing emissions. Based on this inspection and the records I reviewed, the facility operates the turbines in this manner.

Section IV – SC 1: States that the permittee shall equip and maintain FGTURBINES with dry low-NOx combustors. Both turbines are equipped with "SoloNOx" dry low NOx burners. SoloNOx burners reduce the conversion of atmospheric nitrogen to NOx by reducing the combustors flame temperature. NOx formation rates are heavily dependent on flame temperature. Lean combustion is further enhanced by premixing the fuel and combustor airflows upstream of the combustion zone.

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 CO testing must be performed every 5 years at a minimum. NOx and oxygen concentration must be verified annually (at least every 14 calendar months). This testing was performed on November 5, 2019 by Montrose Air Quality Services, LLC.

Section VI - SC 1,2,3: Specifies recordkeeping requirements for FGTURBINES. The permittee must continuously monitor whether the turbines are operating with SoloNOx on or off. I observed that turbine 200 was operating with SoloNOx mode "on" during this inspection. Facility maintains continuous hourly records for each turbine indicating whether SoloNOx mode was on.

The permittee must monitor the total sulfur content of the fuel fired in FGTURBINES. Total sulfur is measured on a continuous basis by a gas chromatograph (GC). The GC reading during this inspection showed that the natural gas had a total sulfur content of 0.375 PPM or 0.022 grains/SCF.

The permittee must maintain records of the hourly Natural Gas Producer Speed (%NGP) for each turbine, hourly CO and NOx emissions, an indicator that SoloNOx was on or off, the monthly and 12-month rolling CO and NOx emissions, a current and valid Federal Energy Regulatory Commission Gas Tariff for the facility, the number of startups and shutdowns, the amount of natural gas combusted, and the operating hours for each turbine. The required records are kept. Mr. DiPaola was able to show me all of these records during my inspection. The tariff can be accessed online at <http://www.vector-HYPERLINK> "<http://www.vector-pipeline.com/Informational-Postings/Tariff.aspx>".

Section VII - SC 1,2,3,4,5: 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 KKKK. 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. This process appears to be exempt from Rule 201 requirements pursuant to Rule 291.

Compliance Determination

Vector Pipeline – Washington 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-N7624-2019.

NAME

Adam Bagon

DATE

9/10/2020

SUPERVISOR

Sebastian Kallumkal