

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

N762469144

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: 07/18/2023
STAFF: Noshin Khan	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: scheduled, on-site inspection		
RESOLVED COMPLAINTS:		

On Tuesday, July 18, 2023, I, Noshin Khan, Michigan Department of Environment, Great Lakes, and Energy-Air Quality Division (EGLE-AQD) staff, performed a scheduled, on-site inspection of Vector Pipeline L.P. Washington Compressor Station located at 12708 30 Mile Road Macomb Township, Michigan 48095 (SRN: N7624). The purpose of the inspection was to determine the facility's compliance status with the requirements of the federal Clean Air Act; Article II, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 Public Act 451, as amended (Act 451); the AQD administrative rules, and the conditions of Renewable Operating Permit (ROP) Number MI-ROP-N7624-2019. I also observed emissions testing on the facility's turbines EUTURBINE1 and EUTURBINE2 to verify compliance with the ROP and 40 CFR 60 Subpart KKKK.

I arrived at the facility around 9AM and met with Matt DiPaola, Area Supervisor, and Alex Smith, Senior Environmental Advisor. We discussed the facility's operations, the conditions of the ROP, and recordkeeping requirements.

The Washington Compressor station is a natural gas transmission facility located on the Vector Pipeline. This pipeline is 348 miles long and runs from Joliet, Illinois to Dawn, Ontario. Matt explained that Vector is a joint venture between Enbridge, which has 60% ownership, and DT Midstream, which has 40% ownership. The other compressor stations on the pipeline are Joliet in Illinois, Springville in Indiana, and Athens and Highland in Michigan. Each compressor station operates turbines, equipped with low NOx controls (SoloNOx), that each drive a compressor. The compressors drive movement of natural gas through the pipeline. This station can direct gas either towards Canada or towards Illinois, and to customers including the St. Joseph Energy Center and the Blue Water Energy Center. The facility is generally unmanned because the compressors are remotely controlled by the Vector Pipeline headquarters in Houston, Texas. Matt informed me that 3 techs are assigned to Washington Compressor in addition to 8 administrative employees. 12 techs cover the whole pipeline.

In addition to mechanical controls in place to initiate a shutdown, the facility is equipped with an Emergency Shutdown (ESD) system. The facility has fire and gas detection systems which will trigger an alarm, and the ESD system automatically closes inlet and outlet valves before directing gas to the release tower. Matt explained that all valves are designed to fail in their safest position.

After discussing operations, I was taken on a walkthrough of the facility. I discuss my observations as related to the conditions of the permit below. I did not observe any parts washers or boilers on site.

Source-Wide Conditions

Special Condition (S.C.) I.1 sets a CO emission limit of 219.18 tons per 12-month rolling time period as determined each month. S.C. I.2 sets a NOx emission limit of 81.34 tons per 12-month rolling time period as determined each month. Alex provided source-wide 12-month rolling emissions records for July 2022 through June 2023. The facility uses most-recent stack test data for emissions calculations. The highest 12-month rolling CO emissions were 3.70 tons as calculated in July 2022, and the highest 12-month rolling NOx emissions were 12.42 tons as calculated in August 2022. These values are below the permitted limits.

Per S.C. III.1 and Rule 285(2)(mm), the facility is required to provide prior notification for natural gas release events greater than 1,000,000 scf for the purposes of routine maintenance, relocation of transmission and distribution systems. I asked Matt and Alex if there had been any of these events since the last inspection in September 2022. They informed me that one notification was sent on September 8,

2022 to AQD staff Iranna Konanahalli for a possible release of greater than 1 MMSCF for planned, federally required ESD testing on September 12. According to Alex this event did not ultimately exceed 1 MMSCF. Alex said that another release event had occurred on May 9, 2023, for a main line valve repair expected to last through May 11. The notification was sent to former AQD staff Kaitlyn Leffert and was consequently not logged. Alex provided a copy of the email notification sent to Kaitlyn. Alex also contacted me on August 23, 2023, to provide notification for a natural gas release event for maintenance, and provided follow up that a total of 1.2 MMSCF was vented. The facility is meeting the reporting requirements of this condition.

EUSPU3

This unit is a natural gas fired internal combustion engine which provides backup power in the event of a local utility power interruption. I observed this unit during the inspection and the display indicated 476.3 total run hours. On the nameplate I observed a rating of 660 kW and 880 HP, which is consistent with the maximum rating of 924 HP in the description in the ROP.

Per S.C. III.1, EUSPU3 shall not operate for more than 500 hours per calendar year. Per S.C. III.2, only natural gas shall be burned in the unit.

During the inspection, staff showed me logs for daily, monthly, and annual operating hours for the generator as required by S.C. VI.1. The log indicated that from January 2023 through June 2023, the generator was used for 2.5 hours. In 2022, the generator was used for 8 emergency hours and 16.5 non-emergency hours. The unit is operated monthly for testing to ensure proper operation in case of an emergency. According to staff, the unit is designed to only burn natural gas from the Vector Pipeline.

In accordance with S.C. VI.2, Alex provided daily records of natural gas usage in EUSPU3 for October 2022 through June 2023.

FGTURBINES

The conditions of this flexible group apply to EUTURBINE1 and EUTURBINE2, which are two Solar Mars 110S natural gas fired turbines rated at 15,000 HP according to the ROP description. The turbines are equipped with low-NOx combustors per S.C. IV.1. During the inspection, I observed the control monitors which indicated the following total turbine operation hours and number of start-ups:

Turbine 1: 8869 hours, started 103 times
Turbine 2: 10123 hours, started 148 times

For the majority of my inspection, Turbine 1 was operating at 103% of Natural Gas Producer Speed (NGP) for the first three runs of the stack test. On the monitor I also observed that the inlet temperature for the turbine was around 71°F, the T5 temperature was about 1357°F, and that SoloNOx was active. The T5 temperature is measured a few feet downstream from the combustion zone and staff explained that the temperature in the combustion zone is too high for temperature monitors. When Turbine 1 testing at the lower NGP began, I observed a 93% NGP, 73°F inlet temperature, 1322°F T5 reading, and active SoloNOx. Turbine 2 was not operating during my visit but was tested after my departure.

According to Matt, the compressors typically operate at 93% NGP. An automatic alarm detects and sounds if NGP reaches 92.9% or below, and another automatic alarm sounds SoloNOx is not active. These alarms would notify the control room in the Houston headquarters. The facility also has operator checks to ensure no SoloNOx downtime. Matt informed me that it is a part of their procedures to report any operation without SoloNOx, and this has not occurred since at least the last inspection.

According to the monitors, the station was increasing pressure from 684 PSI from one side of the pipeline to 807 PSI on the other side of the pipeline.

Per Section I, the turbines are subject to the emission limits below. For CO limits, individual turbine limits are one-half of the listed values:

NOx: 25 ppm at 15% O2
SO2: 0.06 lb/MMBtu

CO: 18.8 lb/hr any time the turbines are operating at or above 92% of NGP; 800 lb/hr for operation in the range of 87% to 92% of NGP

Alex provided a copy of the 2021 stack test results, summarized below:

	EUTURBINE1		EUTURBINE2	
Rate, % NGP	103	93	103	93
NOx lb/hr	4.2	3.3	4.4	5.0
NOx ppm dry @ 15% O ₂	9.7	9.7	9.8	15.1
NOx Limit, ppm dry @ 15% O₂	25	25	25	25
CO Emission Rate lb/hr	0.57	0.33	0.24	0.28
CO Emission Rate Limit, lb/hr	9.4	9.4	9.4	9.4

These results indicate compliance with the NOx and CO emission limits. Since the NOx emission results were less than 75% of the limit, testing was due after two years (in 2023) rather than after one year, per S.C. V.3. Testing for CO emission rates is required at least once every 5 years. The facility is in compliance with testing timelines under Section V.

A copy of Vector Pipeline's current FERC gas tariff is available online, per S.C. VI.3.e. Alex provided a copy of the quality of gas section which notes a maximum sulfur content of 20 grains of sulphur per 100 cubic feet of gas and a minimum heating value of 952 Btus per cubic foot. This results in a sulfur content of about 0.03 lb/MMBtu, in compliance with S.C. I.2.

S.C. III.1 requires that the permittee shall only fire natural gas in the turbines. Both turbines are designed to only burn natural gas from the Vector Pipeline.

S.C. III.2 requires that except for periods of startup and shutdown, the permittee shall not operate the turbines at less than 87% of NGP. Based on the alarm system explained by Matt and the records I reviewed on-site for continuous SoloNOx and NGP monitoring (in accordance with S.C. VI.1 and VI.3), the NGP is maintained above 87% for all periods of operation. The records include hourly data for NGP, SoloNOx status, and CO and NOx emissions as required by S.C. VI.3. I also reviewed records on-site which include daily turbine operating hours, the number of start-ups, and fuel usage for each turbine, as required.

In accordance with S.C. VI.2, the facility maintains a gas chromatograph on site to continuously measure sulfur content. I observed the gas chromatograph, located by Turbine 1, during the site walkthrough.

Alex provided a copy of the Preventative Maintenance Plan (PMP) that the facility is required to implement and maintain per S.C. IX.3. It includes a description of applicable equipment, emission limits, contact information, an inspection and maintenance schedule, corrective action measures, and operating conditions to be monitored. I did not evaluate if this PMP is implemented, but did observe a record on-site for upcoming maintenance activities. I asked Matt about cleaning procedures on the turbines and he informed me that the turbines are washed with soapy water. Previous inspection reports indicate that isopropyl alcohol was used during the winter since water risks freezing during colder months. Matt informed me that isopropyl alcohol is no longer used and that the facility makes sure to wash turbines before winter.

Reporting

As required, the facility has been submitting semi-annual and annual reporting to verify compliance with ROP conditions and report deviations.

Stack Test

When I arrived on site, testing had not yet begun. Staff explained that Turbine 1 would be tested first for 3 runs at maximum NGP followed by 3 runs at minimum NGP. Turbine 2 would then be tested at minimum NGP followed by maximum NGP.

Run 1 began at about 10:10AM. On the control monitor, I observed that Turbine 1 was operating at 103% NGP, inlet temperature for the turbine was around 71°F, T5 temperature was about 1357°F, and SoloNOx was active.

The preliminary calculations for the average emissions of the first 3 runs showed a NOx emission rate of 6.4 ppm at 15% O2 and a CO emission rate of 2.4 lb/hr.

At about 12:10PM, testing at 93% NGP for Turbine 1 began. On the control monitors I observed an inlet temperature of 73°F, a T5 temperature of 1322°F, and active SoloNOx. The first run indicated an O2 level of 15.9%, a NOx emission rate of 12.0 ppm at 15% O2, and a CO emission rate of 0.3 lb/hr.

The AQD received the final test report on August 30, 2023, with the results summarized below.

EPA Method 3A, 7E, 10, and 19	EUTURBINE1		EUTURBINE2	
Rate, % NGP	103	93	103	93
Oxygen dry, %	15.6	16.0	15.7	16.4
NOx ppm dry	5.9	10.0	6.5	10.0
NOx lb/hr	2.7	3.7	3.1	4.0
NOx ppm dry @ 15% O2	6.5	12.1	7.4	13.0
NOx Limit, ppm dry @ 15% O2	25	25	25	25
CO ppm dry	8.0	1.1	0.3	0.4
CO Emission Rate lb/hr	2.2	0.3	0.1	0.1
CO Emission Rate Limit, lb/hr	9.4	9.4	9.4	9.4

Based on my observations during the inspection and records reviewed, the facility is in compliance with the evaluated rules and regulations.

NAME Nashir Khan

DATE 10/02/2023

SUPERVISOR K. Kelly