

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

N376065866

FACILITY: GREAT LAKES GAS TRANSMISSION STATION #8		SRN / ID: N3760
LOCATION: 151 OSS RD, CRYSTAL FALLS		DISTRICT: Marquette
CITY: CRYSTAL FALLS		COUNTY: IRON
CONTACT: Benjamin Samuelkuty , Environmental Analyst		ACTIVITY DATE: 12/13/2022
STAFF: Joe Scanlan	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Targeted inspection to determine compliance with MI-ROP-N3760-2021		
RESOLVED COMPLAINTS:		

REGULATORY AUTHORITY

Under the Authority of Section 5526 of Part 55 of NREPA, The Department of Environment, Great Lakes, and Energy (EGLE) may upon the presentation of their card, and stating the authority and purpose of the investigation, enter and inspect any property at reasonable times for the purpose of investigating either an actual or suspected source of air pollution or ascertaining compliance or noncompliance with NREPA, Rules promulgated thereunder, and the federal Clean Air Act.

FACILITY DESCRIPTION

Great Lakes Gas Transmission (GLGT), headquartered in Houston, Texas, is a natural gas pipeline company that transports natural gas from western Canada into Minnesota, Michigan, Wisconsin, and eastern Canada. The pipeline system is 2,115 miles long and has an average design capacity of approximately 2,400 million cubic feet per day. The company has been in business since 1967 and is currently owned by TC Energy, a North American energy company based out of Calgary, Alberta, Canada.

Compressor stations, or booster stations, are part of the natural gas utility process that transport natural gas from well sites, to processing facilities, to end users. They are strategically utilized to maintain pressure and flow throughout the pipeline network. GLGT operates fourteen compressor stations, with five in the Upper Peninsula of Michigan. The Crystal Falls Station 8 is one of five in the Upper Peninsula and is used to maintain pressure throughout GLGT's pipeline to end users. This facility is located ¼ mile north of US Highway 2, 6.5 miles west of the city of Crystal Falls in Iron County. This area that is in attainment for criteria pollutants. The source operates three natural-gas-fired turbine/compressor units. These systems are composed of a simple cycle gas turbine connected to a compressor by a shaft. The turbine provides the mechanical power via rotation of the shaft to power the compressor. Natural gas is fed through the compressor and exits at a higher pressure.

The facility also utilizes a natural gas-fired emergency engine.

EMISSION UNIT IDs/DESCRIPTIONS

The tables below summarize the emission units at this source:

EMISSION UNIT ID	PERMITTED EMISSION UNIT DESCRIPTION	INSTALL DATE

EUUNIT801	EUUNIT801 - Rolls Royce Model Avon 101G stationary natural gas-fired turbine. Unit 801 has a peak load rating of 18,000 horsepower.	6/01/1971
EUUNIT802	EUUNIT802 - General Electric Model LM1600 stationary natural gas-fired turbine. Unit 802 has a peak load rating of 23,000 horsepower. Unit 802 is subject to 40 CFR 60 Subpart GG.	1/01/1994
EUUNIT803	EUUNIT803 - General Electric Model MS3000 stationary natural gas-fired turbine. Unit 803 has a peak load rating of 14,600 horsepower.	1/01/1975
EUAPU	Natural gas-fired generator, 7.7 MMBtu/hr	1/01/1996

Exempt Emission Units

PTI EXEMPT EMISSION UNIT ID	PTI EXEMPT EMISSION UNIT DESCRIPTION
EUBOILER	Natural gas-fired York Shipley SPWV-150-N096138 Boiler (5.02 MMBTU/hr)
EUSPACEHEATER	Nine (9) natural gas-fired space heaters
EUWATERHEATER	Two (2) natural gas-fired water heaters
EUBRUESTHEATER	Two (2) natural gas-fired Bruest heaters
EULUBETK1	3,000 gallon lube oil storage tank
EULUBETK2	1,800 gallon lube oil storage tank
EUAMBITROLTK	1,000 gallon ambitrol storage tank
EUDIESELTK	300 gallon condensate storage tank
EUCONDENSATETK1	1,000 gallon condensate storage tank

PTI EXEMPT EMISSION UNIT ID	PTI EXEMPT EMISSION UNIT DESCRIPTION
EUPIPEMAINT	Routine and emergency venting of natural gas from transmission and distribution systems.
EUFIELDMAINT	Routine and emergency venting of field gas from gathering lines.

REGULATORY ANALYSIS

GLGT Station #8 is currently subject to the Title V program and holds MI-ROP-N3760-2021 because the potential to emit (PTE) for nitrogen oxides and carbon monoxide exceeds 100 tpy. The facility is considered an area source for hazardous air pollutants (HAP) because the potential to emit of any single HAP is less than 10 tpy and aggregate HAP emissions are less than 25 tpy. EUUNIT802 is subject to 40 CFR Part 60 Subpart GG-NSPS for Stationary Gas Turbines because it was constructed after October 3, 1977 and has a heat input at peak load of greater than 10 MMBtu/hr. EUUNIT801 and EUUNIT803 are not subject to NSPS Subpart GG because the turbines were constructed prior to October 3, 1977. EU-Unit801, EUUNIT802, and EUUNIT803 are not subject to the NESHAP Subpart YYYY for Stationary Combustion Turbines because the turbines are located at an area source for HAP emissions. EUAPU is subject to 40 CFR Part 63 Subpart ZZZZ-NESHAP for Stationary Reciprocating Internal Combustion Engines because the emission unit is a stationary RICE at an area source of HAP emissions. EUAPU is not subject to the NSPS Subpart JJJJ for Stationary Spark Ignition Internal Combustion Engines because the engine was constructed prior to June 12, 2006.

EMMISIONS

The primary pollutants emitted from the combustion process of gas turbines include nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs), particulate matter (PM), and sulfur oxides (SO_x). The formation of nitrogen oxides is related to the combustion temperature in the cylinder. NO_x is formed and emitted primarily through one of three mechanisms: thermal, fuel, and prompt. Thermal NO_x formation occurs in the high temperature zone by the reaction of nitrogen (N₂) and oxygen (O₂) molecules in the combustion air. This is the predominant NO_x formation mechanism for natural gas-fired turbines. Fuel NO_x formation occurs through the reaction of nitrogen molecules in the fuel and the oxygen molecules in the combustion air. This form of NO_x formation is low when burning natural gas since there is a low nitrogen content in the fuel. Prompt NO_x is formed through the reaction of nitrogen molecules in the combustion air and hydrocarbon radicals from the fuel. Higher temperatures of burning and longer residence time results in higher NO_x emissions. CO, VOC, and HAP emissions are directly related to combustion efficiency. Higher combustion temperatures, longer residence times, and well mixing of fuel and combustion air results in greater combustion efficiency and lower

emissions of CO, VOCs, and HAPs. Sulfur oxides emissions are directly related to the sulfur content of the fuel. PM emissions can include trace amounts of metals and condensable, semi-volatile organics which result from incomplete combustion. Emissions from gas turbines vary at different inlet temperature, pressure, and humidity.

Due to operating parameter variabilities resulting in fluctuations of NOx emissions, GLGT has developed a parametric monitoring plan (PMP) that ensures continuous compliance with the emission limits for EUUNIT802. The facility's most current PMP for establishing a fuel consumption rate range is based on performance testing conducted December 2, 2021.

EMISSIONS REPORTING

The table below shows the facility's Michigan Air Emissions Reporting System (MAERS) 2021 submittal.

Pollutant	Amount
CO	41.3 tons
NOx	219.7 tons
PM10	3.9 tons
PM2.5	3.9 tons
SO2	0.35 tons
VOC	1.26 tons

COMPLIANCE HISTORY

The facility has not received any violation notices in the past five years. An off-site inspection of the facility was conducted 12/21/2020 and the facility was found to be in compliance with all applicable air quality rules and regulations at that time.

INSPECTION

On December 13, 2022, AQD Staff (Joseph Scanlan) conducted a targeted inspection on the GLGT Station #8 near Crystal Falls, MI. AQD Staff arrived at the facility and met with TC Energy Environmental Analyst Benjamin Samuelkutty. It was explained that the purpose of the inspection was to ensure compliance with the facility's ROP (MI-ROP-N3760-2021) and all other applicable air pollution control rules and federal regulations. The inspection began by discussing

permitted equipment, the facility, and records. A tour of the facility was then provided. No changes have been made to the facility or equipment since the previous inspection.

EUUNIT801 and EUUNIT803

EUUNIT801 is a Rolls Royce Avon Model 101G with a peak load power rating of 18,000 HP at ISO conditions (59 degrees Fahrenheit at sea level). EUUNIT803 is a General Electric Model MS3000 with a peak load power rating of 14,600 HP at ISO conditions. The units were not operating at the time of inspection.

Process/Operation Restrictions

SC III.1 These emission units burn only pipeline quality natural gas.

Monitoring/Recordkeeping

SC VI.1 Records were provided for the monthly run hours and fuel usage for the period 12/13/2021 through 12/13/2022. EUUNIT801 operated a total of 4,188 hours and burned 573,681 MCF of natural gas. EUUNIT803 operated a total of 2,197 hours and burned 182,108 MCF of natural gas. No changes have occurred on these emission units.

Reporting

The company is prompt in submitting semiannual and annual certification reports and performance test reports. No deviations related to emission exceeding limits have been reported per General Conditions 21 of the ROP.

EUUNIT802

EUUNIT802 is a General Electric LM1600 with a peak load power rating of 23,000 HP at ISO conditions. This emission unit was permitted under PTI #286-93 and is subject to NSPS Subpart GG. The company has developed a Parametric Monitoring Plan (PMP) to comply with SC III.2. The unit was operating at the time of inspection; therefore we did not enter the engine house. No visible emissions were observed from the stack of the unit.

Emission Limits

Pollutant	Limit	Time Period/Operating Scenario
1. CO	123.8 ppmv at 15% oxygen on a dry gas basis ²	Hourly at minimum load*
2. CO	33.3 pph ²	Hourly at minimum load*
3. CO	31.9 ppmv at 15% oxygen on a dry gas basis ²	Hourly at 100% load
4. CO	14.8 pph ²	Hourly at 100% load

Pollutant	Limit	Time Period/Operating Scenario
5. NO _x	175.2 ppmv at 15% oxygen on a dry gas basis ^{2, a}	Hourly at 100% load
6. NO _x	89 pph ²	Hourly at 100% load

SC I.1, I.2, I.3, & I.4 CO emission limits are verified by performance testing conducted every 5 years.

SC I.5 & I.6 NO_x emission limits are verified by performance testing conducted every 5 years and also monitoring fuel consumption per the PMP.

Material Limits

SC II.1 Facility does not burn any fuel in EUUNIT802 that contains total sulfur in excess of 0.8% by weight (8000 ppmw). The unit burns only pipeline quality natural gas.

Process/Operation Restrictions

SC III.1 EUUNIT802 is required to burn only pipeline quality natural gas. The unit burns only pipeline quality natural gas.

SC III.2 requires the permittee to maintain and implement a parameter monitoring plan (PMP) identifying the percent load/fuel consumption ranges established by testing to ensure compliance with the respective limits (SC V.2). The PMP condition was introduced in the 2021 ROP renewal. The condition provides parametric monitoring by establishing acceptable ranges of operating parameters in the PMP that are indicative of emissions. The permittee submitted an acceptable PMP following the issuance of MI-ROP-N3760-2021 and provided an updated PMP January 2, 2023, based on the most recent performance test conducted on December 2, 2021. Based on the PMP, EUUNIT802 shall not exceed a fuel flow of 160 Mscf/hr. From November 2021 to November 2022, the fuel flow for EUUNIT802 did not exceed 142.24 Mscf/hr (Feb 5, 2022). This is well below the limit established by the PMP.

Testing /Sampling

SC V.1, V.2, V.3, & V.4 NO_x & CO performance tests were conducted 12/2/2021 at four evenly-spaced load points in the normal operating range of EUUNIT802. Fuel consumption was monitored and recorded during testing in order to establish the acceptable operating range published in the PMP. Test results were acceptable to the AQD.

Monitoring/Recordkeeping

SC VI.1 The facility monitors and records fuel consumption rate on an hourly basis for EUUNIT802. Hourly consumption is totaled for a daily average fuel consumption in Mscf/hr.

Monthly and daily records have been provided from November 2021 through November 2022 and are attached to this report.

SC VI.2 The facility monitors and records the hours of operation and average shaft horsepower for EUUNIT802. Monthly and daily records have been provided from November 2021 through November 2022 and are attached to this report.

SC VI.3 The facility has provided documentation of a gas tariff file with the Federal Energy Regulatory Commission (FERC) to demonstrate the gas quality characteristics do not exceed a total sulfur content of 20 grains/100 scf.

Reporting

The company is prompt in submitting semiannual and annual certification reports and performance test reports. No deviations related to emission exceeding limits have been reported per General Conditions 21 of the ROP.

FGMACTZZZZ (EUAPU)

EUAPU is a Caterpillar SP-4 emergency engine with a rated power output of 962 HP. The engine is subject to the RICE MACT. AQD staff was provided records to show compliance with the RICE MACT.

Process/Operation Restrictions

SC III.1 & III.3 A maintenance log was provided showing engine parameters (belts/hoses/spark plugs/air filter) were last inspected 1/07/2022.

SC III.2 This unit utilizes the oil analysis program to extend the specified oil change requirement in the RICE MACT. For calendar year 2022, an oil sample was taken on 01/07/22. The sample was submitted to Fluid Life for an oil analysis. The report states that all tests were within the RICE MACT specifications.

SC III.5 & III.6 GLGT is required to keep records of operation of EUAPU per calendar year. EUAPU is allowed to operate up to 100 hours per calendar year for maintenance and readiness testing, and 50 of those hours can be used for non-emergency situations. Hours of operation are tracked through a non-resettable hour meter on the unit. For 2021 the engine operated a total of 14.1 hours for emergency purposes and 4.8 hours for maintenance purposes. For 2022 the engine operated a total of 4.2 hours for maintenance purposes only.

Design/Equipment Parameters

SC IV.1 EUAPU is equipped with a non-resettable hour meter to track operating hours.

Testing/Sampling

SC V.1 For calendar year 2022, an oil sample was collected on 01/07/22. The sample was submitted to Fluid Life for an oil analysis. The report states that all tests were within the RICE MACT specifications.

Monitoring/Recordkeeping

SC VI.1, VI.2, VI.3, VI.4, VI.5, & VI.6 The company maintains adequate records to demonstrate compliance with the RICE MACT.

CONCLUSION

GLGT has been prompt and complete in submitting semi-annual and annual report certifications. Based on this inspection and records reviewed, Great Lakes Gas Transmission Station 8 appears to be in compliance with MI-ROP-N3760-2021 and all other applicable air pollution control rules and federal regulations.

NAME 

DATE 1-18-2023

SUPERVISOR 