

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

N216863172

FACILITY: GREAT LAKES GAS TRANSMISSION STATION #7	SRN / ID: N2168
LOCATION: 400 GREAT LAKES RD, WAKEFIELD	DISTRICT: Marquette
CITY: WAKEFIELD	COUNTY: GOGEBIC
CONTACT: Benjamin Samuelkutty , Environmental Analyst	ACTIVITY DATE: 05/26/2022
STAFF: Lauren Luce	COMPLIANCE STATUS: Compliance
SUBJECT: Targeted Inspection FY22	SOURCE CLASS: MAJOR
RESOLVED COMPLAINTS:	

Facility: Great Lakes Gas Transmission Station #7 (SRN: N2168)

Location: 400 Great Lakes Road, Wakefield, Gogebic County, MI

Contacts: Benjamin Samuelkutty, Environmental Specialist

Taylor McDonald, Technician

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 the TransCanada Corporation, 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 Wakefield Station #7 is one of five in the Upper Peninsula and is used to maintain pressure throughout GLGT's pipeline to end users. Station #7 is situated between the Iron River, WI station and the Crystal Falls, MI station of the pipeline. The station has a capacity of 2.2 BCF of natural gas and 974 PSI of pressure. This facility is located 3 miles southeast of Wakefield in Gogebic County, an area that is in attainment for all criteria pollutants. The source operates two natural-gas-fired turbine/compressor units. These systems are composed of a simple cycle gas turbine connected to a compressor by a shaft.

Gas turbines consist mainly of three components: compressor, combustor, and power turbine. In a simple cycle turbine, ambient air is drawn in and compressed. The hot high-pressure air is then

ignited with fuel in the combustors and routed to the power turbine with additional compressed air from the compressor section. The hot exhaust gases expand through the power section providing rotational force to the power shaft connected to the compressor. Natural gas is fed through the compressor and exits at a higher pressure.

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

Emission Unit ID	Description
EUUNIT701	General Electric model LM2500 stationary gas turbine with a peak power rating of 31,000 HP at ISO conditions (59 degrees F at sea level).
EUUNIT702	Rolls Royce Avon model 76G stationary gas turbine with a peak power rating of 16,000 HP at ISO conditions (59 degrees F at sea level).
EUAPU	Waukesha Model F1197G natural gas-fired four stroke rich burn emergency genset with an engine power output of 250 HP.
EUPIPEMAINT	Routine and emergency venting of natural gas from transmission and distribution systems.
EUFIELDMAINT	Routing and emergency venting of natural gas from gathering lines.

Emissions

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.

Emissions Reporting

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

Pollutant	Pounds per Year (PPY)	Tons per Year (TPY)
CO	108477.57	54.2
NOx	412593.05	206.3
PM10	5943.01	2.97
PM2.5	5943.01	2.97
SO2	529.46	<1
VOC	1892.17	<1

Regulatory Analysis

GLGT Station #7 is currently subject to the Title V program and holds MI-ROP-N2168-2021 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. EUUNIT702 is not subject to 40 CFR Part 60 Subpart GG-NSPS for Stationary Gas Turbines because the turbine was constructed in 1969, prior to the date of October 3, 1977 for subject units. EUUNIT701 and EUUNIT702 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. EU-APU 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.

Compliance History

The facility has not received any violation notices in the past five years. The facility was last inspected in December 2019 and was found to be in compliance with all applicable air quality rules and regulations at that time.

Inspection

On May 26, 2022, AQD Staff (Lauren Luce) conducted a targeted inspection on the GLGT Station #7 in Wakefield, MI. AQD Staff arrived at the facility and met with Technician, Taylor McDonald and Environmental Scientist, Benjamin Samuelkuty. It was explained that the purpose of the inspection was to ensure compliance with the facility’s ROP (MI-ROP-N2168-2021) 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.

EUUNIT701

This emission unit is a General Electric LM2500 stationary gas turbine. The unit is housed in its own warehouse building with a vertical stack through the roof that appeared to be at least 39 feet in height. At the time of the inspection, the unit was operating. As stated in SC.III.1, this emission unit is required to burn only pipeline quality natural gas. During the inspection of this unit, it was observed that the only source of fuel was piped gas from the main pipeline. The nameplate of the current unit stated a 1984 General Electric LM2500 with a peak power rating of 33,700 HP at ISO conditions (59 degrees F at sea level).

A monthly and yearly summary report from May 2021-May 2022 was provided showing total run hours, total fuel, and total BHP hours for EUUNIT701 (SC VI.1, 2). This unit operated an average of 378.68 hours per month from April 2021-April 2022. Maximum hourly fuel rate did not exceed 212.5 Mscfh as specified within the parameter monitoring plan (SC.III.2).

This emission unit contains emission limits for NOx. NOx emissions shall not exceed 184 parts per million by volume corrected to 15% oxygen on a dry gas basis and shall not exceed 123 pounds per hour. These emission limits are enforced through emissions testing that is to occur at least once during the 5-year term of the permit. Testing for this unit was conducted on December 18, 2018. A summary of the test results are shown in the table below.

Parameter	High Load	Mid-High Load	Mid-Low Load	Low Load
NOx ppmvd @ 15% O2	139.60	114.07	104.25	89.57
NOx lb/hr	98.56	66.64	54.17	37.83

EUUNIT702

This emission unit is a Rolls Royce Model Avon 76G stationary gas turbine. The unit is housed in its own warehouse building with a vertical stack through the roof. At the time of the inspection, the unit was operating. As stated in SC.III.1, this emission unit is required to burn only pipeline quality natural gas. During the inspection of this unit, it was observed the only source of fuel was piped gas from the main pipeline. The nameplate of the current unit stated: Rolls-Royce Avon Mark: 1533-76G/13. This unit has a peak power rating of 16,000 HP at ISO conditions (59 degrees F at sea level). A monthly and yearly summary report from May 2021-May 2022 was provided showing total run hours, total fuel, and total BHP hours for EUUNIT702 (SC.VI.1).

EUAPU

This emission unit is a 1969 natural gas-fired Waukesha F1197G emergency generator (see image 1). GLGT is required to keep records of operation of EU-APU per calendar year. EU-APU can 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. During the inspection, the hour meter read 594 hours (SC IV.1) For the calendar year 2021, the engine was operated a total of 25.1 hours for maintenance, readiness testing, and emergencies (SC III.5, 6 & SC VI.4)

A RICE MACT maintenance record sheet was submitted that notes maintenance activity and completion date. Maintenance activities include inspecting spark plugs, air cleaner, belts, and hoses. The sheet also notes when an oil sample was taken and submitted for analysis or if the oil was changed. This unit utilizes the oil analysis program to extend the specified oil change requirement in the RICE MACT. For calendar years 2020-2022, oil samples were taken on 01/02/2020, 01/11/2021, and 01/19/2022. All samples were submitted to Fluid Life for an oil analysis. The report states that all tests were within the RICE MACT specifications (SC V.1)

Compliance

Based on this inspection and records reviewed, Great Lakes Gas Transmission Station #7 appears to be in compliance with MI-ROP-N2168-2021 and all other applicable air pollution control rules and federal regulations.

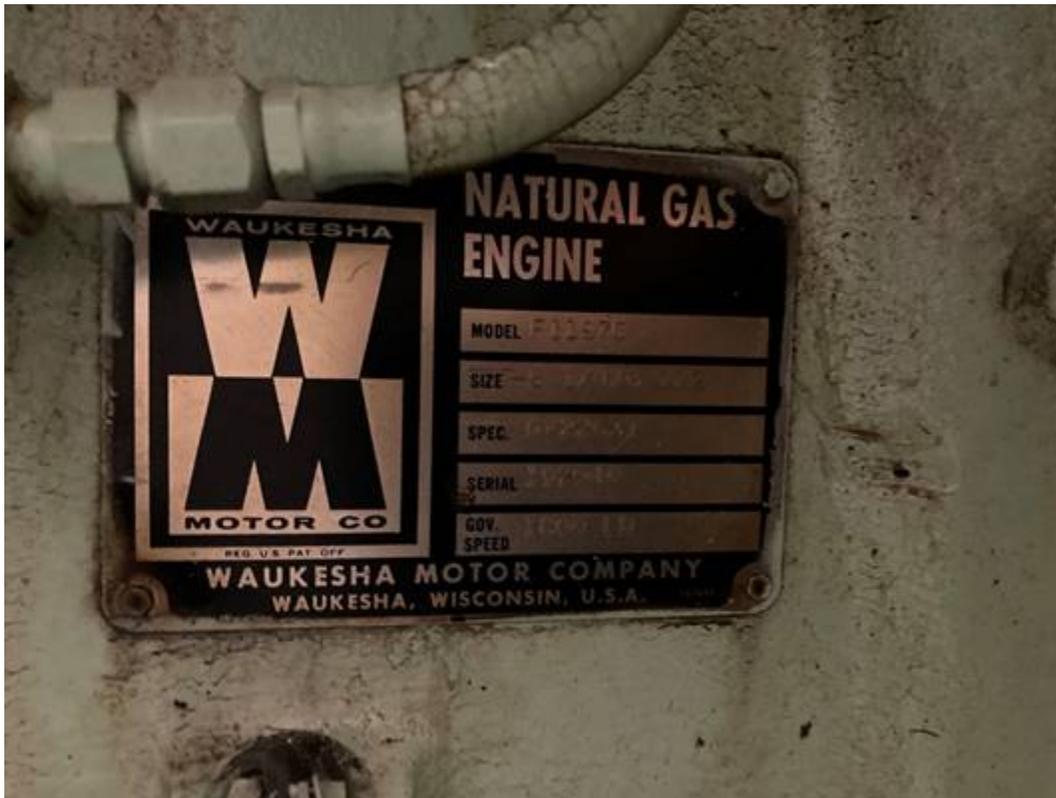


Image (1): EUAPU NAME PLATE.

NAME *Sam Sam*

DATE 6/10/2022

SUPERVISOR *Marshall O'Brien*