

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

N216870029

<b>FACILITY:</b> GREAT LAKES GAS TRANSMISSION STATION #7		<b>SRN / ID:</b> N2168
<b>LOCATION:</b> 400 GREAT LAKES RD, WAKEFIELD		<b>DISTRICT:</b> Marquette
<b>CITY:</b> WAKEFIELD		<b>COUNTY:</b> GOGEBIC
<b>CONTACT:</b> Trent Meske , Area Manager, Lake Superior Area - Great Lakes Reg		<b>ACTIVITY DATE:</b> 11/03/2023
<b>STAFF:</b> Drew Yesmunt	<b>COMPLIANCE STATUS:</b> Compliance	<b>SOURCE CLASS:</b> MAJOR
<b>SUBJECT:</b> Targeted Inspection FY24		
<b>RESOLVED COMPLAINTS:</b>		

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

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

**Contact(s): Benjamin Samuelkuty, Environmental Specialist; Chris McFarlane, Air Quality Specialist; Trent Meske, Area Manager; Chris Gierl, EIC Technician**

### Regulatory Authority

*Under the Authority of Section 5526 of Part 55 of NREPA, the Department of Environment, Great Lakes, and Energy 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. 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. 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.

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

### Process Description

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 utilized to maintain pressure and flow throughout the pipeline network.

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.

### Emissions

The primary pollutants emitted from the combustion process of gas turbines include nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), volatile organic compounds (VOCs), particulate matter (PM), and sulfur oxides (SO<sub>x</sub>). The formation of nitrogen oxides is related to the combustion temperature in the cylinder.

NO<sub>x</sub> is formed and emitted primarily through one of three mechanisms: thermal, fuel, and prompt. Thermal NO<sub>x</sub> formation occurs in the high temperature zone by the reaction of nitrogen (N<sub>2</sub>) and oxygen (O<sub>2</sub>) molecules in the combustion air. This is the predominant NO<sub>x</sub> formation mechanism for natural gas-fired turbines. Fuel NO<sub>x</sub> formation occurs through the reaction of nitrogen molecules in the fuel and the oxygen molecules in the combustion air. This form of NO<sub>x</sub> formation is low when burning natural gas since there is a low nitrogen content in the fuel. Prompt NO<sub>x</sub> 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<sub>x</sub> 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, semivolatile 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) 2022 submittal.

Pollutant	Emissions (PPY)	Emissions (TPY)
CO	94449.55	47.22
NOx	333831.90	166.92
PM10	4725.81	2.36
PM2.5	4725.81	2.36
SO2	421.27	0.21
VOC	1503.80	0.75

**Compliance History**

The facility has not received any violation notices in the past five years. The facility was last inspected in May 2022 and was found to be in compliance with all applicable air quality rules and regulations at that time.

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**Inspection**

On November 3, 2023, AQD staff (Drew Yesmunt) conducted a targeted inspection on the GLGT Station #7 in Wakefield, MI. AQD staff arrived at the facility and met with EIC Technician, Chris Gierl and Area Manager, Trent Meske. 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, records, and a potential delay to a required stack test originally planned for November 7, 2023. It was conveyed to AQD staff that due to low gas flow during winter months, there were safety concerns with recirculating gas causing vibrations through the system. AQD staff informed Chris Gierl and Trent Meske that if the stack test is delayed past December 18, 2023, the facility could be in violation of its ROP. A tour of the facility was then provided. No

changes had been made to the facility or equipment since the previous inspection. Following the inspection, a records request was sent to Air Quality Specialist, Chris McFarlane.

### ***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 not 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 summary report from April 2023-July 2023 was provided showing total run hours, total fuel, and total BHP hours for EUUNIT701 (SC VI.1, 2). 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 within five years from the date of the last test. Testing for this unit was last conducted on December 18, 2018. A summary of the test results is 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 pph	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 not 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 summary report from April 2023 - August 2023 was provided showing total run hours, total fuel, and total BHP hours for EUUNIT702 (SC.VI.1).

#### ***EUAPU***

This emission unit is a natural gas-fired 250 HP Waukesha F1197G emergency engine. At the time of the inspection, the unit was not operating. The hour meter on the unit displayed a total operating runtime of 628.9 hours (SC.IV.1). A summary report was provided from January 2023- November 2023 showing all engine start dates and reasons for operation (SC.VI.4). Records were also provided detailing all maintenance performed on the engine (SC.VI.2) and oil analysis (SC.III.2).

#### **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. It was conveyed to the facility that no violations were observed during the on-site inspection.

NAME 

DATE 12-11-2023

SUPERVISOR 