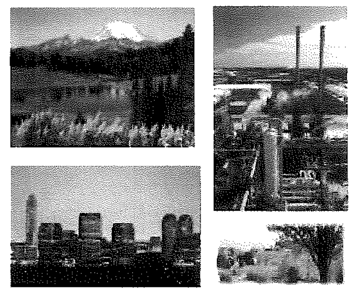

Great Lakes Gas Transmission Limited Partnership
Cloquet Compressor Station No. 5 (CS5)
St. Louis County, Minnesota

AUG 14 2015

Part 71 Permit Renewal Application
Federal Permit to Operate No.: V-FDL-2713700066-2010-02

August 2015

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TABLE OF CONTENTS

APPENDICES

APPENDIX A: Part 71 Federal Operating Permit Application Forms

APPENDIX B: Site Map/Plot Plans

1. Site Location Map
2. Plot Plan

APPENDIX C: Process Flow Diagrams

APPENDIX D: FERC Gas Tariff, General Terms and Conditions

APPENDIX E: Emission Calculation Spreadsheets

1. Table 1 – Potential Emissions Summary
2. Table 2 – Potential Emission of Hazardous Air Pollutants
3. Table 3 – 2013 Actual Emissions of Criteria and Hazardous Air Pollutants
4. Table 4 – 2013 Actual and Potential Emissions of Criteria and Hazardous Air Pollutants for Natural Gas-Fired Turbine EU 001
5. Table 4 – 2013 Actual and Potential Emissions of Criteria and Hazardous Air Pollutants for Natural Gas-Fired Turbine EU 002
6. Table 4 – 2013 Actual and Potential Emissions of Criteria and Hazardous Air Pollutants for Natural Gas-Fired Turbine EU 003
7. Table 4 – 2013 Actual and Potential Emissions of Criteria and Hazardous Air Pollutants for Natural Gas-Fired Standby Electrical Generator EU 004

APPENDIX F: EPA Compilation of Air Pollutant Emission Factors, AP-42, Supplement F, Emission Factor Information

1. Chapter 3.1 Stationary Gas Turbines
2. Chapter 3.2 Natural Gas-Fired Reciprocating Engines

APPENDIX G: Emission Unit Heat Rate Factor (Btu/Hp-Hr) Calculation Spreadsheet

APPENDIX H: 2013 Annual Emissions Inventory

APPENDIX I: Emission Factors from Emissions Test Report

SECTION 1.0 TECHNICAL SUPPORT DOCUMENTATION

1.1 INTRODUCTION

Great Lakes Gas Transmission Company, as operator and agent for Great Lakes Gas Transmission Limited Partnership (GLGT), operates nearly 2,000 miles of large-diameter underground pipeline, which transports natural gas for delivery to customers in the Midwestern and northeastern United States and eastern Canada. Great Lakes also transports gas to and from storage fields located near its pipeline in Michigan. The Great Lakes pipeline system starts at an interconnection with TransCanada Pipelines Limited (TransCanada) near the Manitoba-Minnesota border, and traverses northern Minnesota, northern Wisconsin, and the upper and lower peninsulas of Michigan. The Great Lakes pipeline system then reconnects with the TransCanada system near St. Clair, Michigan. A Great Lakes pipeline in the Upper Peninsula of Michigan interconnects with TransCanada facilities at Sault Ste. Marie. The pipeline's 14 compressor stations, placed approximately 75 miles apart, operate to keep natural gas moving through the system. GLGT has its headquarters in Troy, Michigan. The Great Lakes pipeline system, and other interstate natural gas transmission pipelines, makes up the long-distance link between natural gas production fields, local distribution companies, and end users.

Great Lakes operates a natural gas pipeline compressor station, Cloquet Compressor Station No. 5 (CS5), (SIC Code 4922, NAICS Code 486210) located approximately 8 miles west of the city of Cloquet, St. Louis County, Minnesota. The station is located on privately owned fee land within the external boundaries of the Fond du Lac Band of Lake Superior Chippewa Indian Reservation. The primary function of the Cloquet Compressor Station No. 5 is to provide motive force for natural gas flowing through the pipeline. The facility operates three stationary natural gas-fired turbines, which in turn drive three natural gas compressors. The pipeline system normally operates continuously, 24 hours per day, 365 days per year.

The Federal Permit to Operate No. V-FDL-2713700066-2010-02 for the Cloquet Compressor Station No. 4 expires February 27, 2016. This application is being submitted in accordance with the requirements set forth in Title 40, Part 71, of the Code of Federal Regulations (40 CFR Part 71) to assure compliance by the source, Cloquet Station, with all application requirements of Title V of the Clean Air Act (CAA, 42 USC 7401, et seq.).

As required under Section 4.S of the Operating Permit, GLGT is submitting this permit renewal application within the specified time frame for review by EPA Region V. Therefore, according to 40 CFR §71.5(a)(1) and (2), this is considered a timely renewal application and the facility will be authorized to continue to operate until the permitting authority takes final action on this application.

This document and the completed U.S. EPA Part 71 Federal Operating Permit Application forms attached in Appendix A comprise the application for the Title V Air Permit renewal. This document is provided to support the information contained in the application forms. Section 2.0 describes the facility, its location, the various emission units at the facility, and the operating methods and procedures practiced at the Cloquet Station. Sections 3.0 and 4.0 detail the potential and actual emissions from the various emission units at the facility. Finally, Section 5.0 comprises a review of the applicable Federal Regulations. Support materials for calculations and compliance determinations are provided in the attached appendices. Page ii, in the front of the document, lists the appendices and their content.

SECTION 2.0 FACILITY DESCRIPTION

2.1 FACILITY SITE

The Cloquet Station is located approximately 8 miles west of the city of Cloquet, St. Louis County, Minnesota. The Site Location Map is included in Appendix B. The primary function of this facility is to provide motive force for natural gas flowing through the pipeline.

Four buildings at the facility house the emission sources: three compressor buildings and one warehouse building. The Plot Plan is included in Appendix B. Each compressor building houses one stationary natural gas-fired turbine/compressor unit. The warehouse building houses a natural gas-fired standby electrical generator. In addition, a service building houses a natural gas-fired boiler and also provides office space, a facility operations computer control and a lunch room. Two full-time staff are employed at the facility and visitors to the station are infrequent.

The facility property is predominately undeveloped and grass-covered. In the middle of the facility property, asphalt-paved driveways and parking areas surround the facility buildings. The entrance to the facility from the access road is an unpaved dirt road. The access road extends approximately 5 miles south of U.S. Highway 2.

2.2 AREA CLASSIFICATION

The Cloquet Compressor Station is located in St. Louis County, Minnesota, which is designated by the U.S. EPA as "Unclassifiable/Attainment" for PM (PM10 and PM2.5), Ozone (1-hour and 8-hour), CO, NO2 (2010 1-hour), and Lead (2008), "Better than national standards" for SO2, "Cannot be classified or better than national standards" for NO2 (1971 Annual), and "Not designated" for Lead (1978) (40 CFR §81.324, Attainment Status Designations: Minnesota).

The facility property, which occupies an area of approximately 20 acres and is owned by GLGT, is bordered on the west, north, and south by undeveloped grass-covered and wooded land, and on the east by the access road. The Cloquet Station is located on privately-owned fee land within the external boundaries of the Fond du Lac Band of Lake Superior Chippewa Indian Reservation. There are no Mandatory Federal Class I areas within 100 kilometers of the Cloquet Station.

2.3 PROCESS DESCRIPTION

2.3.1 Current Operations

The Cloquet Station operates to transport natural gas through a dual 36-inch pipeline system. Three stationary natural gas-fired turbine-driven compressors are used to increase the pressure of the natural gas in the transmission pipeline. Flow diagrams are included in Appendix C.

Each compressor building at the Cloquet Station houses a three-component stationary natural gas-fired turbine system utilized for compressing the natural gas, which include a gas generator, a power turbine, and a gas compressor as illustrated in Figure 2.3.1 below.

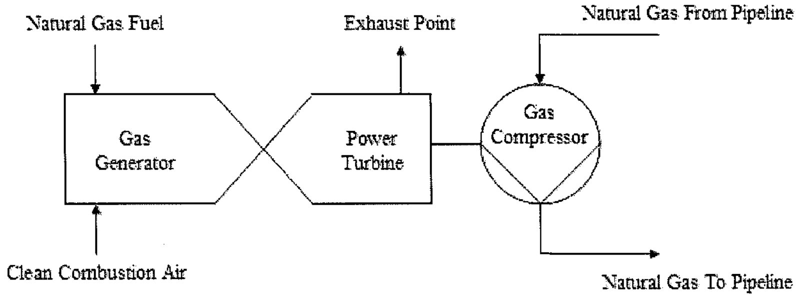


Figure 2.3.1 Turbine/Compressor Process Diagram

The gas generator/power turbine system is considered a simple-cycle system with residual gas energy exhausted into the atmosphere. The gas generator is the component that generates criteria and hazardous air pollutant emissions by means of the combustion of pipeline-quality natural gas. (The FERC Gas Tariff, General Terms and Conditions is included in Appendix D. This document contains pipeline-quality gas standards.) The gas generator, an aircraft-derivative turbine designed to burn natural gas, consists of a clean combustion-air compression section and a natural gas combustor section. The gas generator produces thermodynamic energy or gas horsepower. The gas horsepower, which represents maximum ambient rating for the gas generator unit, is the figure used when calculating the potential to emit (PTE) for the system.

The gas generator is coupled to the power turbine by a transition duct. Gas generator combustion products expand through one or more turbine stages. The power turbine converts the thermodynamic or gas energy from the gas generator to mechanical or rotative energy. The rotative power produced by the power turbine is mechanically coupled to a separate unit, the gas compressor, which pressurizes natural gas to move it through the pipeline system. This rotative power may also be referred to as shaft or brake horsepower.

2.3.2 Natural Gas-Fired Turbine Routine Maintenance and Repair

As a federally regulated public utility, GLGT follows a strict preventive maintenance program for its turbines and auxiliary equipment to provide an uninterrupted flow of natural gas through its transmission pipeline system in compliance with its FERC-issued Certificates of Public Convenience and Necessity, granted pursuant to the federal Natural Gas Act, (15 USC 717, *et seq.*). Because GLGT is a public utility providing essential natural gas transportation services to large portions of the United States and Canada, it cannot accept periods of downtime that would interrupt this flow. GLGT's routine equipment maintenance and repair program is designed to facilitate uninterrupted delivery of natural gas and includes visual inspections, physical examinations, cleaning of combustion areas, and other routine maintenance activities. The program provides for the "change-out" of the gas generator component of a turbine/compressor unit when lengthy repairs or servicing are needed so that the pipeline system remains in full operation.

Routine repair of a gas generator consists of removing it from service and exchanging it for a like-kind gas generator (change-out). The spare gas generator brought in is one of several that are maintained at GLGT's off-site warehouses for this purpose. The defective gas generator is either repaired on site, if the repairs are minor, or shipped to a factory-authorized repair facility. When repairs are completed, the gas generator is returned to one of the off-site warehouses for a future change-out within the GLGT system. The gas generator that was exchanged for the defective unit remains in service until there is a need to remove it for repairs or an overhaul.

2.3.3 Proposed Modifications

There are no process modifications proposed under this permit application.

2.4 DESCRIPTION OF INSIGNIFICANT ACTIVITIES

Regulations contained in 40 CFR Part 71 Subpart A (Federal Operating Permit Programs, Operating Permits) list information required to be included in an application. A list of insignificant activities and emission limits that need not be included in permit applications can be found in 40 CFR §71.5(c)(11). There are certain small emission sources at the Cloquet Station that do not fall into those listed in the regulation. GLGT would like to request that the following small emission sources at the Cloquet Station be considered for inclusion into the permit as insignificant activities.

<table>
<tr><th>Unit/Activity</th><th>Basis</th></tr>
<tr><td>Natural-gas fired York Shipley boiler (4.184 MMBtu/hr)</td><td rowspan="2">40 CFR §71.5(c)(11)(i)(D) (Insignificant activities: "Heating units used for human comfort that do not provide heat for any manufacturing or other industrial process.")</td></tr>
<tr><td>2 Space heaters (0.2 MMBtu/hr)</td></tr>
<tr><td>Storage Tanks:
1 Diesel storage tank (400 gallons)
1 Natural Gas Condensate tank (1,100 gallons)</td><td rowspan="2">40 CFR §71.5(c)(11)(ii)(A) (Insignificant emissions levels: "Emission criteria for regulated air pollutants, excluding hazardous air pollutants (HAP). Potential to emit of regulated air pollutants, excluding HAP, for any single emissions unit shall not exceed 2 tpy.")</td></tr>
<tr><td>Parts cleaning (40 gallon capacity; not in service)</td></tr>
</table>

2.5 DESCRIPTION OF EMISSION UNITS

The following emission units are located at the facility: three stationary natural gas-fired turbines and one natural gas-fired standby electrical generator. Emission unit numbers, stack/vent numbers, and emission unit descriptions are shown in Table 2.5.

None of the emission units at the Cloquet Station are equipped with pollution control devices.

Table 2.5: Description of Emission Units

Emission Unit No.	Stack/ Vent No.	GLGT Emission Unit No.	Description	Manufacturer/ Model	Manufacture Date	Heat Input (MMBtu/hr)
EU 001	SV 001	501	33,700 hp Natural Gas-Fired Turbine	General Electric LM 2500	1986	251.1
EU 002	SV 002	502	16,000 hp Natural Gas-Fired Turbine	Rolls Royce Avon 76G	1969	166.4
EU 003	SV 003	503	23,000 Natural Gas-Fired Turbine	General Electric LM 1600	1992	184.0
EU 004	SV 004	504	600 hp Natural Gas-Fired Standby Electrical Generator	Caterpillar SR4, 4-stroke, lean burn	1993	4.8

2.5.1 Stationary Natural Gas-Fired Turbines (EU 001, EU 002, EU 003)

Three stationary natural gas-fired turbines are located at this facility. The Cloquet Station was constructed in 1968-69 and consists of three natural gas-fired turbine units – one General Electric LM 2500, one Avon (Rolls Royce) 76G and one General Electric LM1600. These are numbered as Units 501, 502, and 503, respectively.

EU001, installed in 1986, is a General Electric LM2500 stationary natural gas-fired turbine with a maximum heat input rating of 251.1 MMBtu/hr (million British thermal units per hour). EU002, installed in 1969, is an Avon 76G stationary natural gas-fired turbine with a maximum heat input rating of 166.4 MMBtu/hr. EU003, installed in 1992, is a General Electric LM1600 stationary natural gas-fired turbine with a maximum heat input rating of 184 MMBtu/hr.

2.5.2 Natural Gas-Fired Standby Electrical Generator (EU 004)

A single natural gas-fired standby electrical generator, located in the warehouse building, provides electrical power for critical operations during temporary electrical power outages and during peak loading. The four stroke lean burn unit, installed in 1993, is a Caterpillar model SR4 with a rated heat input of 4.8 MMBtu/hr and a horsepower rating of 600 HP.

SECTION 3.0 POTENTIAL TO EMIT (PTE) – CALCULATIONS

3.1 STATIONARY NATURAL GAS-FIRED TURBINES (EU 001, EU 002, EU 003)

For the three turbines, calculations of PTE of criteria pollutants and hazardous air pollutants (HAPs), other than NOx and CO, are based upon emission factors (EF) published in the latest edition of the U.S. Environmental Protection Agency (EPA) Compilation of Air Pollutant Emission Factors (AP-42), Volume 1, Fifth Edition, Section 3.1 Stationary Gas Turbines. Appendix F contains the AP-42 information used in determining emission factors. NOx and CO emission factors for the stationary natural gas-fired turbines were calculated based on emission test results. Appendix J contains emission factors from the most recent Emission Test Report. Criteria pollutant emission factors are reported in pounds per MMBtu (lb/MMBtu) or pounds per million standard cubic feet (lb/MMscf).

From maximum rated heat inputs in units of MMBtu/hr and fuel inputs in units of standard cubic feet per hour (scf/hr), annual fuel usage in units of MMscf/yr and annual energy usage in units of MMBtu/yr were calculated. A natural gas heating value of 1,020 Btu/scf was used. The PTE for criteria pollutants and for HAPs were calculated by multiplying emission factors by the rated heat input and/or by the fuel input figures. Potential emissions calculations for each emission unit are included on individual PTE calculation spreadsheets located in Appendix E.

Because no pollution control devices are installed on the emission units at the Cloquet Station, all emissions were calculated as uncontrolled emissions.

Rated Heat Input Calculation Example (EU001 – General Electric LM 2500):

33,700 hp x 8,100 Btu/hp-hr x (MMBtu/1,000,000 Btu) = 273.0 MMBtu/hr

3.2 NATURAL GAS-FIRED STANDBY ELECTRICAL GENERATOR (EU 004)

The maximum rated heat input for the natural gas-fired standby electrical generator was calculated by multiplying rated horsepower (600 hp) by an average brake-specific fuel consumption of 8,000 Btu/hp-hr. The standby electrical generator has a rated heat input of 4.8 MMBtu/hr and no backup fuel is used. Criteria and HAP emissions for the natural gas-fired standby electrical generator are calculated using the emission factors published in AP-42, Section 3.2 Natural Gas-Fired Reciprocating Engines. Potential emissions calculations for each emission unit are included on individual PTE calculation spreadsheets located in Appendix E.

3.3 SUMMARY OF POTENTIAL EMISSIONS

Table 3.4: Summary of Potential Emissions (tpy)

Emission Unit No.	Emission Unit Description	NOx	VOC	SO_2	PM_{10}	CO	Lead	HAP
EU 001	General Electric LM2500 Turbine	588.24	2.51	4.07	7.89	104.02	n/a	1.23
EU 002	Rolls Royce Avon 76G Turbine	211.65	1.53	2.48	4.81	799.14	n/a	0.75
EU 003	General Electric LM1600 Turbine	297.84 *	1.69	2.74	5.32	31.55	n/a	0.83
EU 004	Caterpillar SR4 Generator **	29.38	0.85	0.004	0.07	4.01	n/a	0.52
Total PTE Emissions (tpy)		1127.11	6.58	9.29	18.09	938.72	n/a	3.32

* NOx PTE for EU 003 was calculated using the permit limit of 68 lb/hr and operation of 8,760 hours/yr. Permit Condition 2.0(A)(3)(ii): "Total NOx emissions from EU 003 shall not exceed 68 pounds per hour at any time during operation."

** Generator Potential to Emit was calculated using the permit limit of 3,000 hours/yr. Permit Condition 2.0(A)(3)(iii): "Total operating hours of EU 004 shall not exceed 3,000 hours during any 12-consecutive month period..."

SECTION 4.0 ACTUAL EMISSIONS CALCULATIONS

4.1 EXISTING PERMIT EMISSION LIMITATIONS

According to the current Title V Operating Permit, the stationary natural gas-fired turbines EU001 and EU003 and stationary gas fired emergency generator EU004 at the Cloquet Station are subject to the following NOx and SO_2 emission limits:

Emission Regulatory Limits	
Limit	Reference
Total NO_x emissions from EU001 shall not exceed 191 ppmv at 15 percent oxygen and on a dry basis.	40 CFR §60.332(a)(2), Condition 2.0(A)(1)(i) of PSD-FDL-R50001-04-01
EU001 and EU003 shall not burn any fuel which contains sulfur in excess of 0.8 percent by weight.	40 CFR §60.333(b) , Condition 2.0(A)(2) of PSD-FDL-R50001-04-01
NO_x emissions from EU003 shall not exceed 160 ppmv at 15 percent oxygen and on a dry basis. Compliance with the condition above also will assure compliance with the following: Total NOx emissions from EU003 shall not exceed 196 ppmv at 15 percent oxygen and on a dry basis.	Condition 2.0(A)(3)(i) of PSD-FDL-R50001-04-01, 40 CFR §60.332(a)(2), Condition 2.0(A)(1)(ii) of PSD-FDL-R50001-04-01
Total NO_x emissions from EU003 shall not exceed 68 pounds per hour at any time during operation.	Condition 2.0(A)(3)(ii) of PSD-FDL-R50001-04-01
Total operating hours of EU004 shall not exceed 3,000 hours during any 12-consecutive month period.	Condition 2.0(A)(1)(iii) of PSD-FDL-R50001-04-01

As stated in the current permit, requirement 2.0(B)(2), "[GLGT] has elected not to monitor the total sulfur content of the gaseous fuel combusted in the turbine, as allowed by 40 C.F.R. § 60.334(h)(3). [GLGT] must demonstrate that the gaseous fuel meets the definition of natural gas in § 60.331(u). [GLGT] shall make this demonstration through the use of gas quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract for the gaseous fuel, specifying that the maximum total sulfur content of the fuel is 20.0 grains/l00 scf or less." Based on the demonstration of the current tariff sheet (see Appendix D) for the compressor station, under 40 CFR §60.334(h)(3)(i), the turbines are in compliance with the fuel sulfur limitation of 40 CFR §60.333(b), which assures compliance with 40 CFR §60.333(a).

4.2 ACTUAL EMISSIONS CALCULATIONS

4.2.1 Stationary Natural Gas-Fired Turbines (EU 001, EU 002, EU 003)

No physical or operational limitations have been imposed upon the stationary natural gas-fired turbines, although NOx emission limits have been set for EU001 and EU003. Compliance testing has shown that EU001 operates well within the NOx NSPS emission limit of 191 ppmv. The compliance test for EU003 demonstrated that when the unit is operated at or below the heat input of 141 MMBtu/hr, the unit operates below the 160 ppmv NSPS limit and the 68 lb/hr PSD emissions limit. Software updates have been installed on the unit to maintain a heat input rate at or below the 141 MMBtu/hr rate.

Actual emissions of criteria pollutants and hazardous air pollutants are calculated based on the actual amount of natural gas consumed by each unit in 2013. Actual NOx and CO emissions were calculated for unit EU001, EU002, and EU003, by calculating emission factors for each unit based on the results of the most recent stack test. The emissions factors are listed in Appendix J.

4.2.2 Natural Gas-Fired Standby Electrical Generator (EU 004)

Actual emissions for the standby electrical generator were calculated using the recorded hours of operation in 2013.

4.3 SUMMARY OF ACTUAL EMISSIONS

Table 4.3: Summary of Actual 2013 Emissions (tpy)

Emission Unit No.	Emission Unit Description	NOx	VOC	SO_2	PM_{10}	CO	Lead	HAP
EU 001	General Electric LM2500 Turbine	9.35	0.04	0.06	0.13	1.65	n/a	0.02
EU 002	Rolls Royce Avon 76G Turbine	2.28	0.02	0.03	0.05	8.63	n/a	0.01
EU 003	General Electric LM1600 Turbine	56.58	0.29	0.47	0.92	5.43	n/a	0.14
EU 004	Caterpillar SR4 Generator	5.74	0.17	0.0008	0.01	0.78	n/a	0.10
Total Actual Emissions (tpy)		73.95	0.51	0.56	1.11	16.49	n/a	0.27

SECTION 5.0 REGULATORY APPLICABILITY SUMMARY

5.1 FEDERAL REGULATIONS

5.1.1 Prevention of Significant Deterioration

The Prevention of Significant Deterioration (PSD) applicability is triggered by construction of a "major stationary source" or "major modification" to an existing major stationary source. PSD regulations in 40 CFR 52.21 define a major source as any source type (belonging to a list of 28 categories) that emits or has the potential to emit 100 tpy or more of any regulated pollutant under the CAA, or any other source type that emits or has the potential to emit such pollutants in amounts equal to or greater than 250 tpy [40 CFR 52.21 (b)(1)(i)]. The potential to emit is based on the maximum design capacity of a source, subject to federally enforceable permit limitations (e.g., limits on annual hours of operation) and takes into account pollution control efficiency.

The Cloquet area is considered an attainment area for all criteria pollutants (40 CFR 50). As a result, the emissions from a new source or the modification of an existing source must be reviewed for applicability under 40 CFR §52.21. Natural gas pipeline transportation is not among the 28 industrial categories listed in the PSD rules as being major sources if the PTE is equal to or greater than 100 TPY of any single regulated pollutant [40 CFR 52.21(b)(1)(i)(a)]. However, the Cloquet does have a PTE of more than 250 TPY of CO and NOx. Therefore, the station is considered a major source under the federal PSD rules [40 CFR 52.21(b)(1)(i)(b)].

The Cloquet Station was built prior to August 7, 1980, the date of applicability for PSD. One modification to the facility was made after August 7, 1980 (the addition in 1992 of a new General Electric LM1600 turbine unit, EU003). Consequently, NSR applicability to individual sources would be based upon installation date and the mass of emittants.

EU002 was installed in 1969, which was prior to the August 7, 1980 date of applicability for PSD. Therefore, EU 002 was not subject to NSR.

EU001 and EU003, however, were installed in 1986 and 1992, respectively, which is after the August 7, 1980 date of applicability for PSD. Therefore, these units are required to meet NOx emission limitations based on PSD requirements: 191 ppmv, and 160 ppmv at 15% oxygen on a dry basis, respectively.

5.1.2 New Source Performance Standards (NSPS)

NSPS contained in 40 CFR 60 require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the relevant regulations. These NSPS regulations were reviewed to determine their applicability to the Cloquet Station equipment or to confirm non-applicability as appropriate. The results of this review are summarized below by regulatory citation.

40 CFR 60 Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

This standard is applicable to each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million Btu per hour (Btu/hr)) or less, but greater than or equal to 2.9 MW (10 million Btu/hr). This standard is not applicable to the Cloquet Station because there are no natural gas-fired boilers with a design heat input capacity of 2.9 MW (10 MMBtu/hr) or greater.

40 CFR 60 Subpart K - Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973 and prior to May 19, 1978

This regulation applies to petroleum liquids storage vessels with storage capacity greater than 40,000 gallons and constructed, reconstructed, or modified after June 11, 1973 but before May 19, 1978. There are no petroleum storage vessels with capacity greater than 40,000 gallons at this facility. Therefore, this regulation is not applicable.

40 CFR 60 Subpart Ka - Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978 and prior to July 23, 1984

This regulation applies to petroleum liquids storage vessels with storage capacity greater than 40,000 gallons and constructed, reconstructed, or modified after May 18, 1978 but before July 23, 1984. There are no petroleum storage vessels with capacity greater than 40,000 gallons at this facility. Therefore, this regulation is not applicable.

40 CFR 60 Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984

This regulation applies to volatile organic liquid storage vessels with storage capacity greater than 75 cubic meters (19,812.9 gal) and constructed, reconstructed, or modified after July 23, 1984. There are no volatile organic liquid storage vessels with capacity greater than 75 cubic meters at this facility. Therefore, this regulation is not applicable.

40 CFR 60 Subpart GG - Standards of Performance for Stationary Gas Turbines

The standards of performance in Subpart GG apply to stationary gas turbines with a heat input at peak load greater than or equal to 10 MMBtu/hr and have commenced construction, modification, or reconstruction after October 3, 1977. The EU002 Turbine is greater than 10 MMBtu/hr, but was installed prior to October 3, 1977. Therefore this regulation is not applicable to EU002. Future modifications or reconstruction of this turbine may make it subject.

The EU001 and EU003 turbines at the Cloquet Station have a capacity of more than 10 MMBtu/hr of heat input, but were installed in 1986 and 1992, respectively. Therefore, EU001 and EU003 are subject to NSPS. Stack testing has substantiated that the unit is in compliance with the NOx standards as calculated by 40 CFR 60.332(a)(2). The rule specifies the following formula be used to calculate the NOx emission concentration limit:

$$STD = 0.0150 \frac{(14.4)}{Y} + F$$

where:

STD = allowable ISO corrected (if required as given in §60.335(b)(1)) NOx emission concentration (percent by volume at 15 percent oxygen and on a dry basis),

Y = manufacturer's rated heat rate at manufacturer's rated load (kilojoules per watt hour) or, actual measured heat rate based on lower heating value of fuel as measured at actual peak load for the facility. The value of Y shall not exceed 14.4 kilojoules per watt hour, and

F = NOx emission allowance for fuel-bound nitrogen as defined in paragraph (a)(4) of this section.

Sulfur Dioxide (SO2) testing and fuel sulfur limitations under NSPS: Per 40 CFR 60.333(b), "...No owner or operator subject to the provisions of this section may burn in any stationary gas turbine any fuel which contains sulfur in excess of 0.8% by weight...." GLGT's current Federal Energy Regulatory Commission (FERC) Gas Tariff (Third Revised Volume No. 1) limits the amount of sulfur that may be present in the natural gas in GLGT's pipeline system. The FERC tariff, enclosed as Appendix D, illustrates that the total sulfur within the natural gas cannot exceed 20 grains per hundred cubic feet of gas (grains/100 ft^3), or 0.064% by weight. Therefore GLGT is in compliance with the sulfur standard.

40 CFR 60 Subpart KKK-Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants

This regulation is not applicable to the Cloquet Station because the facility is not a natural gas processing plant as defined in the regulation. A Natural Gas Processing Plant is defined as: "any processing site engaged in the extraction of natural gas liquids from field gas, fractionation of mixed natural gas liquids to natural gas products, or both." The facility does not engage in extraction of natural gas liquids from field gas or fractionate mixed natural gas liquids to natural gas products. Therefore this regulation does not apply.

40 CFR 60 Subpart LLL - Standards of Performance for Onshore Natural Gas Processing: SO_2 Emissions

This regulation is applicable to a sweetening unit and a sulfur recovery unit at a natural gas processing plant. The regulation defines a sweetening unit as a process device used to separate hydrogen sulfide and carbon dioxide contents from sour natural gas and a sulfur recovery unit as a process device that recovers elemental sulfur from acid gas. The Cloquet Station processes natural gas but does not operate a sweetening unit or a sulfur recovery unit. Therefore, this regulation is not applicable.

40 CFR 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE)

This regulation applies to owners or operators of stationary CI ICE that commence construction, modification or reconstruction after July 11, 2005 and to manufacturers of 2007 and later model year CI ICE. The Cloquet Station does not operate any stationary CI ICE; therefore this regulation does not apply.

40 CFR 60 Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (SI ICE)

On March 18th, 2008, US EPA finalized Standards for Performance for Stationary Spark Ignition Internal Combustion Engines (SI ICE). This regulation applies to owners or operators of stationary SI ICE that commence construction, modification or reconstruction after June 12, 2006 and to manufacturers of applicable SI. The Caterpillar SR4 generator at the Cloquet Station was constructed in 1993, prior to June 12, 2006 and has not been modified or reconstructed since June 12, 2006. Therefore this regulation does not apply.

40 CFR 60 Subpart KKKK - Standards of Performance for Stationary Combustion Turbines

The standards of performance for Stationary Combustion Turbines, applies to combustion turbines with peak load heat input greater than 10 MMBtu/hour constructed, modified, or reconstructed after February 18, 2005. The three turbines at the Cloquet station are all greater than 10 MMBtu/hr, but were installed in 1986, 1969, and 1992, and have not been modified or reconstructed since February 18, 2005. Therefore this regulation is not currently applicable. Future modifications or reconstruction of the turbines may make them subject. The periodic replacement of stationary gas turbine components for overhaul or repair, does not subject the permittee to the requirements of Subpart KKKK unless the changes meet the definition of "modification" or "reconstruction".

5.1.3 National Emission Standards for Hazardous Air Pollutants (NESHAP)

Federal NESHAP regulations promulgated pursuant to Section 112 of the CAA are found in 40 CFR Parts 61 and 63. In general, NESHAP, or Maximum Achievable Control Technology (MACT) standards apply to major stationary sources of HAP emissions, defined as potential-to-emit of 10 tons or more per year of any single HAP or 25 tons or more per year of any combination of HAP and area stationary sources of HAP emissions (thresholds less than a major source). The Cloquet Station is considered an area source of HAPs due to total potential HAP emissions less than 25 tpy and potential formaldehyde emissions less than 10 tpy. Potentially applicable NESHAPs are discussed below.

40 CFR 61 Subpart M - National Emission Standard for Asbestos

The Cloquet Station may at times engage in demolition and/or renovation activities involving asbestos-containing materials (ACM). Therefore, the facility could be potentially subject to Subpart M, Standards for Demolition and Renovation (40 CFR 61.145). Procedures are in place to ensure the facility complies with these standards.

40 CFR 61 Subpart V - National Emission Standard for Equipment Leaks (Fugitive Emission Sources)

This regulation is not applicable to the Cloquet Station because the provisions of this subpart apply to sources that are intended to operate in volatile hazardous air pollutant (VHAP) service. "In VHAP service means that a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 10 percent by weight a volatile hazardous air pollutant (VHAP) as determined according to the provisions of 61.245(d)." The Cloquet Station processes do not have any sources that operate in VHAP service.

40 CFR 63 Subpart A – General Provisions

This regulation has general provisions that are referenced by other more specific NESHAP regulations.

40 CFR 63 Subpart HH - NESHAP from Oil and Natural Gas Production Facilities

This regulation is not applicable to the Cloquet Station because the facility is a transmission facility and is not an oil and gas production facility as defined in this regulation.

40 CFR 63 Subpart HHH - NESHAP from Natural Gas Transmission and Storage Facilities

Subpart HHH establishes national emission limitations and operating limitations for natural gas transmission and storage facilities that are major sources of HAP emissions. The rule affects facilities that transport or store natural gas prior to entering the pipeline to a local distribution company or to a final user. Not only is the Cloquet Station an area source of HAP emissions, it is a natural gas compression facility, but does not operate a glycol dehydration unit, which is the only "affected" source under the regulation. Therefore, the station is not subject to this regulation.

40 CFR 63 Subpart ZZZZ – NESHAP for Stationary Reciprocating Internal Combustion Engines (RICE)

Subpart ZZZZ regulates HAP emissions from existing, new, and reconstructed stationary compression ignition (CI) and spark ignition (SI), emergency and non-emergency, RICE located at major and area sources of HAP emissions. This standard is potentially applicable to the Cloquet Station. The facility's 600 hp natural gas-fired emergency generator is an existing (installed in 1993) four-stroke lean burn engine. Per §63.6640(f), the engine will be subject to operating requirements in §63.6640(f)(1)-(4).

40 CFR 63 Subpart DDDDD– NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters

The Industrial/Commercial/Institutional Boilers and Process Heaters MACT for major sources was promulgated on March 21, 2011, and regulates HAP emissions from new and existing industrial, commercial, or institutional boilers and process heaters located at major sources of HAP emissions. The EPA subsequently issued a notice on May 18, 2011 to postpone the effective dates of the final rule until the completion of reconsideration or judicial review, whichever is earlier. On January 9, 2012, the EPA vacated the May 18, 2011 notice that delayed the effective dates of the Boiler MACT rule. The notice on final action on reconsideration was published in the Federal Register on January 31, 2013. This rule is not applicable to the boiler located at the Cloquet Station, since the Station is an area source of HAP.

40 CFR 63 Subpart JJJJJJ – NESHAP for Industrial, Commercial, and Institutional Boilers Area Sources

The Industrial/Commercial/Institutional Boilers and Process Heaters for area sources was promulgated on March 21, 2011, and regulates HAP emissions from industrial, commercial, or institutional boilers located at area sources of HAP emissions. This rule is potentially applicable to the Cloquet Station because it is an area source of HAP. However, per §63.11237, the 4.18 MMBtu/hr natural gas-fired York Shipley boiler is classified as a gas-fired boiler because it burns only natural gas not combined with any solid fuels. As such, per §63.11195(e), the boiler is "not subject to this subpart and to any requirements in this subpart".

5.1.4 Compliance Assurance Monitoring (CAM)

Enhanced monitoring requirements have been adopted into 40 CFR 64. The enhanced monitoring requirements are referred to as Compliance Assurance Monitoring (CAM). CAM is applicable to sources that have a potential to emit in excess of major source thresholds, not considering "tailpipe" emission controls, and use an "active" control device to achieve compliance with the emission limit. Combustion controls may be considered in evaluating the potential to emit.

An emission unit is subject to CAM if all of the following criteria are satisfied:

- the unit is located at a major source that is required to obtain a Part 70 or Part 71 permit;
- the unit is subject to an emission limitation or standard for the applicable regulated air pollutant;
- the unit uses a control device to achieve compliance with any such emission limitation or standard, and
- the unit has potential pre-control device emissions of the applicable regulated air pollutant above the major source threshold.

The potential emissions of NOx from each of the three natural gas-fired turbines are in excess of the appropriate major source thresholds. EU001 and EU003 are subject to NOx emission limitations of 191 ppmv and 160 ppmv at 15% oxygen on a dry basis, respectively (Section 2.0(A)(1) and 2.0(A)(3) of the Title V Operating Permit). However, none of the turbines employ an active control device to control NOx emissions. Therefore, the CAM rule does not apply to these units at this time.

5.1.5 Accidental Releases

Applicability to this regulation is based on the type and quantity of certain regulated substances stored at a facility, and the Cloquet Station does not exceed the applicability thresholds (40 CFR 68.10). Therefore, the station is not subject to the Risk Management Programs for Chemical Accidental Release Prevention Requirements.

5.1.6 Acid Rain Requirements

Utilities and other facilities that combust fossil fuel (coal) and generate electricity for wholesale or retail sale may be subject to acid rain program requirements, including the requirements to hold an acid rain permit under 40 CFR 72. The Cloquet Station does not fall under this definition and is therefore not subject to the Acid Rain Requirements.

5.2 ADDITIONAL STATE AIR POLLUTION CONTROL REQUIREMENTS

5.2.1 General Construction and Operating Permit Requirements

Per Minn. Rules Part 7007.0200 Sources Required or Allowed to Obtain a Part 70 Permit, Subpart 2, any major stationary source of air pollutants, as defined in section 302 of the act (General Provisions; Definitions), that directly emits or has the potential to emit, 100 tons per year or more of any air pollutant and, effective July 1, 2011, 100,000 tons per year CO_2e of greenhouse gases, must obtain a permit under this part.

The Cloquet Station directly and potentially emits concentrations of air pollutants in excess of 100 tons per year. This application satisfies the requirements of Minn. Rules Part 7007.0200 Subpart 2, Sources Required or Allowed to Obtain a Part 70 Permit. Because the Cloquet Station is subject to section 111 of the Clean Air Act and is located in Indian Country, 40 CFR 71.3(a) and 71.4(b) make it subject to the permitting requirements of 40 CFR part 71. The Part 71 Permit is enforced and managed by EPA Region V.

5.2.2 Control of Pollutant Emissions

Minn. Rules Part 7011.0105 Visible Emission Restrictions for Existing Facilities states, "No owner or operator of an existing emission facility to which parts 7011.0100 to 7011.0115 are applicable shall cause to be discharged into the atmosphere from the facility any gases which exhibit greater than 20 percent opacity; except for one six-minute period per hour of not more than 33 percent opacity." Due to the nature of natural gas combustion emissions, little or no opacity is generated. Emission standards for visible air contaminants have not been defined for the stationary natural gas turbines in any other rule. EPA Region V has not requested testing for opacity emissions. Therefore, the Cloquet Station is in compliance with the visible emissions rule.

Minn. Rules Part 7001.0150 Preventing Particulate Matter from Becoming Airborne states: "No person shall cause or permit the handling, use, transporting, or storage of any material...or permit a building or its appurtenances or a road, or a driveway, or an open area to be constructed, used, repaired, or demolished without applying all such reasonable measures as may be required to prevent particulate matter from becoming airborne." GLGT has written a Fugitive Emission Control Plan, which was approved by the MPCA and has been implemented at the Cloquet Station. Therefore, the station is in compliance with the particulate requirements.

Minn. Rules Part 7011.2300 Standards of Performance for Stationary Internal Combustion Engines, Subpart 1, Visible Air Contaminants states: "No owner or operator of any stationary internal combustion engine shall cause or permit the emission of visible air contaminants from the engine in excess of 20 percent opacity once operating temperatures have been attained." The standby electrical generator is the only emission unit at the Cloquet Station that meets the definition of stationary internal combustion engine. EPA Region V has not required testing for opacity emissions. Therefore, the Cloquet Station is in compliance with the visible air contaminants section of the Minnesota standards of performance for stationary internal combustion engines.

Minn. Rules Part 7030.0040 Noise Standards describe the limiting levels of sound established on the basis of present knowledge for the preservation of public health and welfare. The State may request testing of sources. EPA Region V has not requested the Cloquet Station to do noise testing. Therefore, the station is in compliance with the Noise Standards.

5.2.3 Compliance with Air Emission Inventory Requirements

Minn. Rules Part 7019.3000 Emission Inventory, Subpart 1 states that all owners or operators of emission reporting facilities (those required to obtain an air permit under Chapter 7007) shall submit an annual emission inventory report to the MPCA, in a format specified by the commissioner, relating to ammonia, carbon monoxide, particulate matter, and all "chargeable pollutants" as defined in Minn. Rules Part 7002.0015, Subpart 2a (such as NOx, VOC, PM10, SO2, Lead). The report shall be submitted on or before November 15 of the year following the year being reported per Section 4.0.B of the Title V Operating Permit (40 CFR 71.6(a)(7), 71.9).

The Cloquet Station is an emission reporting facility. GLGT provided an emission inventory to the EPA every year that submittal was required. Therefore, the station is in compliance with the Emission Inventory rules.

5.2.4 Reporting, Recordkeeping, Testing, and Inspection Requirements

Minn. Rules Part 7007.0500, Subp. 2(K)(1) Compliance Plan states, "A description of the compliance status of the stationary source at the time of application submittal … and a description of the methods used to determine compliance…" shall be included in the permit application. Section 5 of this Title V application, Regulatory Review and Compliance Plan, constitutes the compliance plan for this Title V application. Additionally, GLGT does submit an annual compliance report to the EPA. Therefore, the Cloquet Station is in compliance with the Compliance Plan/Certification Reports requirements.

Minn. Rules Part 7017.2020, Performance Tests General Requirements, Subpart 1 states "The owner or operator of an emission facility shall arrange to conduct a performance test at any emission facility at the times required by an applicable requirement or compliance document and at additional times if the commissioner requests a performance test..." GLGT has submitted all testing notifications, test plans, and test results in a timely manner. GLGT will conduct compliance testing as requested by the commissioner. Therefore, the Cloquet Station is in compliance with the monitoring and testing requirements of Minn. Rules Chapter 7017.

APPENDIX A:

PART 71 FEDERAL OPERATING PERMIT

APPLICATION FORMS

- Form 5900-79: General Information and Summary (GIS)
- Form 5900-80: Emissions Unit Description for Fuel Combustion Sources (EUD-1)
    - EU001
    - EU002
    - EU003
    - EU004
- Form 5900-83: Insignificant Emissions (IE)
- Form 5900-84: Emissions Calculations (EMISS)
    - EU001
    - EU002
    - EU003
    - EU004
- Form 5900-85: Potential to Emit Summary (PTE)
- Form 5900-86: Initial Compliance Plan and Compliance Certification (I-COMP)
- Form 5900-02: Certification of Truth, Accuracy, and Completeness (CTAC)

United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

GENERAL INFORMATION AND SUMMARY (GIS)

A. Mailing Address and Contact Information

Facility name Great Lakes Gas Transmission – Cloquet Compressor Station No. 5 (CS5)

Mailing address: Street or P.O. Box 700 Louisiana Street, Suite 700

City Houston State TX ZIP 77002 -

Contact person: Tiffany Grady Title Air Quality Specialist

Telephone (832) 320 - 5835 Ext.

Facsimile (832) 320 - 6835

B. Facility Location

Temporary source? ___Yes X No Plant site location 3741 Brandon Road

City Cloquet State MN County St. Louis EPA Region V

Is the facility located within:

Indian lands? X YES ___ NO OCS waters? ___ YES X NO

Non-attainment area? ___ YES X NO If yes, for what air pollutants? N/A

Within 50 miles of affected State? ___ YES X NO If yes, What State(s)? ___

C. Owner

Name Great Lakes Gas Transmission Limited Partnership Street/P.O. Box 5250 Corporate Drive

City Troy State MI ZIP 48098 -

Telephone (832) 320 - 5835 Ext

D. Operator

Name Great Lakes Gas Transmission Company Street/P.O. Box 5250 Corporate Drive

City Troy State MI ZIP 48098 -

Telephone (832) 320 - 5835 Ext

E. Application Type

Mark only one permit application type and answer the supplementary question appropriate for the type marked.

___Initial Permit _X_ Renewal ___ Significant Mod ___ Minor Permit Mod(MPM)

___ Group Processing, MPM ___ Administrative Amendment

For initial permits, when did operations commence? _____/_____/_____

For permit renewal, what is the expiration date of current permit? _02_/_27_/_2016_

F. Applicable Requirement Summary

Mark all types of applicable requirements that apply.

___ SIP ___ FIP/TIP ___ PSD ___Non-attainment NSR

___ Minor source NSR _X_ Section 111 ___ Phase I acid rain ___Phase II acid rain

_X_ Stratospheric ozone ___ OCS regulations ___ NESHAP ___ Sec. 112(d) MACT

___ Sec. 112(g) MACT ___ Early reduction of HAP ___ Sec 112(j) MACT ___ RMP [Sec.112(r)]

___ Tank Vessel requirements, sec. 183(f)) ___ Section 129 Standards/Requirement

___ Consumer / comm.. products, ' 183(e) ___ NAAQS, increments or visibility (temp. sources)

Has a risk management plan been registered? ___YES _X_NO Regulatory agency ____________

Phase II acid rain application submitted? ___YES _X_NO If yes, Permitting authority ____________

G. Source-Wide PTE Restrictions and Generic Applicable Requirements

Cite and describe any emissions-limiting requirements and/or facility-wide "generic" applicable requirements.

Not applicable.

H. Process Description

List processes, products, and SIC codes for the facility.

Process	Products	SIC
Natural Gas Transmission	Not applicable.	4922

I. Emission Unit Identification

Assign an emissions unit ID and describe each emissions unit at the facility. Control equipment and/or alternative operating scenarios associated with emissions units should by listed on a separate line. Applicants may exclude from this list any insignificant emissions units or activities.

Emissions Unit ID	Description of Unit
EU 001	Natural gas-fired Turbine Unit 501
EU 002	Natural gas-fired Turbine Unit 502
EU 003	Natural gas-fired Turbine Unit 503
EU 004	Natural gas-fired Standby Electrical Generator Unit 504

J. Facility Emissions Summary

Enter potential to emit (PTE) for the facility as a whole for each air pollutant listed below. Enter the name of the single HAP emitted in the greatest amount and its PTE. For all pollutants stipulations to major source status may be indicated by entering "major" in the space for PTE. Indicate the total actual emissions for fee purposes for the facility in the space provided. Applications for permit modifications need not include actual emissions information.

NOx 1709.98 tons/yr VOC 6.38 tons/yr SO2 8.96 tons/yr

PM-10 17.46 tons/yr CO 930.38 tons/yr Lead N/A tons/yr

Total HAP 3.23 tons/yr

Single HAP emitted in the greatest amount Formaldehyde PTE 1.470 tons/yr

Total of regulated pollutants (for fee calculation), Sec. F, line 5 of form FEE 0 tons/yr

K. Existing Federally-Enforceable Permits

Permit number(s) V-FDL-2713700066-2010-02 Permit type Part 71 Permitting authority EPA Region V

Permit number(s) ______ Permit type ______ Permitting authority ______

L. Emission Unit(s) Covered by General Permits

Emission unit(s) subject to general permit N/A

Check one: ___ Application made ___ Coverage granted

General permit identifier ______ Expiration Date ___/___/___

M. Cross-referenced Information

Does this application cross-reference information? ___ YES _X_ NO (If yes, see instructions)

INSTRUCTIONS FOLLOW

EPA United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

EMISSION UNIT DESCRIPTION FOR FUEL COMBUSTION SOURCES (EUD-1)

A. General Information

Emissions unit ID _EU 001_ Description _Unit 501, Stationary Natural Gas-Fired Turbine Unit_

SIC Code (4-digit) _4922_ SCC Code _20300202_

B. Emissions Unit Description

Primary use _Natural gas prime mover_ Temporary Source ___Yes _X_ No

Manufacturer _General Electric_ Model No. _LM 2500_

Serial Number _NA_ Installation Date _1_ / _1_ / _1986_

Boiler Type: ___ Industrial boiler ___ Process burner ___ Electric utility boiler

Other (describe) ______

Boiler horsepower rating______ Boiler steam flow (lb/hr)______

Type of Fuel-Burning Equipment (coal burning only):

___ Hand fired ___Spreader stoker ___Underfeed stoker ___Overfeed stoker

___ Traveling grate ___Shaking grate ___Pulverized, wet bed ___ Pulverized, dry bed

Actual Heat Input _200.0_ MM BTU/hr Max. Design Heat Input _273.0_ MM BTU/hr

C. Fuel Data

Primary fuel type(s) Natural gas Standby fuel type(s) None

Describe each fuel you expected to use during the term of the permit.

Fuel Type	Max. Sulfur Content (%)	Max. Ash Content (%)	BTU Value (cf, gal., or lb.)
Natural Gas	0.8	0.0	1020

D. Fuel Usage Rates

Fuel Type	Annual Actual Usage	Maximum Usage	
		Hourly	Annual
Natural Gas	1477 MMscf/hr	251,100 scf/hr	2,199 MMscf/yr

E. Associated Air Pollution Control Equipment

Emissions unit ID NA Device type_____

Air pollutant(s) Controlled_____ Manufacturer_____

Model No._____ Serial No._____

Installation date___/___/___ Control efficiency (%) _____

Efficiency estimation method_____

F. Ambient Impact Assessment

This information must be completed by temporary sources or when ambient impact assessment is an applicable requirement for this emissions unit (this is not common).

Stack height (ft) 39.5 Inside stack diameter (ft) 7.34

Stack temp(°F) 936 Design stack flow rate (ACFM) NA

Actual stack flow rate (ACFM) 341,396 Velocity (ft/sec) 106.75

United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

EMISSION UNIT DESCRIPTION FOR FUEL COMBUSTION SOURCES (EUD-1)

A. General Information

Emissions unit ID _EU 002_ Description _Unit 502, Stationary Natural Gas-Fired Turbine Unit_

SIC Code (4-digit) _4922_ SCC Code _20300202_

B. Emissions Unit Description

Primary use _Natural gas prime mover_ Temporary Source ___Yes _X_ No

Manufacturer _Rolls Royce_ Model No. _Avon 76G_

Serial Number _NA_ Installation Date _12 / 1 / 1969_

Boiler Type: ___ Industrial boiler ___ Process burner ___ Electric utility boiler

Other (describe) ___

Boiler horsepower rating___ Boiler steam flow (lb/hr)___

Type of Fuel-Burning Equipment (coal burning only):

___ Hand fired ___Spreader stoker ___Underfeed stoker ___Overfeed stoker

___ Traveling grate ___Shaking grate ___Pulverized, wet bed ___ Pulverized, dry bed

Actual Heat Input _159_ MM BTU/hr Max. Design Heat Input _166.4_ MM BTU/hr

C. Fuel Data

Primary fuel type(s) Natural gas Standby fuel type(s) None

Describe each fuel you expected to use during the term of the permit.

Fuel Type	Max. Sulfur Content (%)	Max. Ash Content (%)	BTU Value (cf, gal., or lb.)
Natural Gas	0.8	0.0	1020

D. Fuel Usage Rates

Fuel Type	Annual Actual Usage	Maximum Usage	
		Hourly	Annual
Natural Gas	954.13 MMscf/yr	166,400 scf/hr	1,457.66 MMscf/yr

E. Associated Air Pollution Control Equipment

Emissions unit ID NA Device type ____

Air pollutant(s) Controlled ____ Manufacturer ____

Model No. ____ Serial No. ____

Installation date ___/___/___ Control efficiency (%) ____

Efficiency estimation method ____

F. Ambient Impact Assessment

This information must be completed by temporary sources or when ambient impact assessment is an applicable requirement for this emissions unit (this is not common).

Stack height (ft) 31.0 Inside stack diameter (ft) 9.19

Stack temp(°F) 769.0 Design stack flow rate (ACFM) NA

Actual stack flow rate (ACFM) 199,175 Velocity (ft/sec) 38.66

United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

EMISSION UNIT DESCRIPTION FOR FUEL COMBUSTION SOURCES (EUD-1)

A. General Information

Emissions unit ID _EU 003_ Description _Unit 503, Stationary Natural Gas-Fired Turbine Unit_

SIC Code (4-digit) _4922_ SCC Code _20300202_

B. Emissions Unit Description

Primary use _Natural gas prime mover_ Temporary Source ___Yes _X_No

Manufacturer _General Electric_ Model No. _LM 1600_

Serial Number _NA_ Installation Date _1_/_1_/_1992_

Boiler Type: ___ Industrial boiler ___ Process burner ___ Electric utility boiler

Other (describe) ______

Boiler horsepower rating______ Boiler steam flow (lb/hr)______

Type of Fuel-Burning Equipment (coal burning only):

___ Hand fired ___Spreader stoker ___Underfeed stoker ___Overfeed stoker

___ Traveling grate ___Shaking grate ___Pulverized, wet bed ___ Pulverized, dry bed

Actual Heat Input _141_ MM BTU/hr Max. Design Heat Input _184.0_ MM BTU/hr

C. Fuel Data

Primary fuel type(s) Natural gas Standby fuel type(s) None

Describe each fuel you expected to use during the term of the permit.

Fuel Type	Max. Sulfur Content (%)	Max. Ash Content (%)	BTU Value (cf, gal., or lb.)
Natural Gas	0.8	0.0	1020

D. Fuel Usage Rates

Fuel Type	Annual Actual Usage	Maximum Usage	
		Hourly	Annual
Natural Gas	1169 MMscf/yr	184,000 scf/hr	1,612 MMscf/yr

E. Associated Air Pollution Control Equipment

Emissions unit ID NA Device type ________

Air pollutant(s) Controlled ________ Manufacturer ________

Model No. ________ Serial No. ________

Installation date ___/___/___ Control efficiency (%) ________

Efficiency estimation method ________

F. Ambient Impact Assessment

This information must be completed by temporary sources or when ambient impact assessment is an applicable requirement for this emissions unit (this is not common).

Stack height (ft) 38.8 Inside stack diameter (ft) 5.68

Stack temp(°F) 934.0 Design stack flow rate (ACFM) NA

Actual stack flow rate (ACFM) 249,808 Velocity (ft/sec) 90.12

United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

EMISSION UNIT DESCRIPTION FOR FUEL COMBUSTION SOURCES (EUD-1)

A. General Information

Emissions unit ID _EU 004_ Description _Natural gas-fired Emergency Standby Generator_

SIC Code (4-digit) _4922_ SCC Code _20300201_

B. Emissions Unit Description

Primary use _Emergency Electrical Generator_ Temporary Source ___Yes _X_No

Manufacturer _Caterpillar_ Model No. _SR4_

Serial Number _NA_ Installation Date _1 / 1 / 1993_

Boiler Type: ___ Industrial boiler ___ Process burner ___ Electric utility boiler

Other (describe) ___

Boiler horsepower rating___ Boiler steam flow (lb/hr)___

Type of Fuel-Burning Equipment (coal burning only):

___ Hand fired ___Spreader stoker ___Underfeed stoker ___Overfeed stoker

___ Traveling grate ___Shaking grate ___Pulverized, wet bed ___ Pulverized, dry bed

Actual Heat Input _NA_ MM BTU/hr Max. Design Heat Input _4.8_ MM BTU/hr

C. Fuel Data

Primary fuel type(s) Natural gas Standby fuel type(s) None

Describe each fuel you expected to use during the term of the permit.

Fuel Type	Max. Sulfur Content (%)	Max. Ash Content (%)	BTU Value (cf, gal., or lb.)
Natural Gas	0.8	0.0	1020

D. Fuel Usage Rates

Fuel Type	Annual Actual Usage	Maximum Usage	
		Hourly	Annual
Natural Gas	13 MMscf/yr	4,800 scf/hr	42.05 MMscf/yr

E. Associated Air Pollution Control Equipment

Emissions unit ID NA Device type

Air pollutant(s) Controlled Manufacturer

Model No. Serial No.

Installation date / / Control efficiency (%)

Efficiency estimation method

F. Ambient Impact Assessment

This information must be completed by temporary sources or when ambient impact assessment is an applicable requirement for this emissions unit (this is not common).

Stack height (ft) 10.0 Inside stack diameter (ft) 0.67

Stack temp(°F) 813.0 Design stack flow rate (ACFM) NA

Actual stack flow rate (ACFM) 5,950 Velocity (ft/sec) 281.5

United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

INSIGNIFICANT EMISSIONS (IE)

On this page list each insignificant activity or emission unit. In the "number" column, indicate the number of units in this category. Descriptions should be brief but unique. Indicate which emissions criterion of part 71 is the basis for the exemption.

Number	Description of Activities or Emissions Units	RAP, except HAP	HAP
1 boiler, 2 space heaters	40 CFR §71.5(c)(11)(i)(D) (Insignificant activities: "Heating units used for human comfort that do not provide heat for any manufacturing or other industrial process.") • 1 Natural gas-fired York Shipley boiler (4.18 MMBtu/hr) • 2 Natural gas-fired space heaters (0.2 MMBtu/hr each)	✓	
2 tanks, 44 drums, 1 parts cleaner	40 CFR §71.5(c)(11)(ii)(A) (Insignificant emissions levels: "Emission criteria for regulated air pollutants, excluding hazardous air pollutants (HAP). Potential to emit of regulated air pollutants, excluding HAP, for any single emissions unit shall not exceed 2 tpy.") Storage Tanks: • 1 Diesel storage tank (400 gallons) • 1 Natural Gas Condensate tank (1,100 gallons) Parts Cleaner: • 1 Parts cleaner (40 gallons capacity; not in service)	✓	

United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

EMISSION CALCULATIONS (EMISS)

Calculate potential to emit (PTE) for applicability purposes and actual emissions for fee purposes for each emissions unit, control device, or alternative operating scenario identified in section I of form **GIS**. If form **FEE** does not need to be submitted with the application, do not calculate actual emissions.

A. Emissions Unit ID EU 001

B. Identification and Quantification of Emissions

First, list each air pollutant that is either regulated at the unit or present in major amounts, then list any other regulated pollutant (for fee calculation) not already listed. HAP may be simply listed as "HAP." Next, calculate PTE for applicability purposes and actual emissions for fee purposes for each pollutant. Do not calculate PTE for air pollutants listed solely for fee purposes. Include all fugitives for fee purposes. You may round to the nearest tenth of a ton for yearly values or tenth of a pound for hourly values.

Air Pollutants	Emission Rates: Actual Annual Emissions (tons/yr)	Emission Rates: Potential to Emit: Hourly (lb/hr)	Emission Rates: Potential to Emit: Annual (tons/yr)	CAS No.
Emissions for this unit are listed in Appendix E – Table 4 for EU-001.				

United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

EMISSION CALCULATIONS (EMISS)

Calculate potential to emit (PTE) for applicability purposes and actual emissions for fee purposes for each emissions unit, control device, or alternative operating scenario identified in section I of form **GIS**. If form **FEE** does not need to be submitted with the application, do not calculate actual emissions.

A. Emissions Unit ID EU 002

B. Identification and Quantification of Emissions

First, list each air pollutant that is either regulated at the unit or present in major amounts, then list any other regulated pollutant (for fee calculation) not already listed. HAP may be simply listed as "HAP." Next, calculate PTE for applicability purposes and actual emissions for fee purposes for each pollutant. Do not calculate PTE for air pollutants listed solely for fee purposes. Include all fugitives for fee purposes. You may round to the nearest tenth of a ton for yearly values or tenth of a pound for hourly values.

Air Pollutants	Emission Rates			CAS No.
	Actual Annual Emissions (tons/yr)	Potential to Emit		
		Hourly (lb/hr)	Annual (tons/yr)	
Emissions for this unit are listed in Appendix E – Table 4 for EU-002.				

United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

EMISSION CALCULATIONS (EMISS)

Calculate potential to emit (PTE) for applicability purposes and actual emissions for fee purposes for each emissions unit, control device, or alternative operating scenario identified in section I of form **GIS**. If form **FEE** does not need to be submitted with the application, do not calculate actual emissions.

A. Emissions Unit ID EU 003

B. Identification and Quantification of Emissions

First, list each air pollutant that is either regulated at the unit or present in major amounts, then list any other regulated pollutant (for fee calculation) not already listed. HAP may be simply listed as "HAP." Next, calculate PTE for applicability purposes and actual emissions for fee purposes for each pollutant. Do not calculate PTE for air pollutants listed solely for fee purposes. Include all fugitives for fee purposes. You may round to the nearest tenth of a ton for yearly values or tenth of a pound for hourly values.

Air Pollutants	Emission Rates: Actual Annual Emissions (tons/yr)	Emission Rates: Potential to Emit: Hourly (lb/hr)	Emission Rates: Potential to Emit: Annual (tons/yr)	CAS No.
Emissions for this unit are listed in Appendix E – Table 4 for EU-003.				

United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

EMISSION CALCULATIONS (EMISS)

Calculate potential to emit (PTE) for applicability purposes and actual emissions for fee purposes for each emissions unit, control device, or alternative operating scenario identified in section I of form **GIS**. If form **FEE** does not need to be submitted with the application, do not calculate actual emissions.

A. Emissions Unit ID EU 004

B. Identification and Quantification of Emissions

First, list each air pollutant that is either regulated at the unit or present in major amounts, then list any other regulated pollutant (for fee calculation) not already listed. HAP may be simply listed as "HAP." Next, calculate PTE for applicability purposes and actual emissions for fee purposes for each pollutant. Do not calculate PTE for air pollutants listed solely for fee purposes. Include all fugitives for fee purposes. You may round to the nearest tenth of a ton for yearly values or tenth of a pound for hourly values.

Air Pollutants	Emission Rates			CAS No.
	Actual Annual Emissions (tons/yr)	Potential to Emit		
		Hourly (lb/hr)	Annual (tons/yr)	
Emissions for this unit are listed in Appendix E – Table 4 for EU-004.				

United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

POTENTIAL TO EMIT (PTE)

For each unit with emissions that count towards applicability, list the emissions unit ID and the PTE for the air pollutants listed below and sum them up to show totals for the facility. You may find it helpful to complete form **EMISS** before completing this form. Show other pollutants not listed that are present in major amounts at the facility on attachment in a similar fashion. You may round values to the nearest tenth of a ton. Also report facility totals in section **J** of form **GIS**.

Emissions Unit ID	Regulated Air Pollutants and Pollutants for which the Source is Major (tons/yr)						
	NOx	VOC	SO2	PM10	CO	Lead	HAP
EU 001	588.24	2.51	4.07	7.89	104.02	n/a	1.23
EU 002	211.65	1.53	2.48	4.81	799.14	n/a	0.75
EU 003	297.84 *	1.69	2.74	5.32	31.55	n/a	0.83
EU 004	29.38	0.85	0.004	0.07	4.01	n/a	0.52
FACILTY TOTALS	1127.11	6.58	9.29	18.09	938.72	n/a	3.32

United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 06/30/2015

Federal Operating Permit Program (40 CFR Part 71)

INITIAL COMPLIANCE PLAN AND COMPLIANCE CERTIFICATION (I-COMP)

SECTION A - COMPLIANCE STATUS AND COMPLIANCE PLAN

Complete this section for each unique combination of applicable requirements and emissions units at the facility. List all compliance methods (monitoring, recordkeeping and reporting) you used to determine compliance with the applicable requirement described above. Indicate your compliance status at this time for this requirement and compliance methods and check "YES" or "NO" to the follow-up question.

Emission Unit ID(s): EU-001 (Unit 501, LM 2500)

Applicable Requirement (Describe and Cite)

Permit Section 2.0(A)(1) NOx NSPS limit: 191 ppmv at 15 percent oxygen and on a dry basis. 40 CFR 60.332(a)(2).

Compliance Methods for the Above (Description and Citation):

Testing. Performance testing completed on 10/21-22/2010 –showing compliance (also refer to "Performance Testing" – Permit Condition Section 2.0(B)(4) below.).

Compliance Status:

_X_ In Compliance: Will you continue to comply up to permit issuance? _X_Yes ____No

___ Not In Compliance: Will you be in compliance at permit issuance? ___Yes ___No

___ Future-Effective Requirement: Do you expect to meet this on a timely basis? ____Yes ____No

---

Emission Unit ID(s): EU-001 and EU-003 (Unit 501, LM 2500 and Unit 503, LM 1600)

Applicable Requirement (Describe and Cite)

Permit Section 2.0(A)(2) SO_2 NSPS limit: shall not burn any fuel which contains sulfur in excess of 0.8% by weight. 40 CFR 60.333(b)

Compliance Methods for the Above (Description and Citation):

Operation and Tariff Recordkeeping. Unit fueled with pipeline quality natural gas. Company FERC certified tariff requirements: "shall not contain more than 20 grains total sulfur/100 scf of gas" which is equal to 0.068% by weight.

Compliance Status:

_X_ In Compliance: Will you continue to comply up to permit issuance? _X_Yes ____No

___ Not In Compliance: Will you be in compliance at permit issuance? ___Yes ___No

___ Future-Effective Requirement: Do you expect to meet this on a timely basis? ____Yes ____No

---

Emission Unit ID(s): EU-003 (Unit 503, LM 1600)

Applicable Requirement (Describe and Cite)

Permit Section 2.0(A)(3)(i) PSD BACT NOx limit: 160 ppmv at 15 percent oxygen and on a dry basis. Compliance will assure compliance with 40 CFR 60.332(a)(2): 196 ppmv at 15 percent oxygen and on a dry basis.

Compliance Methods for the Above (Description and Citation):

Testing. Performance testing completed on 10/21-22/2010 –showing compliance. GLGT has software controls in place that will prevent this unit from exceeding the emissions limit. Fuel usage and operating hours are recorded and used to calculate NOx emissions in accordance with approved NOx Monitoring Plan.

Compliance Status:

_X_ In Compliance: Will you continue to comply up to permit issuance? _X_Yes ____No

___ Not In Compliance: Will you be in compliance at permit issuance? ___Yes ___No

___ Future-Effective Requirement: Do you expect to meet this on a timely basis? ____Yes ____No

Emission Unit ID(s): EU-003 (Unit 503, LM 1600)
Applicable Requirement (Describe and Cite)
Permit Section 2.0(A)(3)(ii) PSD BACT NOx limit: 68 lb/hr at all times during operation.
Compliance Methods for the Above (Description and Citation):
Testing. Performance testing completed on 10/21-22/2010 –showing compliance. GLGT has software controls in place that will prevent this unit from exceeding the emissions limit. Fuel usage and operating hours are recorded and used to calculate NOx emissions in accordance with approved NOx Monitoring Plan.
Compliance Status:
_X_ In Compliance: Will you continue to comply up to permit issuance? _X_Yes ____No
___ Not In Compliance: Will you be in compliance at permit issuance? ___Yes ___No
___ Future-Effective Requirement: Do you expect to meet this on a timely basis? ____Yes ____No

Emission Unit ID(s): EU-004 (Unit 504, Caterpillar SR4)
Applicable Requirement (Describe and Cite)
Permit Section 2.0(A)(3)(iii) PSD BACT limit: 3,000 hours during any 12-consecutive month period.
Compliance Methods for the Above (Description and Citation):
Recordkeeping. Monthly records of 12-month rolling sum APU hours are kept onsite.
Compliance Status:
_X_ In Compliance: Will you continue to comply up to permit issuance? _X_Yes ____No
___ Not In Compliance: Will you be in compliance at permit issuance? ___Yes ___No
___ Future-Effective Requirement: Do you expect to meet this on a timely basis? ____Yes ____No

Emission Unit ID(s): All Emission Units
Applicable Requirement (Describe and Cite)
Permit Section 2.0(A)(4) Good Air Pollution Control Practice. 40 CFR 60.11(d)
Compliance Methods for the Above (Description and Citation):
Operation Procedures and Recordkeeping. Emission Units are operated in conjunction with manufacturer and industry standards for proper operation and maintenance. Emission units have no pollution control equipment. Standard Operation and Maintenance procedures are located onsite. Permit-specific training was provided to all "facility plant operators" by 10/11/2010. Records of training materials and sign-in sheets are kept onsite.
Compliance Status:
_X_ In Compliance: Will you continue to comply up to permit issuance? _X_Yes ____No
___ Not In Compliance: Will you be in compliance at permit issuance? ___Yes ___No
___ Future-Effective Requirement: Do you expect to meet this on a timely basis? ____Yes ____No

Emission Unit ID(s): EU-001 and EU-003 (Unit 501, LM 2500 and Unit 503, LM 1600)
Applicable Requirement (Describe and Cite)
Permit Section 2.0(B)(1) Monitoring and Testing. 40 CFR 70.6(a)(3)(i)(A)
Compliance Methods for the Above (Description and Citation):
Operation Procedures and Recordkeeping. GLGT has monitoring and recordkeeping systems in place that in turn support fulfillment of the NOx Monitoring Plant.
Compliance Status:
_X_ In Compliance: Will you continue to comply up to permit issuance? _X_Yes ____No
___ Not In Compliance: Will you be in compliance at permit issuance? ___Yes ___No
___ Future-Effective Requirement: Do you expect to meet this on a timely basis? ____Yes ____No

Emission Unit ID(s): EU-001 and EU-003 (Unit 501, LM 2500 and Unit 503, LM 1600)
Applicable Requirement (Describe and Cite)
Permit Section 2.0(B)(2) Monitoring and Testing. 40 CFR 60.334(h)(4), 40 CFR 60.331(u)
Compliance Methods for the Above (Description and Citation):
Tariff Recordkeeping. GLGT fuels EU-001 and EU-003 only with pipeline quality natural gas fed directly from the GLGT pipeline. GLGT FERC Certified tariff meets the requirements of 40 CFR 60.331(u), therefore sulfur monitoring is not required.
Compliance Status:
_X_ In Compliance: Will you continue to comply up to permit issuance? _X_Yes ____No
___ Not In Compliance: Will you be in compliance at permit issuance? ___Yes ___No
___ Future-Effective Requirement: Do you expect to meet this on a timely basis? ____Yes ____No

Emission Unit ID(s): EU-001 and EU-003 (Unit 501, LM 2500 and Unit 503, LM 1600)
Applicable Requirement (Describe and Cite)
Permit Section 2.0(B)(3) Performance Testing. 40 CFR 60.335, 60.8, 71.6(a)(3)(i)(A)
Compliance Methods for the Above (Description and Citation):
Testing and Recordkeeping. Performance testing on EU001 and EU 003 was conducted within 12 months of the effective date of this permit and will be conducted subsequently every 5 years thereafter. Testing for NOx will be conducted in accordance with test methods, procedures and calculations in 40 CFR Part 60 (Method 20). The 10/22/2010 performance testing at CS5 was completed in accordance with an approved performance test plan. A written report was submitted to EPA.
Compliance Status:
_X_ In Compliance: Will you continue to comply up to permit issuance? _X_Yes ____No
___ Not In Compliance: Will you be in compliance at permit issuance? ___Yes ___No
___ Future-Effective Requirement: Do you expect to meet this on a timely basis? ____Yes ____No

Emission Unit ID(s): Facility
Applicable Requirement (Describe and Cite)
Permit Section 2.0(C) Recordkeeping/Reporting. 40 CFR 71.6(a)(3), 60.7, 60.8.
Compliance Methods for the Above (Description and Citation):
Recordkeeping. Fuel usage and operating hour logs, performance test result reports, training records, and operation and maintenance procedures are maintained onsite. A copy of the Monitoring Plan is kept on site with the Title V permit. Rolling 12-month sum table of APU hours of operation is located onsite.
Compliance Status:
_X_ In Compliance: Will you continue to comply up to permit issuance? _X_Yes ____No
___ Not In Compliance: Will you be in compliance at permit issuance? ___Yes ___No
___ Future-Effective Requirement: Do you expect to meet this on a timely basis? ____Yes ____No

Emission Unit ID(s): Facility
Applicable Requirement (Describe and Cite)
Permit Section 3.0(A) General Recordkeeping. 40 CFR 71.6(a)(3)(ii)
Compliance Methods for the Above (Description and Citation):
Recordkeeping. All records of required monitoring information and support information are maintained for a period of 5 calendar years from the date of the sampling, measurement, report or application.
Compliance Status:
_X_ In Compliance: Will you continue to comply up to permit issuance? _X_Yes ____No
___ Not In Compliance: Will you be in compliance at permit issuance? ___Yes ___No
___ Future-Effective Requirement: Do you expect to meet this on a timely basis? ____Yes ____No

EPA United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 6/30/2015

Federal Operating Permit Program (40 CFR Part 71)

CERTIFICATION OF TRUTH, ACCURACY, AND COMPLETENESS (CTAC)

This form must be completed, signed by the "Responsible Official" designated for the facility or emission unit, and sent with each submission of documents (i.e., application forms, updates to applications, reports, or any information required by a part 71 permit).

A. Responsible Official

Name: (Last) Kornaga (First) Anthony (MI) M.

Title Director, US Gas PI and Storage Ops Plan Dev.

Street or P.O. Box 5250 Corporate Drive

City Troy State MI ZIP 48098 - 2644

Telephone (248) 205 - 7465 Ext. ______ Facsimile (___) ___ - ____

B. Certification of Truth, Accuracy and Completeness (to be signed by the responsible official)

I certify under penalty of law, based on information and belief formed after reasonable inquiry, the statements and information contained in these documents are true, accurate and complete.

Name (signed) Anth M. Kornaga

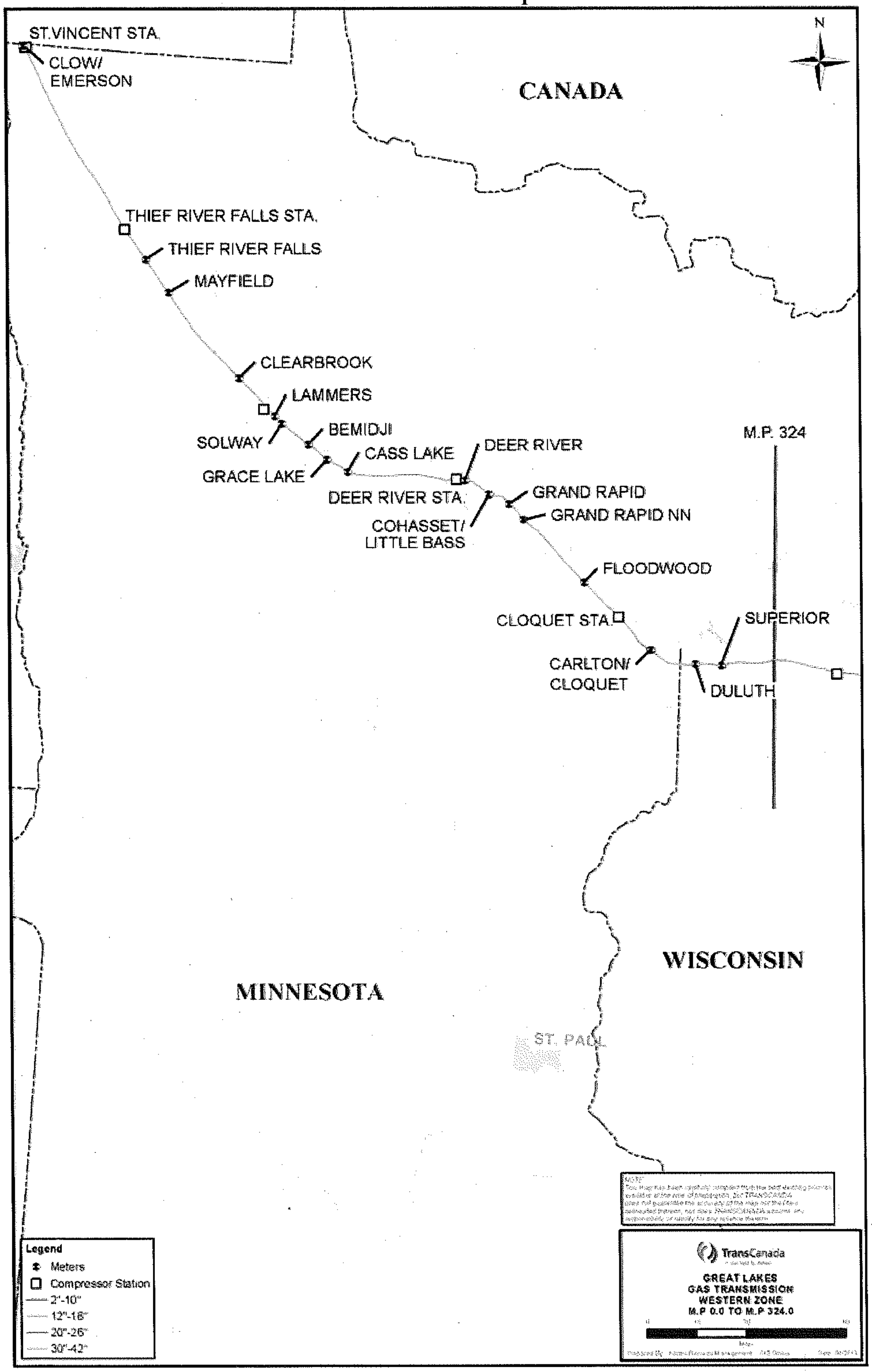
Name (typed) Anthony M. Kornaga Date: 8 / 10 / 2015

APPENDIX B:

SITE MAP/PLOT PLAN

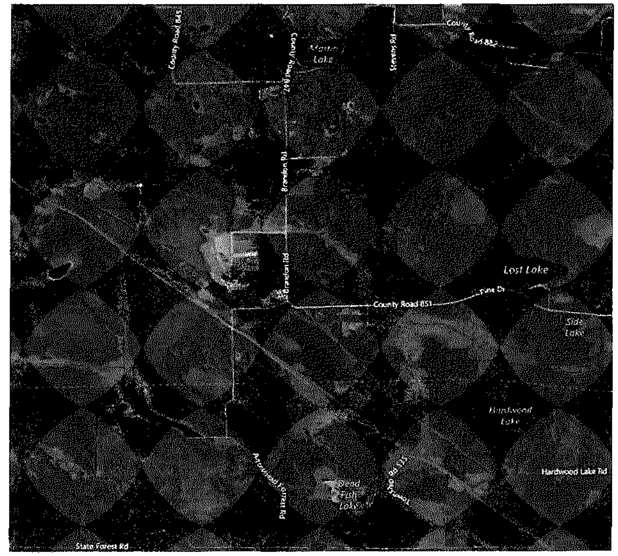
- Site Location Map
- Plot Plan

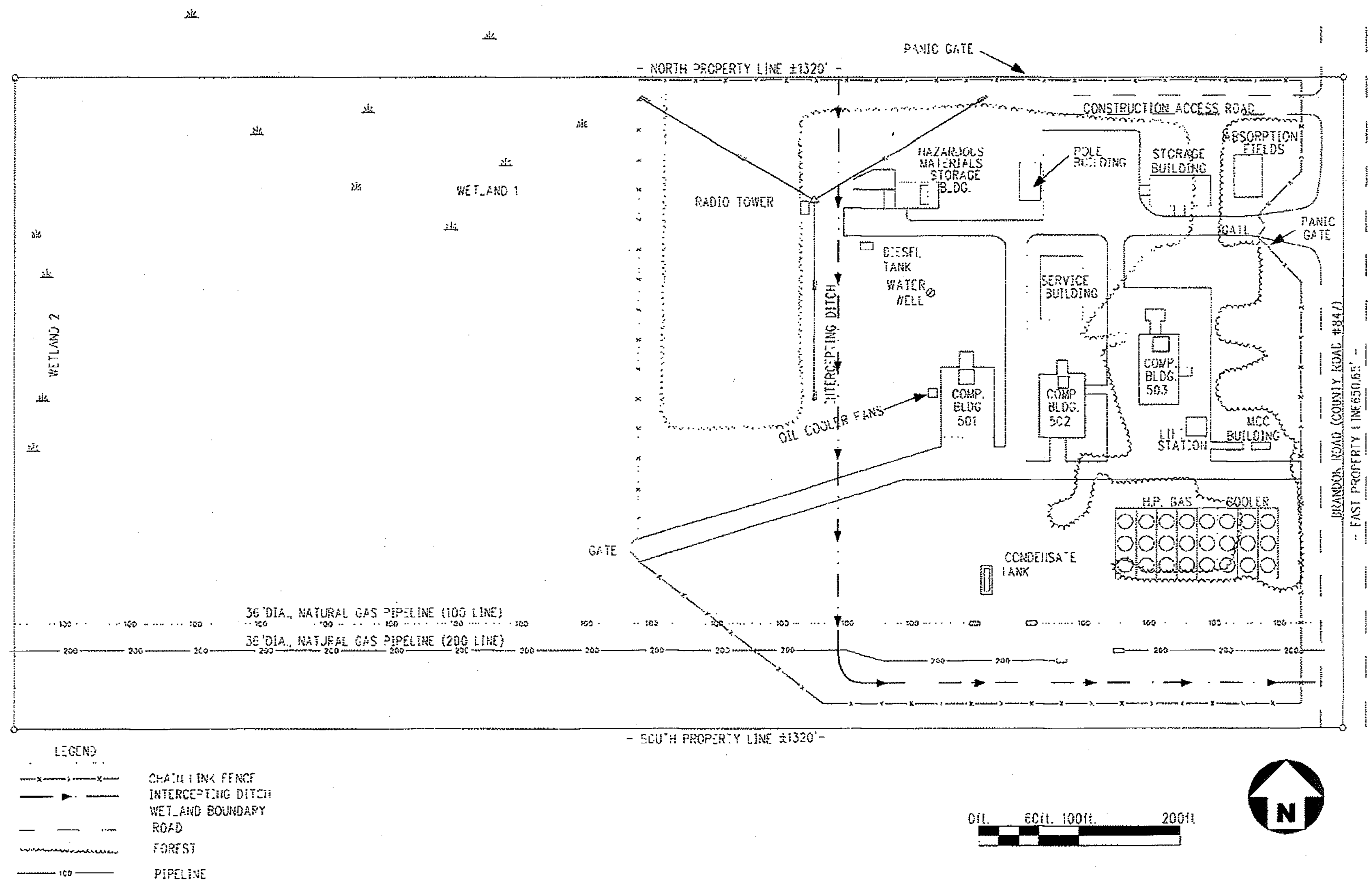
Western Zone Map



AREA MAP

Great Lakes Gas Transmission Company
Cloquet Compressor Station No. 5
St. Louis County, Minnesota





Great Lakes Gas Transmission Company

COMPRESSOR STATION NO. 5

ENVIRONMENTAL CONDITIONS - SITE SKETCH

M.P. 269.24, St. Louis County

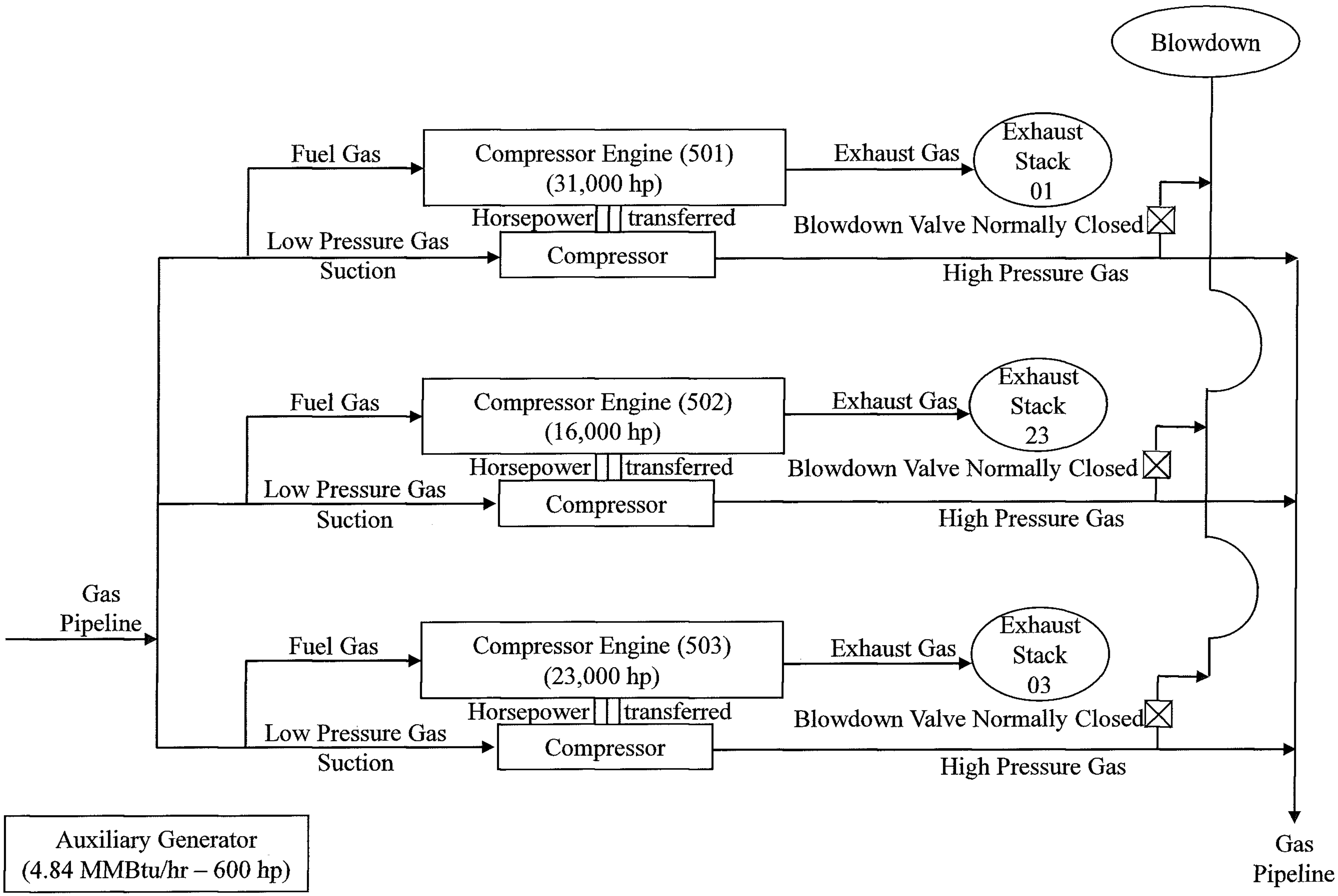
Cloquet, Minnesota

DATE	10/28/93	REVISED	03/05/01
FIGURE NO.	105-WS-1000		

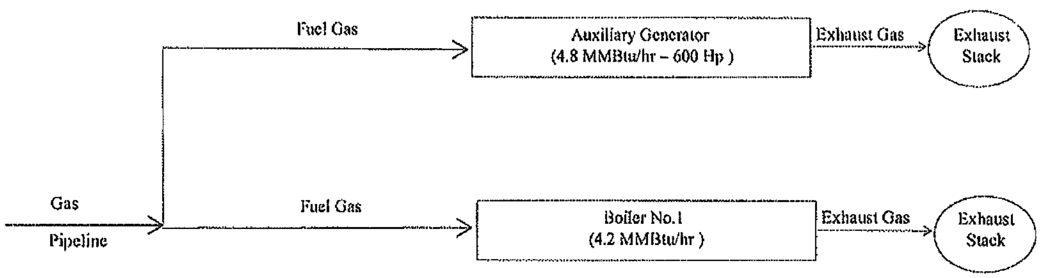
APPENDIX C:

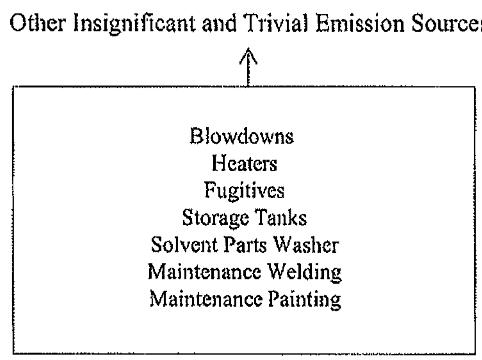
PROCESS FLOW DIAGRAMS

Simple Process Flow Diagram
Cloquet Compressor Station
Significant Emission Units



Simple Process Flow Diagram
Cloquet Compressor Station
Insignificant and Trivial Emission Units





APPENDIX D:

FERC GAS TARIFF

GENERAL TERMS AND CONDITIONS

FERC Gas Tariff

Third Revised Volume No. 1

of

GREAT LAKES GAS TRANSMISSION LIMITED PARTNERSHIP

Filed with

Federal Energy Regulatory Commission

Communications Covering This Tariff Should be Addressed to:

Joan Collins
Manager, Tariffs and Compliance
Great Lakes Gas Transmission Limited Partnership
Mailing Address: P.O. Box 2446
Houston, TX 77252-2446
Courier Address: 717 Texas Street
Houston, TX 77002-2761
Phone: (832) 320-5651
Fax: (832) 320-6651

6.8 QUALITY

1. Heating Value. Gas delivered by Shipper to Transporter at each point of receipt shall have a heating value not greater than 1069 BTUs per cubic foot nor less than 967 BTUs. Transporter shall have the right to waive such Btu content limits if, in Transporter's sole opinion, Transporter is able to accept gas with a Btu content outside such limits without affecting Transporter's operations. The heating value shall be determined at intervals of not more than thirty (30) Days by means of an instrument(s) of standard manufacture accepted in the industry for this purpose or using a sample of gas representative of the gas stream that is being delivered to Transporter or received from Transporter at the point(s) of receipt or delivery.

   In the event, however, that the heating value of Gas received by Transporter at any point drops below 1013 Btu, which is the Btu level at which the MDQs of Service Agreements are currently based and Transporter is unable to Transport a Shipper's Scheduled Daily Delivery due to the drop in the Btu level, Transporter shall utilize the Curtailment provision of Section 6.11.4 of the General Terms and Conditions, but only for those Shippers from whom Transporter receives Gas at that point.

   For the purpose of calculating receipts and deliveries, the heating value of the gas so determined at each such point shall be deemed to remain constant at such point until the next determination.

2. Freedom from Objectionable Odor and Matter

   The gas received and delivered hereunder:

   (a) shall be commercially free (at prevailing pressure and temperature) from objectionable odors, dust, or other solid or liquid matter that might interfere with its merchantability or cause injury to or interference with proper operation of the lines, regulators, meters and other equipment of Transporter;

   (b) shall not contain more than one quarter (1/4) grain of hydrogen sulfide per one hundred (100) cubic feet of gas;

   (c) shall not contain more than twenty (20) grains of total sulfur (including the sulfur in any hydrogen sulfide and mercaptans) per one hundred (100) cubic feet of gas;

   (d) shall not at any time have an oxygen content in excess of one percent (1%) by volume and the parties shall make every reasonable effort to keep the gas free of oxygen;

   (e) shall not contain as nearly as practicable any free water nor contain more than four (4) pounds of water vapor per million cubic feet of gas;

(f) shall not contain more than two percent (2%) by volume of carbon dioxide;

(g) shall be at a temperature not in excess of one hundred twenty degrees (120°) Fahrenheit or less than twenty degrees (20°) Fahrenheit; and

(h) shall not contain more than three percent (3%) by volume of nitrogen.

3. Failure to Meet Specifications. Should any gas tendered for delivery by Shipper fail at any time to conform to any of the specifications of this section, Transporter shall notify Shipper of the failure and Transporter may suspend all or a portion of the receipt of any such gas if it will jeopardize operation of Transporter's system or will cause Transporter to suffer an economic loss; and Transporter shall be relieved of all obligations for the duration of such time as the gas does not meet the specifications; provided however that Transporter shall have the right to waive the specifications set forth in this section if, in Transporter's sole opinion, Transporter is able to accept such non-conforming gas without adversely affecting Transporter's operations.

4. Commingling. It is recognized that gas delivered by Shipper will be commingled with other gas transported by Transporter. Accordingly, the gas of Shipper shall be subject to such changes in heat content as may result from such commingling and Transporter shall, notwithstanding any other provision in this FERC Gas Tariff, Third Revised Volume No. 1, herein, be under no obligation to redeliver for Shipper's account, gas of a heat content identical to that caused to be delivered by Shipper to Transporter.

APPENDIX E:

EMISSION CALCULATION SPREADSHEETS

- Table 1 – Potential Emissions Summary
- Table 2 – Potential Emissions of Hazardous Air Pollutants
- Table 3 – 2013 Actual Emissions of Criteria and Hazardous Air Pollutants
- Table 4 – 2013 Actual and Potential Emissions of Criteria and Hazardous Air Pollutants for Natural Gas-Fired Turbine EU 001
- Table 4 – 2013 Actual and Potential Emissions of Criteria and Hazardous Air Pollutants for Natural Gas-Fired Turbine EU 002
- Table 4 – 2013 Actual and Potential Emissions of Criteria and Hazardous Air Pollutants for Natural Gas-Fired Turbine EU 003
- Table 4 – 2013 Actual and Potential Emissions of Criteria and Hazardous Air Pollutants for Natural Gas-Fired Standby Electrical Generator EU 004

Great Lakes Gas Transmission Limited Partnership
Deer River Compressor Station No. 4 (CS4)

Appendix E - Table 1 - Potential Emissions Summary

For EPA Part 71 Form PTE

Criteria Pollutant	**NOx**	**VOC**	**SO2**	**PM10**	**CO**	**Lead**	**HAP**
Turbine Unit 501 (EU 001)	588.24	2.51	4.07	7.89	104.02	n/a	1.23
Turbine Unit 502 (EU 002)	211.65	1.53	2.48	4.81	799.14	n/a	0.75
Turbine Unit 503 (EU 003)	297.84	1.69	2.74	5.32	31.55	n/a	0.83
Standby Generator (EU 004)	29.38	0.85	0.004	0.07	4.01	n/a	0.52
Total PTE Emissions (tpy)	1127.11	6.58	9.29	18.09	938.72	0.00	3.32

Great Lakes Gas Transmission Limited Partnership
Deer River Compressor Station No. 4 (CS4)

Appendix E - Table 2 - Potential Emissions of Hazardous Air Pollutants

For EPA Part 71 Form PTE
Potential Emissions - HAPs - TPY

Hazardous Air Pollutant (HAP)	CAS Number	Turbine Unit 501 (EU 001)	Turbine Unit 502 (EU 002)	Turbine Unit 503 (EU 003)	Standby Generator (EU 004)	Total PTE Emissions (tpy)
1,1,2,2-Tetrachloroethane	79-34-5				0.0003	0.0003
1,1,2-Trichloroethane	79-00-5				0.0002	0.0002
1,3-Butadiene	106-99-0	0.0005	0.0003	0.0003	0.002	0.003
1,3-Dichloropropene	542-75-6				0.0002	0.0002
2-Methylnaphthalene	91-57-6*				0.0002	0.0002
2,2,4-Trimethylpentane	540-84-1				0.002	
3-Methylchloranthrene	56-49-5*					##############
7,12-Dimethylbenz(a)anthracene	57-97-6*					0.0000000
Acenaphthene	83-32-9*				0.00001	0.00001
Acenaphthylene	203-96-8*				0.0000	0.0000
Acetaldehyde	75-07-0	0.048	0.029	0.032	0.060	0.122
Acrolein	107-02-8	0.008	0.005	0.005	0.037	0.047
Anthracene	120-12-7*					##############
Benz(a)anthracene	56-55-3*					##############
Benzene	71-43-2	0.014	0.009	0.010	0.003	0.022
Benzo(a)pyrene	50-32-8*					##############
Benzo(b)fluoranthene	205-99-2*				0.000001	0.000001
Benzo(e)pyrene	192-97-2				0.000003	
Benzo(g,h,i)perylene	191-24-2*				0.000003	0.000003
Benzo(k)fluoranthene	205-82-3*					##############
Biphenyl	92-52-4				0.002	
Carbon Tetrachloride	56-23-5				0.0003	0.0003
Chlorobenzene	108-90-7				0.0002	0.0002
Chloroform	67-66-3				0.0002	0.0002
Chrysene	218-01-9*				0.00000	0.00000
Dibenzo(a,h)anthracene	53-70-3*					##############
Dichlorobenzene	25321-22-6					0.00000
Ethylbenzene	100-41-4	0.038	0.023	0.026	0.0003	0.049
Ethylene Dibromide	106-93-4				0.0003	0.0003
Fluoranthene	206-44-0*				0.00001	0.00001
Fluorene	86-73-7*				0.0000	0.0000
Formaldehyde	50-00-0	0.849	0.517	0.572	0.380	1.470
Indeno(1,2,3-c,d)pyrene	193-39-5*					##############
Methanol	67-56-1				0.018	0.018
Methylene Chloride	74-87-3				0.0001	0.0001
Naphthalene	91-20-3	0.002	0.0009	0.001	0.001	0.003
n-Hexane	110-54-3				0.008	0.008
PAH	130498-29-2*	0.003	0.002	0.002	0.0002	0.004
Phenanthrene	85-01-8*				0.0001	0.0001
Phenol	108-95-2				0.0002	
Propylene Oxide	75-56-9	0.035	0.021	0.023		0.045
Pyrene	129-00-0*				0.00001	0.00001
Styrene	100-42-5				0.0002	0.0002
Tetrachloroethane	79-34-5				0.0000	
Toluene	108-88-3	0.155	0.095	0.105	0.003	0.202
Vinyl Chloride	75-01-4				0.0001	0.0001
Xylene	1330-20-7	0.077	0.047	0.052	0.001	0.100

* Polycyclic Organic Matter (POM)

	2.09
	1.470
	Formaldehyde

Great Lakes Gas Transmission Limited Partnership
Deer River Compressor Station No. 4 (CS4)

Appendix E - Table 3 - 2013 Actual Emissions of Criteria and Hazardous Air Pollutants

For EPA Part 71 Form FEE Part D.

Criteria Pollutant	NOx	VOC	SO2	PM10	CO	Lead	HAP
Turbine Unit 501 (EU 001)	9.35	0.04	0.06	0.13	1.65	n/a	0.02
Turbine Unit 502 (EU 002)	2.28	0.02	0.03	0.05	8.63	n/a	0.01
Turbine Unit 503 (EU 003)	56.58	0.29	0.47	0.92	5.43	n/a	0.14
Standby Generator (EU 004)	5.74	0.17	0.0008	0.01	0.78	n/a	0.10
Total 2013 Actual Emissions (tpy)	73.95	0.51	0.56	1.11	16.49	n/a	0.27

For EPA Part 71 Form FEE Part E. HAP Identification

Hazardous Air Pollutant (HAP)	CAS Number	HAP Number	Turbine Unit 501 (EU 001)	Turbine Unit 502 (EU 002)	Turbine Unit 503 (EU 003)	Standby Generator (EU 004)	Total 2013 Actual Emissions (tpy)
1,1,2,2-Tetrachloroethane	79-34-5	HAP 1				5.63E-05	############
1,1,2-Trichloroethane	79-00-5	HAP 2				4.47E-05	############
1,3-Butadiene	106-99-0	HAP 3	8.17E-06	3.38E-06	5.96E-05	3.76E-04	############
1,3-Dichloropropene	542-75-6	HAP 4				3.71E-05	############
2-Methylnaphthalene	91-57-6*	HAP 6				4.67E-05	############
2,2,4-Trimethylpentane	540-84-1					3.52E-04	
3-Methylchloranthrene	56-49-5*	HAP 7					############
7,12-Dimethylbenz(a)anthracene	57-97-6*	HAP 8					############
Acenaphthene	83-32-9*	HAP 9				1.76E-06	############
Acenaphthylene	203-96-8*	HAP 10				7.78E-06	############
Acetaldehyde	75-07-0	HAP 11	7.60E-04	3.15E-04	5.55E-03	1.18E-02	############
Acrolein	107-02-8	HAP 12	1.22E-04	5.03E-05	8.87E-04	7.23E-03	############
Anthracene	120-12-7*	HAP 13					############
Benz(a)anthracene	56-55-3*	HAP 14					############
Benzene	71-43-2	HAP 15	2.28E-04	9.44E-05	1.66E-03	6.19E-04	############
Benzo(a)pyrene	50-32-8*	HAP 16					############
Benzo(b)fluoranthene	205-99-2*	HAP 17				2.34E-07	############
Benzo(e)pyrene	192-97-2					5.84E-07	
Benzo(g,h,i)perylene	191-24-2*	HAP 19				5.83E-07	############
Benzo(k)fluoranthene	205-82-3*	HAP 20					############
Biphenyl	92-52-4					2.98E-04	
Carbon Tetrachloride	56-23-5	HAP 22				5.16E-05	############
Chlorobenzene	108-90-7	HAP 23				4.28E-05	############
Chloroform	67-66-3	HAP 24				4.01E-05	############
Chrysene	218-01-9*	HAP 25				9.75E-07	############
Dibenzo(a,h)anthracene	53-70-3*	HAP 26					############
Dichlorobenzene	25321-22-6	HAP 27					############
Ethylbenzene	100-41-4	HAP 28	6.08E-04	2.52E-04	4.44E-03	5.59E-05	############
Ethylene Dibromide	106-93-4	HAP 29				6.23E-05	############
Fluoranthene	206-44-0*	HAP 30				1.56E-06	############
Fluorene	86-73-7*	HAP 31				7.98E-06	############
Formaldehyde	50-00-0	HAP 32	1.35E-02	5.59E-03	9.85E-02	7.43E-02	############
Indeno(1,2,3-c,d)pyrene	193-39-5*	HAP 33					############
Methanol	67-56-1	HAP 34				3.52E-03	############
Methylene Chloride	74-87-3	HAP 35				2.81E-05	############
Naphthalene	91-20-3	HAP 36	2.47E-05	1.02E-05	1.80E-04	1.05E-04	############
n-Hexane	110-54-3	HAP 37				1.56E-03	############
PAH	130498-29-2*	HAP 38	4.18E-05	1.73E-05	3.05E-04	3.79E-05	############
Phenanthrene	85-01-8*	HAP 39				1.46E-05	############
Phenol	108-95-2					3.38E-05	
Propylene Oxide	75-56-9	HAP 41	5.51E-04	2.28E-04	4.02E-03		############
Pyrene	129-00-0*	HAP 42				1.91E-06	############
Styrene	100-42-5	HAP 43				3.32E-05	############
Tetrachloroethane	79-34-5					3.49E-06	
Toluene	108-88-3	HAP 45	2.47E-03	1.02E-03	1.80E-02	5.74E-04	############
Vinyl Chloride	75-01-4	HAP 46				2.10E-05	############
Xylene	1330-20-7	HAP 47	1.22E-03	5.03E-04	8.87E-03	2.59E-04	############
Total 2013 Actual HAP Emissions			0.0195	0.0081	0.1425	0.102	0.251

* Polycyclic Organic Matter (POM)

Great Lakes Gas Transmission Limited Partnership
Deer River Compressor Station No. 4 (CS4)

Appendix E - Table 4 - 2013 Actual and Potential Emissions of Criteria and Hazardous Air Pollutants for Natural Gas-Fired Turbine Unit 402

For EPA Part 71 Form EMISS, Unit EU 001

Equipment Information	
Facility:	Cloquet CS5
AQD Emission Unit ID:	EU 001
Unit No.	501
Make:	General Electric
Model Number:	LM2500
Installation Date:	1986
AQD Stack Number:	SV001
Stack Height (feet):	39.5
Stack Diameter (feet):	7.34
Fuel Burned:	Natural Gas
Assumptions:	
Turbine Rated Capacity, (hp):	33,700
PTE Hours of Operation:	8,760
Brake-Specific Fuel Consumption (Btu/hp-hr):	8,100
2013 Actual Fuel Use (MMscf/year):	37.26
Calculated Max. Annual Fuel Use (MMscf/year):	2,344.33
Calculated Max. Hourly Fuel Use (MMscf/hour):	0.268
Calculated Max. Heat Input (MMBtu/hr):	273.0
Fuel Heat Content (Btu/scf):	1,020

Potential Emissions - Criteria Pollutants

Criteria Pollutant	Notes	Emission Factor (lb/MMBtu)	Stack Test Emission Factor plus Safety Factor (lb/MMBtu)	Emission Factor on Fuel Use Basis (lb/MMscf)	2013 Actual Emissions (tpy)	PTE Hourly Emissions (lb/hr)	PTE Annual Emissions (tpy)
NOx	1	4.1E-01	4.92E-01	501.840	9.35	134.30	588.24
VOC	2	2.1E-03	n/a	2.142	0.040	0.57	2.51
SO2	2,3	3.4E-03	n/a	3.468	0.065	0.93	4.07
PM (PM10)	2,4	6.6E-03	n/a	6.732	0.125	1.80	7.89
CO	1	6.0E-02	8.70E-02	88.740	1.65	23.75	104.02
Lead	2	--	n/a	n/a	n/a	n/a	n/a

Potential Emissions - HAPs

Hazardous Air Pollutant (HAP)	Notes	AP-42 Emission Factor (lb/MMBtu)	Emission Factor on Fuel Use Basis (lb/MMscf) [6]	2013 Actual Emissions (tpy)	PTE Hourly Emissions (lb/hr)	PTE Annual Emissions (tpy)
1,3-Butadiene	5	4.3E-07	4.39E-04	0.000	0.00	0.00
Acetaldehyde	5	4.0E-05	4.08E-02	0.001	0.01	0.05
Acrolein	5	6.4E-06	6.53E-03	0.000	0.00	0.01
Benzene	5	1.2E-05	1.22E-02	0.000	0.00	0.01
Ethylbenzene	5	3.2E-05	3.26E-02	0.001	0.01	0.04
Formaldehyde	5	7.1E-04	7.24E-01	0.013	0.19	0.85
Naphthalene	5	1.3E-06	1.33E-03	0.000	0.00	0.00
PAH	5,7	2.2E-06	2.24E-03	0.000	0.00	0.00
Propylene Oxide	5	2.9E-05	2.96E-02	0.001	0.01	0.03
Toluene	5	1.3E-04	1.33E-01	0.002	0.04	0.16
Xylene	5,8	6.4E-05	6.53E-02	0.001	0.02	0.08
			Total HAP	0.020	0.28	1.23

Notes
1. NOx and CO Emission Factors from Stack test (October 21, 2010). For Unit 501, a safety factor of 20% was added to the average NOx emission rate, and a safety factor of 45 percent was added to the average CO emission rate. Note that the NOx PTE figures for Unit 501 were calculated by using the NSPS emission limitation of 234.5 ppmv (see Section 4.1 for details) converted to an emission factor at stack conditions, as shown on the conversion table in Appendix J.
2. VOC, SO2, PM, and Lead Emission factors from AP-42 Table 3.1-2a, "Emission Factors for Criteria Pollutants and Greenhouse Gases from Stationary Gas Turbines" (4/00). Emission factor for lead listed as "ND = No Data".
3. SO2 emissions factor from AP-42 Table 3.1-2a (0.94S). Emission Factor footnote h: "...If S is not available, use 3.4 E-03 lb/MMBtu for natural gas turbines...."
4. It is assumed that PM (total) = PM10.
5. HAP emission factors from AP-42, Table 3.1-3, "Emission Factors for Hazardous Air Pollutants from Natural Gas-Fired Stationary Gas Turbines" (4/00).

6. Emission factors converted from lb/MMBtu to lb/MMscf using the AP-42 Emission Factor footnote c. "...To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by 1020..."
7. For inventory purposes, assume Polycyclic Aromatic Hydrocarbons (PAH) is the same as Polycyclic Organic Matter (POM).
8. Mixed xylenes

Great Lakes Gas Transmission Limited Partnership
Deer River Compressor Station No. 4 (CS4)

Appendix E - Table 4 - 2013 Actual and Potential Emissions of Criteria and Hazardous Air Pollutants for Natural Gas-Fired Turbine Unit 401

For EPA Part 71 Form EMISS, Unit EU 002

Equipment Information	
Facility:	Cloquet CS5
AQD Emission Unit ID:	EU 002
Unit No.	502
Make:	Rolls Royce/Avon
Model Number:	76G
Installation Date:	1969
AQD Stack Number:	SV002
Stack Height (feet):	31.0
Stack Diameter (feet):	9.19
Fuel Burned:	Natural Gas
Assumptions:	
Turbine Rated Capacity, (hp):	16,000
PTE Hours of Operation:	8,760
Brake-Specific Fuel Consumption (Btu/hp-hr):	10,400
2013 Actual Fuel Use (MMscf/year):	15.42
Calculated Max. Annual Fuel Use (MMscf/year):	1,429.08
Calculated Max. Hourly Fuel Use (MMscf/hour):	0.163
Calculated Max. Heat Input (MMBtu/hr):	166.4
Fuel Heat Content (Btu/scf):	1,020

Potential Emissions - Criteria Pollutants

Criteria Pollutant	Notes	Emission Factor (lb/MMBtu)	Stack Test Emission Factor plus Safety Factor (lb/MMBtu)	Emission Factor on Fuel Use Basis (lb/MMscf)	2013 Actual Emissions (tpy)	PTE Hourly Emissions (lb/hr)	PTE Annual Emissions (tpy)
NOx	1	2.4E-01	2.90E-01	296.208	2.28	48.32	211.65
VOC	2	2.1E-03	n/a	2.142	0.017	0.35	1.53
SO2	2,3	3.4E-03	n/a	3.468	0.027	0.57	2.48
PM (PM10)	2,4	6.6E-03	n/a	6.732	0.052	1.10	4.81
CO	1	7.5E-01	1.10E+00	1118.389	8.63	182.45	799.14
Lead	2	--	n/a	n/a	n/a	n/a	n/a

Potential Emissions - HAPs

Hazardous Air Pollutant (HAP)	Notes	AP-42 Emission Factor (lb/MMBtu)	Emission Factor on Fuel Use Basis (lb/MMscf) [6]	2013 Actual Emissions (tpy)	PTE Hourly Emissions (lb/hr)	PTE Annual Emissions (tpy)
1,3-Butadiene	5	4.3E-07	4.39E-04	0.000	0.00	0.00
Acetaldehyde	5	4.0E-05	4.08E-02	0.000	0.01	0.03
Acrolein	5	6.4E-06	6.53E-03	0.000	0.00	0.00
Benzene	5	1.2E-05	1.22E-02	0.000	0.00	0.01
Ethylbenzene	5	3.2E-05	3.26E-02	0.000	0.01	0.02
Formaldehyde	5	7.1E-04	7.24E-01	0.006	0.12	0.52
Naphthalene	5	1.3E-06	1.33E-03	0.000	0.00	0.00
PAH	5,7	2.2E-06	2.24E-03	0.000	0.00	0.00
Propylene Oxide	5	2.9E-05	2.96E-02	0.000	0.00	0.02
Toluene	5	1.3E-04	1.33E-01	0.001	0.02	0.09
Xylene	5,8	6.4E-05	6.53E-02	0.001	0.01	0.05
			Total HAP	0.008	0.17	0.75

Notes
1. NOx and CO Emission Factors from Stack test (December 1, 2005). For Unit 502, a safety factor of 20% was added to the average NOx emission rate, and a safety factor of 46 percent was added to the average CO emission rate.
2. VOC, SO2, PM, and Lead Emission factors from AP-42 Table 3.1-2a, "Emission Factors for Criteria Pollutants and Greenhouse Gases from Stationary Gas
3. SO2 emissions factor from AP-42 Table 3.1-2a (0.94S). Emission Factor footnote h: "...If S is not available, use 3.4 E-03 lb/MMBtu for natural gas turbines...."
4. It is assumed that PM (total) = PM10.
5. HAP emission factors from AP-42, Table 3.1-3, "Emission Factors for Hazardous Air Pollutants from Natural Gas-Fired Stationary Gas Turbines" (4/00).

6. Emission factors converted from lb/MMBtu to lb/MMscf using the AP-42 Emission Factor footnote c. "...To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by 1020..."
7. For inventory purposes, assume Polycyclic Aromatic Hydrocarbons (PAH) is the same as Polycyclic Organic Matter (POM).
8. Mixed xylenes

Great Lakes Gas Transmission Limited Partnership
Deer River Compressor Station No. 4 (CS4)

Appendix E - Table 4 - 2013 Actual and Potential Emissions of Criteria and Hazardous Air Pollutants for Natural Gas-Fired Turbine Unit 402

For EPA Part 71 Form EMISS, Unit EU 003

Equipment Information	
Facility:	Cloquet CS5
AQD Emission Unit ID:	EU 003
Unit No.	503
Make:	General Electric
Model Number:	LM1600
Installation Date:	1992
AQD Stack Number:	SV003
Stack Height (feet):	38.8
Stack Diameter (feet):	5.68
Fuel Burned:	Natural Gas
Assumptions:	
Turbine Rated Capacity, (hp):	23,000
PTE Hours of Operation:	8,760
Brake-Specific Fuel Consumption (Btu/hp-hr):	8,000
2013 Actual Fuel Use (MMscf/year):	271.90
Calculated Max. Annual Fuel Use (MMscf/year):	1,580.24
Calculated Max. Hourly Fuel Use (MMscf/hour):	0.180
Calculated Max. Heat Input (MMBtu/hr):	184.0
Fuel Heat Content (Btu/scf):	1,020

Potential Emissions - Criteria Pollutants

Criteria Pollutant	Notes	Emission Factor (lb/MMBtu)	Stack Test Emission Factor plus Safety Factor (lb/MMBtu)	Emission Factor on Fuel Use Basis (lb/MMscf)	2013 Actual Emissions (tpy)	PTE Hourly Emissions (lb/hr)	PTE Annual Emissions (tpy)
NOx	1,2	3.4E-01	4.08E-01	416.160	56.58	68.00	297.84
VOC	3	2.1E-03	n/a	2.142	0.291	0.39	1.69
SO2	3,4	3.4E-03	n/a	3.468	0.471	0.63	2.74
PM (PM10)	3,5	6.6E-03	n/a	6.732	0.915	1.21	5.32
CO	1	2.7E-02	3.92E-02	39.933	5.43	7.20	31.55
Lead	3	--	n/a	n/a	n/a	n/a	n/a

Potential Emissions - HAPs

Hazardous Air Pollutant (HAP)	Notes	AP-42 Emission Factor (lb/MMBtu)	Emission Factor on Fuel Use Basis (lb/MMscf) 6	2013 Actual Emissions (tpy)	PTE Hourly Emissions (lb/hr)	PTE Annual Emissions (tpy)
1,3-Butadiene	7	4.3E-07	4.39E-04	0.000	0.00	0.00
Acetaldehyde	7	4.0E-05	4.08E-02	0.006	0.01	0.03
Acrolein	7	6.4E-06	6.53E-03	0.001	0.00	0.01
Benzene	7	1.2E-05	1.22E-02	0.002	0.00	0.01
Ethylbenzene	7	3.2E-05	3.26E-02	0.004	0.01	0.03
Formaldehyde	7	7.1E-04	7.24E-01	0.098	0.13	0.57
Naphthalene	7	1.3E-06	1.33E-03	0.000	0.00	0.00
PAH	7,8	2.2E-06	2.24E-03	0.000	0.00	0.00
Propylene Oxide	7	2.9E-05	2.96E-02	0.004	0.01	0.02
Toluene	7	1.3E-04	1.33E-01	0.018	0.02	0.10
Xylene	7,9	6.4E-05	6.53E-02	0.009	0.01	0.05
			Total HAP	0.142	0.19	0.83

Notes

1. NOx and CO Emission Factors from Stack test (October 22, 2010). For Unit 503, a safety factor of 20% was added to the average NOx emission rate, and a safety factor of 45 percent was added to the average CO emission rate.
2. NOx Potential to Emit was calculated using the permit limit of 68 lb/hr and operation of 8,760 hours/yr. Permit Condition 2.0(A)(3)(ii): "Total NOx emissions from EU 003 shall not exceed 68 pounds per hour at any time during operation."
3. VOC, SO2, PM, and Lead Emission factors from AP-42 Table 3.1-2a, "Emission Factors for Criteria Pollutants and Greenhouse Gases from Stationary Gas
4. SO2 emissions factor from AP-42 Table 3.1-2a (0.94S). Emission Factor footnote h: "...If S is not available, use 3.4 E-03 lb/MMBtu for natural gas turbines...."
5. It is assumed that PM (total) = PM10.

6. Emission factors converted from lb/MMBtu to lb/MMscf using the AP-42 Emission Factor footnote c. "...To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by 1020..."
7. HAP emission factors from AP-42, Table 3.1-3, "Emission Factors for Hazardous Air Pollutants from Natural Gas-Fired Stationary Gas Turbines" (4/00).
8. For inventory purposes, assume Polycyclic Aromatic Hydrocarbons (PAH) is the same as Polycyclic Organic Matter (POM).
9. Mixed xylenes

Appendix E - Table 4 - 2013 Actual and Potential Emissions of Criteria and Hazardous Air Pollutants for Natural Gas-Fired Standby Electrical Generator

For EPA Part 71 Form EMISS, Unit EU 004

Equipment Information	
Facility:	Cloquet CS5
AQD Emission Unit ID:	EU 004
Unit No.	504
Make:	Caterpillar
Model Number:	SR4, 4SLB
Installation Date:	1993
AQD Stack Number:	SV004
Stack Height (feet):	10.0
Stack Diameter (feet):	0.67
Fuel Burned:	Natural Gas
Assumptions:	
Rated Capacity, (hp):	600
Calculated 2013 Actual Hours of Operation:	586.3
PTE Hours of Operation[1]:	3,000
Brake-Specific Fuel Consumption (Btu/hp-hr):	8,000
Calculated 2013 Actual Fuel Use (MMscf/year):	2.759
Calculated Max. Annual Fuel Use (MMscf/year):	14.12
Calculated Max. Hourly Fuel Use (MMscf/hour):	0.005
Calculated Max. Heat Input (MMBtu/hr):	4.8
Fuel Heat Content (Btu/scf):	1,020

Potential Emissions - Criteria Pollutants

Criteria Pollutant	Notes	Emission Factor (lb/MMBtu)	Emission Factor on Fuel Use Basis (lb/MMscf)	2013 Actual Emissions (tpy)	PTE Hourly Emissions (lb/hr)	PTE Annual Emissions (tpy) [1]
NOx	2	4.08E+00	4161.600	5.74	19.58	29.38
VOC	2	1.18E-01	120.360	0.17	0.57	0.85
SO2	2	5.88E-04	0.600	0.00	0.00	0.00
PM10	2,3	9.99E-03	10.187	0.01	0.05	0.07
CO	2,4	5.57E-01	568.140	0.78	2.67	4.01
Lead	2	not listed	n/a	n/a	n/a	n/a

Potential Emissions - HAPs

Hazardous Air Pollutant (HAP)	Notes	AP-42 Emission Factor (lb/MMBtu)	Emission Factor on Fuel Use Basis (lb/MMscf) [5]	2013 Actual Emissions (tpy)	PTE Hourly Emissions (lb/hr)	PTE Annual Emissions (tpy)
1,1,2,2-Tetrachloroethane	6	4.00E-05	4.08E-02	0.00006	0.0002	0.0003
1,1,2-Trichloroethane	6	3.18E-05	3.24E-02	0.00004	0.0002	0.0002
1,3-Butadiene	6	2.67E-04	2.72E-01	0.00038	0.0013	0.0019
1,3-Dichloropropene	6	2.64E-05	2.69E-02	0.00004	0.0001	0.0002
2-Methylnaphthalene	6	3.32E-05	3.39E-02	0.00005	0.0002	0.0002
2,2,4-Trimethylpentane	6	2.50E-04	2.55E-01	0.00035	0.0012	0.0018
Acenaphthene	6	1.25E-06	1.28E-03	0.00000	0.0000	0.0000
Acenaphthylene	6	5.53E-06	5.64E-03	0.00001	0.0000	0.0000
Acetaldehyde	6	8.36E-03	8.53E+00	0.01176	0.0401	0.0602
Acrolein	6	5.14E-03	5.24E+00	0.00723	0.0247	0.0370
Benzene	6	4.40E-04	4.49E-01	0.00062	0.0021	0.0032
Benzo(b)fluoranthene	6	1.66E-07	1.69E-04	0.00000	0.0000	0.0000
Benzo(e)pyrene	6	4.15E-07	4.23E-04	0.00000	0.0000	0.0000
Benzo(g,h,i)perylene	6	4.14E-07	4.22E-04	0.00000	0.0000	0.0000
Biphenyl	6	2.12E-04	2.16E-01	0.00030	0.0010	0.0015
Carbon Tetrachloride	6	3.67E-05	3.74E-02	0.00005	0.0002	0.0003
Chlorobenzene	6	3.04E-05	3.10E-02	0.00004	0.0001	0.0002
Chloroform	6	2.85E-05	2.91E-02	0.00004	0.0001	0.0002
Chrysene	6	6.93E-07	7.07E-04	0.00000	0.0000	0.0000
Ethylbenzene	6	3.97E-05	4.05E-02	0.00006	0.0002	0.0003
Ethylene Dibromide	6	4.43E-05	4.52E-02	0.00006	0.0002	0.0003
Fluoranthene	6	1.11E-06	1.13E-03	0.00000	0.0000	0.0000
Fluorene	6	5.67E-06	5.78E-03	0.00001	0.0000	0.0000
Formaldehyde	6	5.28E-02	5.39E+01	0.07430	0.2534	0.3802
Methanol	6	2.50E-03	2.55E+00	0.00352	0.0120	0.0180
Methylene Chloride	6	2.00E-05	2.04E-02	0.00003	0.0001	0.0001
n-Hexane	6	1.11E-03	1.13E+00	0.00156	0.0053	0.0080
Naphthalene	6	7.44E-05	7.59E-02	0.00010	0.0004	0.0005
PAH	6,7	2.69E-05	2.74E-02	0.00004	0.0001	0.0002
Phenanthrene	6	1.04E-05	1.06E-02	0.00001	0.0000	0.0001
Phenol	6	2.40E-05	2.45E-02	0.00003	0.0001	0.0002
Pyrene	6	1.36E-06	1.39E-03	0.00000	0.0000	0.0000
Styrene	6	2.36E-05	2.41E-02	0.00003	0.0001	0.0002
Tetrachloroethane	6	2.48E-06	2.53E-03	0.00000	0.0000	0.0000
Toluene	6	4.08E-04	4.16E-01	0.00057	0.0020	0.0029
Vinyl Chloride	6	1.49E-05	1.52E-02	0.00002	0.0001	0.0001
Xylene	6	1.84E-04	1.88E-01	0.00026	0.0009	0.0013
			Total HAP	0.102	0.347	0.520

Notes
1. Potential to Emit was calculated using the permit limit of 3,000 hours/yr. Permit Condition 2.0(A)(3)(iii): "Total operating hours of EU 004 shall not exceed 3,000 hours during any 12-consecutive month period..."
2. VOC, SO2, PM, and CO Emission factors from AP-42 Table 3.2-2, "Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines" (7/00).
3. PM10 is the sum of the emission factors for PM10 (filterable) and PM Condensable.
4. CO factor is for <90% Load (more conservative than 90-105% Load).
5. Emission factors converted from lb/MMBtu to lb/MMscf using the AP-42 Emission Factor footnote b. "...To convert from (lb/MMBtu) to (lb/106 scf), multiply by the heat content of the fuel. If the heat content is not available, use 1020 Btu/scf...."
6. HAP emission factors from AP-42 Table 3.2-2, "Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines" (7/00).
7. For inventory purposes, assumed PAH is the same as Polycyclic Organic Matter (POM).

APPENDIX F:

EPA COMPILATION OF AIR POLLUTANT EMISSION FACTORS, AP-42, SUPPLEMENT F, EMISSION FACTOR INFORMATION

- Chapter 3.1 Stationary Gas Turbines
- Chapter 3.2 Natural Gas-Fired Reciprocating Engines

Table 3.1-2a. EMISSION FACTORS FOR CRITERIA POLLUTANTS AND GREENHOUSE GASES FROM STATIONARY GAS TURBINES

Emission Factors[a] - Uncontrolled				
Pollutant	Natural Gas-Fired Turbines[b]		Distillate Oil-Fired Turbines[d]	
	(lb/MMBtu)[c] (Fuel Input)	Emission Factor Rating	(lb/MMBtu)[e] (Fuel Input)	Emission Factor Rating
CO_2[f]	110	A	157	A
N_2O	0.003[g]	E	ND	NA
Lead	ND	NA	1.4 E-05	C
SO_2	0.94S[h]	B	1.01S[h]	B
Methane	8.6 E-03	C	ND	NA
VOC	2.1 E-03	D	4.1 E-04[j]	E
TOC[k]	1.1 E-02	B	4.0 E-03[l]	C
PM (condensible)	4.7 E-03[l]	C	7.2 E-03[l]	C
PM (filterable)	1.9 E-03[l]	C	4.3 E-03[l]	C
PM (total)	6.6 E-03[l]	C	1.2 E-02[l]	C

[a] Factors are derived from units operating at high loads ($\geq$80 percent load) only. For information on units operating at other loads, consult the background report for this chapter (Reference 16), available at "www.epa.gov/ttn/chief". ND = No Data, NA = Not Applicable.

[b] SCCs for natural gas-fired turbines include 2-01-002-01, 2-02-002-01 & 03, and 2-03-002-02 & 03.

[c] Emission factors based on an average natural gas heating value (HHV) of 1020 Btu/scf at 60°F. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by 1020. Similarly, these emission factors can be converted to other natural gas heating values.

[d] SCCs for distillate oil-fired turbines are 2-01-001-01, 2-02-001-01, 2-02-001-03, and 2-03-001-02.

[e] Emission factors based on an average distillate oil heating value of 139 MMBtu/10^3 gallons. To convert from (lb/MMBtu) to (lb/10^3 gallons), multiply by 139.

[f] Based on 99.5% conversion of fuel carbon to CO_2 for natural gas and 99% conversion of fuel carbon to CO_2 for distillate oil. CO_2 (Natural Gas) [lb/MMBtu] = (0.0036 scf/Btu)(%CON)(C)(D), where %CON = weight percent conversion of fuel carbon to CO_2, C = carbon content of fuel by weight, and D = density of fuel. For natural gas, C is assumed at 75%, and D is assumed at 4.1 E+04 lb/10^6scf. For distillate oil, CO_2 (Distillate Oil) [lb/MMBtu] = (26.4 gal/MMBtu) (%CON)(C)(D), where C is assumed at 87%, and the D is assumed at 6.9 lb/gallon.

[g] Emission factor is carried over from the previous revision to AP-42 (Supplement B, October 1996) and is based on limited source tests on a single turbine with water-steam injection (Reference 5).

[h] All sulfur in the fuel is assumed to be converted to SO_2. S = percent sulfur in fuel. Example, if sulfur content in the fuel is 3.4 percent, then S = 3.4. If S is not available, use 3.4 E-03 lb/MMBtu for natural gas turbines, and 3.3 E-02 lb/MMBtu for distillate oil turbines (the equations are more accurate).

[j] VOC emissions are assumed equal to the sum of organic emissions.

[k] Pollutant referenced as THC in the gathered emission tests. It is assumed as TOC, because it is based on EPA Test Method 25A.

[l] Emission factors are based on combustion turbines using water-steam injection.

Table 3.1-3. EMISSION FACTORS FOR HAZARDOUS AIR POLLUTANTS FROM NATURAL GAS-FIRED STATIONARY GAS TURBINES[a]

Emission Factors[b] - Uncontrolled		
Pollutant	Emission Factor (lb/MMBtu)[c]	Emission Factor Rating
1,3-Butadiene[d]	< 4.3 E-07	D
Acetaldehyde	4.0 E-05	C
Acrolein	6.4 E-06	C
Benzene[e]	1.2 E-05	A
Ethylbenzene	3.2 E-05	C
Formaldehyde[f]	7.1 E-04	A
Naphthalene	1.3 E-06	C
PAH	2.2 E-06	C
Propylene Oxide[d]	< 2.9 E-05	D
Toluene	1.3 E-04	C
Xylenes	6.4 E-05	C

[a] SCC for natural gas-fired turbines include 2-01-002-01, 2-02-002-01, 2-02-002-03, 2-03-002-02, and 2-03-002-03. Hazardous Air Pollutants as defined in Section 112 (b) of the *Clean Air Act.*

[b] Factors are derived from units operating at high loads (≥80 percent load) only. For information on units operating at other loads, consult the background report for this chapter (Reference 16), available at "www.epa.gov/ttn/chief".

[c] Emission factors based on an average natural gas heating value (HHV) of 1020 Btu/scf at 60°F. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by 1020. These emission factors can be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this heating value.

[d] Compound was not detected. The presented emission value is based on one-half of the detection limit.

[e] Benzene with SCONOX catalyst is 9.1 E-07, rating of D.

[f] Formaldehyde with SCONOX catalyst is 2.0 E-05, rating of D.

Table 3.2-2. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE LEAN-BURN ENGINES[a]
(SCC 2-02-002-54)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Criteria Pollutants and Greenhouse Gases		
NO_x[c] 90 - 105% Load	4.08 E+00	B
NO_x[c] <90% Load	8.47 E-01	B
CO[c] 90 - 105% Load	3.17 E-01	C
CO[c] <90% Load	5.57 E-01	B
CO_2[d]	1.10 E+02	A
SO_2[e]	5.88 E-04	A
TOC[f]	1.47 E+00	A
Methane[g]	1.25 E+00	C
VOC[h]	1.18 E-01	C
PM10 (filterable)[i]	7.71 E-05	D
PM2.5 (filterable)[i]	7.71 E-05	D
PM Condensable[j]	9.91 E-03	D
Trace Organic Compounds		
1,1,2,2-Tetrachloroethane[k]	<4.00 E-05	E
1,1,2-Trichloroethane[k]	<3.18 E-05	E
1,1-Dichloroethane	<2.36 E-05	E
1,2,3-Trimethylbenzene	2.30 E-05	D
1,2,4-Trimethylbenzene	1.43 E-05	C
1,2-Dichloroethane	<2.36 E-05	E
1,2-Dichloropropane	<2.69 E-05	E
1,3,5-Trimethylbenzene	3.38 E-05	D
1,3-Butadiene[k]	2.67E-04	D
1,3-Dichloropropene[k]	<2.64 E-05	E
2-Methylnaphthalene[k]	3.32 E-05	C
2,2,4-Trimethylpentane[k]	2.50 E-04	C
Acenaphthene[k]	1.25 E-06	C

Table 3.2-2. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE LEAN-BURN ENGINES (Continued)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Acenaphthylene[k]	5.53 E-06	C
Acetaldehyde[k,l]	8.36 E-03	A
Acrolein[k,l]	5.14 E-03	A
Benzene[k]	4.40 E-04	A
Benzo(b)fluoranthene[k]	1.66 E-07	D
Benzo(e)pyrene[k]	4.15 E-07	D
Benzo(g,h,i)perylene[k]	4.14 E-07	D
Biphenyl[k]	2.12 E-04	D
Butane	5.41 E-04	D
Butyr/Isobutyraldehyde	1.01 E-04	C
Carbon Tetrachloride[k]	<3.67 E-05	E
Chlorobenzene[k]	<3.04 E-05	E
Chloroethane	1.87 E-06	D
Chloroform[k]	<2.85 E-05	E
Chrysene[k]	6.93 E-07	C
Cyclopentane	2.27 E-04	C
Ethane	1.05 E-01	C
Ethylbenzene[k]	3.97 E-05	B
Ethylene Dibromide[k]	<4.43 E-05	E
Fluoranthene[k]	1.11 E-06	C
Fluorene[k]	5.67 E-06	C
Formaldehyde[k,l]	5.28 E-02	A
Methanol[k]	2.50 E-03	B
Methylcyclohexane	1.23 E-03	C
Methylene Chloride[k]	2.00 E-05	C
n-Hexane[k]	1.11 E-03	C
n-Nonane	1.10 E-04	C

Table 3.2-2. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE LEAN-BURN ENGINES
(Continued)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
n-Octane	3.51 E-04	C
n-Pentane	2.60 E-03	C
Naphthalene[k]	7.44 E-05	C
PAH[k]	2.69 E-05	D
Phenanthrene[k]	1.04 E-05	D
Phenol[k]	2.40 E-05	D
Propane	4.19 E-02	C
Pyrene[k]	1.36 E-06	C
Styrene[k]	<2.36 E-05	E
Tetrachloroethane[k]	2.48 E-06	D
Toluene[k]	4.08 E-04	B
Vinyl Chloride[k]	1.49 E-05	C
Xylene[k]	1.84 E-04	B

[a] Reference 7. Factors represent uncontrolled levels. For NO_x, CO, and PM10, "uncontrolled" means no combustion or add-on controls; however, the factor may include turbocharged units. For all other pollutants, "uncontrolled" means no oxidation control; the data set may include units with control techniques used for NOx control, such as PCC and SCR for lean burn engines, and PSC for rich burn engines. Factors are based on large population of engines. Factors are for engines at all loads, except as indicated. SCC = Source Classification Code. TOC = Total Organic Compounds. PM-10 = Particulate Matter ≤ 10 microns (μm) aerodynamic diameter. A "<" sign in front of a factor means that the corresponding emission factor is based on one-half of the method detection limit.

[b] Emission factors were calculated in units of (lb/MMBtu) based on procedures in EPA Method 19. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by the heat content of the fuel. If the heat content is not available, use 1020 Btu/scf. To convert from (lb/MMBtu) to (lb/hp-hr) use the following equation:

$$\text{lb/hp-hr} = (\text{lb/MMBtu})\,(\text{heat input, MMBtu/hr})\,(\text{1/operating HP, 1/hp})$$

[c] Emission tests with unreported load conditions were not included in the data set.

[d] Based on 99.5% conversion of the fuel carbon to CO_2. CO_2 [lb/MMBtu] = (3.67)(%CON)(C)(D)(1/h), where %CON = percent conversion of fuel carbon to CO_2, C = carbon content of fuel by weight (0.75), D = density of fuel, 4.1 E+04 lb/10^6 scf, and

h = heating value of natural gas (assume 1020 Btu/scf at 60°F).

[e] Based on 100% conversion of fuel sulfur to SO_2. Assumes sulfur content in natural gas of 2,000 gr/10^6scf.

[f] Emission factor for TOC is based on measured emission levels from 22 source tests.

[g] Emission factor for methane is determined by subtracting the VOC and ethane emission factors from the TOC emission factor. Measured emission factor for methane compares well with the calculated emission factor, 1.31 lb/MMBtu vs. 1.25 lb/MMBtu, respectively.

[h] VOC emission factor is based on the sum of the emission factors for all speciated organic compounds less ethane and methane.

[i] Considered $\leq 1\ \mu m$ in aerodynamic diameter. Therefore, for filterable PM emissions, PM10(filterable) = PM2.5(filterable).

[j] PM Condensable = PM Condensable Inorganic + PM-Condensable Organic

[k] Hazardous Air Pollutant as defined by Section 112(b) of the Clean Air Act.

[l] For lean burn engines, aldehyde emissions quantification using CARB 430 may reflect interference with the sampling compounds due to the nitrogen concentration in the stack. The presented emission factor is based on FTIR measurements. Emissions data based on CARB 430 are available in the background report.

APPENDIX G:

EMISSION UNIT HEAT RATE FACTOR (Btu/hp-hr)

CALCULATION SPREADSHEET

Emission Unit Heat Rate Factor (Btu/hp-hr) Calculations

Unit No.	Make/Model	Test 1 Btu/hp-hr	Test 2 Btu/hp-hr	Test 3 Btu/hp-hr	Test 4 Btu/hp-hr
202	Avon 76G	10071	10300	9882	10043
301	Avon 76G	10208	10429	10060	10226
502	Avon 76G	9271	9406	9176	9578
303	LM1600	6950	6930	6998	6999
503	LM1600	7104	7160	7277	7277
302	LM2500	7275	7327	7455	7587
501	LM2500	7786	7847	7657	7895
701	LM2500	7794	8771	7626	7677

Average for all like units operated at 100% load:

	Tested Btu/hp-hr
Avon 76G	9887.5
GE LM1600	7086.9
GE LM2500	7724.8

	Tested (Btu/hp-hr) Avon 76G	GE LM1600	GE LM2500
Standard deviation	424.5	139.8	383.3

Student's t Distribution = Average + [t value*(std.dev./sqrt n)]

	n	n-1	sqrt of n	t value (99%)
Avon 76G	12	11	3.46	3.106
LM1600	8	7	2.83	3.499
LM2500	12	11	3.46	3.106

Student's t Distribution (@ 99% confidence interval)

	Tested
Avon 76G	10268.1
GE LM1600	7259.9
GE LM2500	8068.4

Use 8,000 Btu/hp-hr for General Electric LM1600 engines.
Use 8,100 Btu/hp-hr for General Electric LM2500 engines
Use 10,400 Btu/hp-hr for Avon 76G engines.

24-Jul-95

APPENDIX H:

ANNUAL EMISSIONS INVENTORY

Great Lakes Gas Transmission
Cloquet Compressor Station 5

CLOQUET # 5
EMISSION ESTIMATES
2013

Operator ID	Emission Unit Description	Annual Operating Hours	Days Operated per Year	Actual Gas Usage (MMscf)	Annual Tank Thruput (1000 gal)	NOx Emission Factor (lb/MMscf)	CO Emission Factor (lb/MMscf)	VOC Emission Factor (lb/MMscf or lb/1000 gal)	Ammonia Emission Factor (lb/MMscf)	PM10 Emission Factor (lb/MMscf)	SOx Emission Factor (lb/MMscf)
Unit 501	GE LM2500 Turbine	306	13	37.26	-	See attached tables for EF information					
Unit 502	Rolls Royce Avon Turbine	117	5	15.42	-						
Unit 503	GE LM1600 Turbine	2,831	118	271.90	-						

Operator ID	NOx Emissions (lbs/yr)	CO Emissions (lbs/yr)	VOC Emissions (lbs/yr)	Ammonia Emissions (lbs/yr)	PM10 Emissions (lbs/yr)	SOx Emissions (lbs/yr)	NOx Emissions (tpy)	CO Emissions (tpy)	VOC Emissions (tpy)	Ammonia Emissions (tpy)	PM10 Emissions (tpy)	SOx Emissions (tpy)
Unit 501	15,583.78	2,280.55	79.82	--	250.86	22.36	7.79189045	1.14027665	0.03990968	--	0.12543043	0.01117918
Unit 502	3,807.34	11,815.34	33.04	--	103.84	9.25	1.90367029	5.90767101	0.01651945	--	0.05181828	0.0046273
Unit 503	94,293.39	7,488.00	582.40	--	1,830.40	163.14	47.1466932	3.74400211	0.29120016	--	0.91520051	0.08156867
Total	**113,684.51**	**21,583.90**	**695.26**	**0.00**	**2,185.10**	**194.75**	**56.84**	**10.79**	**0.35**	**0.00**	**1.09**	**0.10**

Emissions Calculated as follows:

Engines (Actual Annual Gas Usage, MMscf) * (Emission Factor, lb/MMscf) = Emissions, lbs/yr)

Great Lakes Gas Transmission
Cloquet Compressor Station 5

Engine Data from COMET Database 1/1/13-12/31/13

Unit	Manufacturer	Model	Fuel Usage (MMcf/yr)
Unit 501	GENERAL ELECTRIC	LM 2500	37.264
Unit 502	ROLLS ROYCE	AVON	15.424
Unit 503	GENERAL ELECTRIC	LM 1600	271.896

Emission Factors to be used for reporting for engines

Unit	NO_X (lb/MMscf)	CO (lb/MMscf)	VOC (lb/MMscf)	PM (lb/MMscf)	SO_2 (lb/MMscf)
Unit 501	418.200	61.200	2.142	6.732	0.600
Unit 502	246.840	766.020	2.142	6.732	0.600
Unit 503	346.800	27.540	2.142	6.732	0.600

	Unit 501	Unit 502	Unit 503
NO_X	Emissions test 10/21/2010; g/hp-hr calculated based on Fuel Flow (scfh) from stack test (182,043 scfh)	December 1, 2005 stack test. Stack test report submitted to EPA January 10, 2006.	Emissions Test 10/22/2010; g/hp-hr calculated based on Fuel Flow (scfh) from stack test (146,743 scfh)
CO	Emissions test 10/21/2010, running at 34% load; g/hp-hr calculated based on Fuel Flow (scfh) from stack test (119,490 scfh)	December 1, 2005 stack test. Stack test report submitted to EPA January 10, 2006.	Emissions Test 10/22/2010, running at 47% load; g/hp-hr calculated based on Fuel Flow (scfh) from stack test (88,200 scfh)
VOC	April 2000 EPA AP-42 Table 3.1-2a, Supplement F. (0.0021 lb/MMBtu)(1020 MMBtu/MMCF)= 2.142 lb/MMCF	April 2000 EPA AP-42 Table 3.1-2a, Supplement F. (0.0021 lb/MMBtu)(1020 MMBtu/MMCF)= 2.142 lb/MMCF	April 2000 EPA AP-42 Table 3.1-2a, Supplement F. (0.0021 lb/MMBtu)(1020 MMBtu/MMCF)= 2.142 lb/MMCF
PM	PM Total from April 2000 AP-42, Table 3.1-2a, Supplement F. (0.0066 lb/MMBtu)(1020 MMBtu/MMCF) = 6.732 lb/MMCF.	PM Total from April 2000 AP-42, Table 3.1-2a, Supplement F. (0.0066 lb/MMBtu)(1020 MMBtu/MMCF) = 6.732 lb/MMCF.	PM Total from April 2000 AP-42, Table 3.1-2a, Supplement F. (0.0066 lb/MMBtu)(1020 MMBtu/MMCF) = 6.732 lb/MMCF.
SO_2	Based on a max. value of 0.205 gr/100 scf from TGP	Based on a max. value of 0.205 gr/100 scf from TGP	Based on a max. value of 0.205 gr/100 scf from TGP

*NOx and CO emission factors derived from stack test data by dividing hourly emission rate (gm/bhp-hr) using measured stack test parameters (i.e., lb/MMscf = (gm/bhp-hr)/453.6 * bhp (hp)/fuel rate (scf) * 1E6)*
PM_{10}, VOC, and SO_2 emission factors developed using 1,020 Btu/scf

TOTAL FACILITY HAP EMISSIONS

HAP	Emission Rate (tpy)
Acetaldehyde	0.007
Acrolein	0.001
1,3-Butadiene	0.000
Benzene	0.002
Ethylbenzene	0.005
Formaldehyde	0.118
Naphthalene	0.000
PAH	0.000
Propylene Oxide	0.005
Toluene	0.022
Xylene	0.011
Total (lb/yr) =	**340.124**
Total (tons/year) =	***0.170***

UNIT 1 - TURBINE

HAP	Emission Factor (lb/MMBTU)	Emission Rate (lb/hr)	Emission Rate (tpy)
Acetaldehyde	4.00E-05	1.74E-04	0.001
Acrolein	6.40E-06	2.78E-05	0.000
1,3-Butadiene	4.30E-07	1.87E-06	0.000
Benzene	1.20E-05	5.21E-05	0.000
Ethylbenzene	3.20E-05	1.39E-04	0.001
Formaldehyde	7.10E-04	3.08E-03	0.013
Naphthalene	1.30E-06	5.64E-06	0.000
PAH	2.20E-06	9.55E-06	0.000
Propylene Oxide	2.90E-05	1.26E-04	0.001
Toluene	1.30E-04	5.64E-04	0.002
Xylene	6.40E-05	2.78E-04	0.001
		Total (tons/year) =	**0.019**

UNIT 2 - TURBINE

HAP	Emission Factor (lb/MMBTU)	Emission Factor (lb/hp-hr)	Emission Rate (tpy)
Acetaldehyde	4.00E-05	7.18E-05	0.000
Acrolein	6.40E-06	1.15E-05	0.000
1,3-Butadiene	4.30E-07	7.72E-07	0.000
Benzene	1.20E-05	2.16E-05	0.000
Ethylbenzene	3.20E-05	5.75E-05	0.000
Formaldehyde	7.10E-04	1.28E-03	0.006
Naphthalene	1.30E-06	2.33E-06	0.000
PAH	2.20E-06	3.95E-06	0.000
Propylene Oxide	2.90E-05	5.21E-05	0.000
Toluene	1.30E-04	2.33E-04	0.001
Xylene	6.40E-05	1.15E-04	0.001
		Total (tons/year) =	**0.008**

UNIT 3 - TURBINE

HAP	Emission Factor (lb/MMBTU)	Emission Factor (lb/hp-hr)	Emission Rate (tpy)
Acetaldehyde	4.00E-05	1.27E-03	0.006
Acrolein	6.40E-06	2.03E-04	0.001
1,3-Butadiene	4.30E-07	1.36E-05	0.000
Benzene	1.20E-05	3.80E-04	0.002
Ethylbenzene	3.20E-05	1.01E-03	0.004
Formaldehyde	7.10E-04	2.25E-02	0.098
Naphthalene	1.30E-06	4.12E-05	0.000
PAH	2.20E-06	6.96E-05	0.000
Propylene Oxide	2.90E-05	9.18E-04	0.004
Toluene	1.30E-04	4.12E-03	0.018
Xylene	6.40E-05	2.03E-03	0.009
		Total (tons/year) =	**0.136**

NOTES:

HAP emission factors derived from AP-42 Table 3.1-3 (Turbines)
Facility must report any emission of a single HAP for any unit >0.5 tpy

APPENDIX I:

EMISSION FACTORS FROM EMISSIONS TEST REPORT

Great Lakes Gas Transmission
Cloquet Compressor Station 5

'ngine Data from COMET Database 1/1/13-12/31/13

Unit	Manufacturer	Model	Fuel Usage (MMcf/yr)
Unit 501	GENERAL ELECTRIC	LM 2500	37.264
Unit 502	ROLLS ROYCE	AVON	15.424
Unit 503	GENERAL ELECTRIC	LM 1600	271.896

Emission Factors to be used for reporting for engines

Unit	NO_X (lb/MMscf)	CO (lb/MMscf)	VOC (lb/MMscf)	PM (lb/MMscf)	SO_2 (lb/MMscf)
Unit 501	418.200	61.200	2.142	6.732	0.600
Unit 502	246.840	766.020	2.142	6.732	0.600
Unit 503	346.800	27.540	2.142	6.732	0.600

	Unit 501	Unit 502	Unit 503
NO_X	Emissions test 10/21/2010; g/hp-hr calculated based on Fuel Flow (scfh) from stack test (182,043 scfh)	December 1, 2005 stack test. Stack test report submitted to EPA January 10, 2006.	Emissions Test 10/22/2010; g/hp-hr calculated based on Fuel Flow (scfh) from stack test (146,743 scfh)
CO	Emissions test 10/21/2010, running at 34% load; g/hp-hr calculated based on Fuel Flow (scfh) from stack test (119,490 scfh)	December 1, 2005 stack test. Stack test report submitted to EPA January 10, 2006.	Emissions Test 10/22/2010, running at 47% load; g/hp-hr calculated based on Fuel Flow (scfh) from stack test (88,200 scfh)
VOC	April 2000 EPA AP-42 Table 3.1-2a, Supplement F. (0.0021 lb/MMBtu)(1020 MMBtu/MMCF)= 2.142 lb/MMCF	April 2000 EPA AP-42 Table 3.1-2a, Supplement F. (0.0021 lb/MMBtu)(1020 MMBtu/MMCF)= 2.142 lb/MMCF	April 2000 EPA AP-42 Table 3.1-2a, Supplement F. (0.0021 lb/MMBtu)(1020 MMBtu/MMCF)= 2.142 lb/MMCF
PM	PM Total from April 2000 AP-42, Table 3.1-2a, Supplement F. (0.0066 lb/MMBtu)(1020 MMBtu/MMCF) = 6.732 lb/MMCF.	PM Total from April 2000 AP-42, Table 3.1-2a, Supplement F. (0.0066 lb/MMBtu)(1020 MMBtu/MMCF) = 6.732 lb/MMCF.	PM Total from April 2000 AP-42, Table 3.1-2a, Supplement F. (0.0066 lb/MMBtu)(1020 MMBtu/MMCF) = 6.732 lb/MMCF.
SO_2	Based on a max. value of 0.205 gr/100 scf from TGP	Based on a max. value of 0.205 gr/100 scf from TGP	Based on a max. value of 0.205 gr/100 scf from TGP

NOx and CO emission factors derived from stack test data by dividing hourly emission rate (gm/bhp-hr) using measured stack test parameters
*:.e., lb/MMscf = (gm/bhp-hr)/453.6 * bhp (hp)/fuel rate (scf) * 1E6)*
PM_{10}, VOC, and SO_2 emission factors developed using 1,020 Btu/scf