



Florida Gas Transmission Company

Capital Projects Field Office, 111 Kelsey Lane, Ste. A., Tampa, FL 33609
813.655.7441 / 800.381.1477

April 11, 2001

RECEIVED

APR 13 2001

Mr. Clair H. Fancy, P.E.
Bureau of Air Regulation
Florida Department of Environmental Protection
Twin Towers Office Bldg.
2600 Blairstone
Tallahassee, FL 32399-2400

BUREAU OF AIR REGULATION

Reference: Facility: 0070012
Compressor Station No. 16, Brooker, Bradford County

Dear Mr. Fancy:

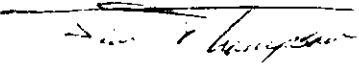
Subject: Application for Air Construction Permit

Florida Gas Transmission Company (FGT) is proposing to install a new Cooper-Rolls 501-KC7 compressor turbine at the above referenced facility. The facility is a major source under New Source Review definitions; however, the proposed modifications do not result in emissions that are significant under Prevention of Significant Deterioration requirements. Therefore, a state only construction permit is required.

Enclosed is an Application for an Air Construction Permit for the proposed modifications. FGT understands that no processing fee is required since this facility is operated under a Part 70 Permit.

If you have any questions or need additional information, please call me at (800) 381-1477.

Sincerely,


Jim Thompson
Project Manager, Environmental

CC: James Alexander, Phase V w/o attachments
Jim Thompson, Phase V
Clay Roesler, FGT
V. Duane Pierce, Ph.D., AQMcs, LLC
Brad Barnett, Compressor Station No. 16

Florida Gas Transmission Company

Phase V Expansion Project

Compressor Station No. 16

**APPLICATION
For
AIR CONSTRUCTION
PERMIT**

March 2001

Prepared by AQMcs, LLC

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1.0 INTRODUCTION

Florida Gas Transmission Company (FGT), a Delaware Corporation and ENRON/EL PASO affiliate of Houston, Texas, is proposing to expand its existing natural gas pipeline facility near Brooker in Bradford County, Florida (Compressor Station No. 16). This proposed modification is part of FGT's Phase V Expansion Project, aimed at increasing the supply capacity of FGT's network servicing domestic, commercial, and industrial customers in Florida. The scope of work for the Phase V Expansion Project includes expansion through the addition of state-of-the-art compressor engines at eight existing compressor stations and the development of two new compressor stations within the State of Florida. The basic project components include:

- Mainline loops, additions, and replacements;
- Lateral loops and additions;
- Meter station additions, modifications, and expansions;
- Regulator additions, modifications, and expansions; and
- Compressor station additions and modifications.

Compressor Station No. 16 is located in Bradford County, Florida, approximately 3 miles north of Brooker on Highway 231. Figure 1-1 shows the location of the existing compressor station.

The proposed expansion at this location consists of the addition of one 7,009 brake horsepower (bhp), natural-gas-fired, turbine compressor engine and the replacement of two existing gas-fired emergency generators with a single 585 bhp natural gas fired emergency generator. The proposed compressor engine will be used solely for transporting natural gas by pipeline for distribution to markets in Florida. The proposed new engine is a Cooper-Rolls 501-KC7 DLE equipped with dry low NO_x (oxides of nitrogen) combustion. Under current federal and state air quality regulations, the proposed modification will constitute a minor modification of an existing major source. Based on the projected annual emission rates, there will be no PSD (Prevention of Significant Deterioration) significant increase in any emissions.

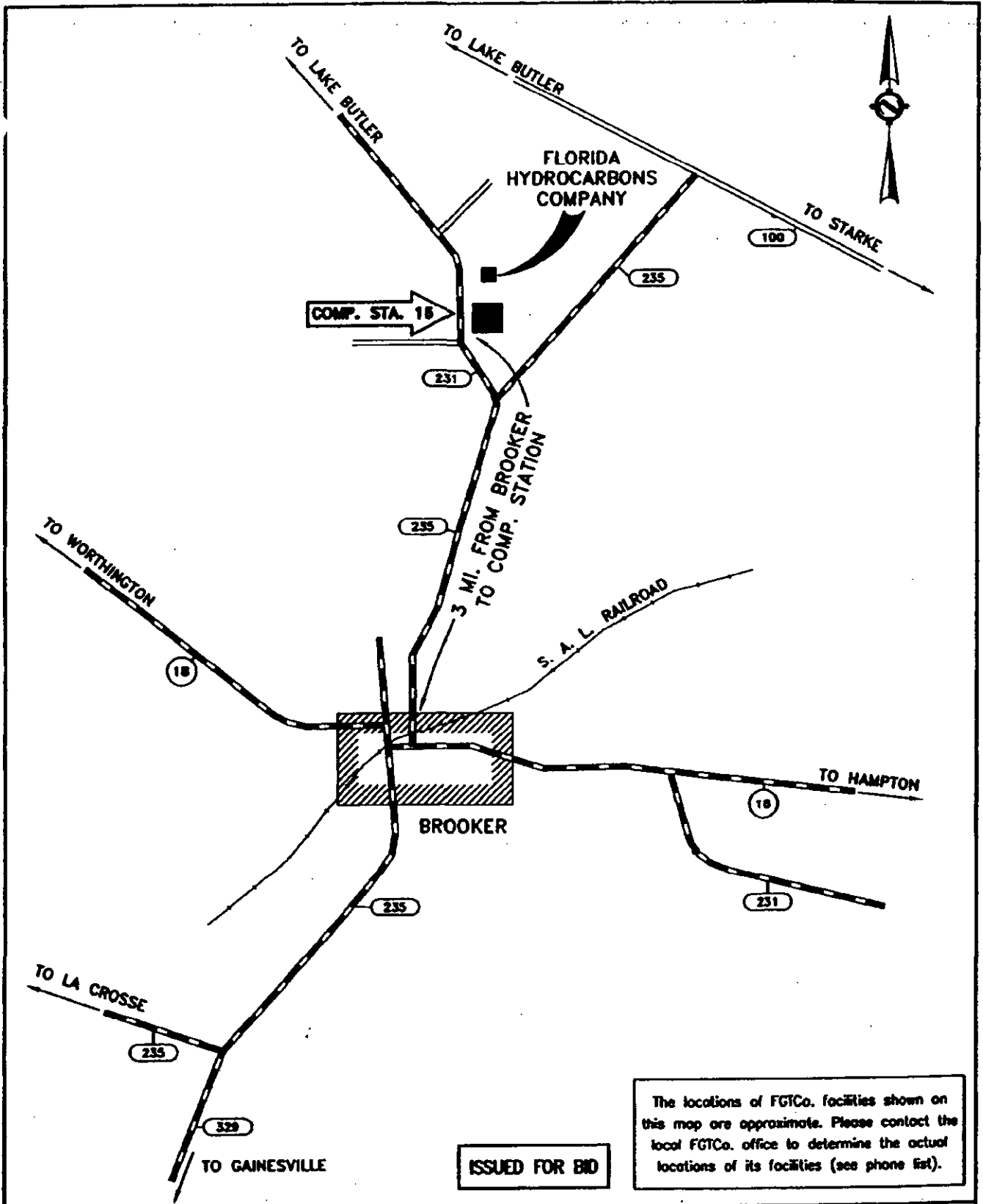
Engineering designs for the proposed expansion project include selection of an engine incorporating dry low NO_x combustion technology. Dry low NO_x technology for control of NO_x emissions would represent Best Available Control Technology (BACT) for the proposed turbine engine under PSD requirements.

This narrative contains three additional sections. Descriptions of the existing operation at FGT's Compressor Station No.16 and the proposed 7,009 bhp engine addition and the emergency generator replacement are presented in Section 2.0. The air quality review requirements and applicability of state and federal regulations are discussed in Section 3.0.

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References are included in Section 4.0.

FDEP permit application forms are presented in Attachment A. Attachment B contains a plot plan of the facility. Attachment C contains vendor information and Attachment D contains emission calculations.



The locations of FGCo. facilities shown on this map are approximate. Please contact the local FGCo. office to determine the actual locations of its facilities (see phone list).

ISSUED FOR BID

P.L. NO. DATE		CONSTRUCTION YR 2000 BY DATE			COMPRESSOR STATION NO. 16 FGT PHASE V EXPANSION VICINITY MAP BRADFORD COUNTY, FLORIDA	PROJECT NO. 599941	
A 75 10/27/00		DESIGN DATE 10/11/00				SHEET 1 OF 1 A	
FILE NO. 44521A18.DWG		SCALE NONE		Florida Gas Transmission Co. Houston, Texas		STA. 16	

2.0 PROJECT DESCRIPTION

A plot plan of FGT's Compressor Station No. 16, showing the location of the plant boundaries, the existing emission sources, and the location of the proposed engine addition, is presented in Attachment B. The following sections provide a description of the existing operations at this location, as well as a description of the proposed project.

2.1 Existing Operations

FGT's existing Compressor Station No. 16 consists of five 2,000 bhp and one 4,000 bhp natural-gas-fired reciprocating internal combustion (IC) engines. Table 2-1 summarizes engine manufacturer, model, and the date of installation for each of the existing engines. The original installation was made in 1958 (Compressor Engines 1601 through 1603). Other engines were added in 1966 and 1968 (Compressor Engines 1604 and 1605). These engines were installed before the CAA Amendments of 1977. An addition referred to as Phase II was constructed in 1991 (Compressor Engine 1606) and was subject to PSD review. These existing engines are not being modified as part of this expansion project.

The existing facility also has supporting equipment including lube and used oil storage tanks, air compressors and emergency generators.

2.2 Proposed Compressor Station Addition

FGT proposes to increase the horsepower capacity of Compressor Station No. 16, as part of the Phase V Expansion Project. This will involve adding one new gas-fired turbine (Compressor Engine 1607). The proposed new engine will be used to increase the volumetric delivery capacity by driving a gas compressor that is a part of a gas transmission line that transports natural gas from source wells in Texas and Louisiana for delivery throughout Florida. Without the proposed engine, it would not be possible to increase the volumetric delivery capacity necessary to meet both short and long-term demands for natural gas in Florida.

2.2.1 New Compressor Engine Addition

FGT proposes to install one natural gas-fired turbine engine compressor unit and associated support equipment at Compressor Station No. 16. The turbine engine will be a Cooper-Rolls 501-KC7 DLE engine compressor unit rated at 7,009 bhp ISO. Fuel will be exclusively natural gas from the FGT's natural gas pipeline. Engine specifications and stack parameters for the proposed engine are presented in Table 2-2.

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Table 2-1 Summary of Existing Compressor Engines

Engine #	Date of Installation	Type	Manufacturer	Model #	Brake Horse Power (bhp)
1601	1958	Reciprocating	Worthington	SEHG-8	2000
1602	1958	Reciprocating	Worthington	SEHG-8	2000
1603	1958	Reciprocating	Worthington	SEHG-8	2000
1604	1966	Reciprocating	Worthington	SEHG-8	2000
1605	1968	Reciprocating	Worthington	SEHG-8	2000
1606	1991	Reciprocating	Cooper - Bessemer	8W-330-C2	4000

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Table 2-2 Proposed Compressor Engine 1607 Specifications and Stack Parameters

Parameter	Design
Compressor Engine	1607
Type	Gas Turbine
Manufacturer	Cooper-Rolls
Model	501-KC7 DLE
Unit Size	7,009 bhp
Specific Heat Input	8,054 Btu/hp-hr
Maximum Fuel Consumption ^a	0.0597 MMscf/hr
Speed	13,600 rpm
Stack Parameters	
Stack Height	61.17 ft
Stack Diameter	6.0 ft
Exhaust Gas Flow	96,903 acfm
Exhaust Temperature	965 °F
Exhaust Gas Velocity	40.04 ft/sec

NOTE:

acfm = actual cubic feet per minute.
 bhp = brake horsepower.
 Btu/bhp-hr = British thermal units per brake horsepower per hour.
 °F = degrees Fahrenheit.
 ft = feet.
 ft/sec = feet per second.
 MMscf/hr = million standard cubic feet per hour
 rpm = revolutions per minute.

^a Based on vendor provided heat input value plus 10% and a heating value for natural gas of 1040 British thermal units per standard cubic foot (Btu/scf).

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Hourly and annual emissions of regulated pollutants from the proposed engine under normal operating conditions are presented in Table 2-3. Emissions of oxides of nitrogen (NO_x), carbon monoxide (CO) and non-methane hydrocarbons (NMHC) are based on the engine manufacturer's supplied data (See Attachment C).

Typically, turbine vendors do not provide information on particulate matter (PM) or sulfur dioxide (SO₂) emissions; therefore, particulate matter emissions are based upon USEPA publication AP-42 Table 3.1-2a (USEPA, 2000) and emissions of SO₂ are based on FGT's Federal Energy Regulatory Commission (FERC) certificate limit of 10 grains sulfur per 100 cubic feet of natural gas.

2.2.2 Support Equipment Additions and Changes

In addition to the compressor engines, some support equipment will be installed at the site. They include:

- A new compressor building
- A new control building
- One new, emergency generator to replace two existing gas-fired generators.

The location of new on-site structures is shown on the facility plot plan contained in Attachment B. The new compressor building, housing the turbine, has approximate dimensions of 40 feet wide by 60 feet long by 30 feet high. The new control building will be located south of the new compressor building. The approximate dimensions of the control building will be 11 feet wide by 40 feet long by 12 feet high. Due to the size of this building and its distance from the new exhaust stack, it will not influence dispersion of compressor engine emissions.

The new generator will be powered by a natural gas fueled, lean burn Waukesha Model H24GL rated at 440 kW (585 bhp). Engine specifications and stack parameters for the proposed engine are presented in Table 2-4 and emissions are presented in Table 2-5.

2.2.3 Fugitive Emissions

Potential new emissions from Compressor Station No. 16 also include fugitive emissions from the new valves and flanges that will be in gas service. These fugitive emissions have been estimated using USEPA factors for components in gas service at oil and gas facilities (EPA

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Table 2-3 Emissions from FGT's Proposed Turbine Engine No. 1607

Pollutant	Emission Factor	Reference	lb/hr	TPY
Nitrogen Oxides	5.60 lb/hr	Manufacturer Data	5.60	24.5
Carbon Monoxide	6.86 lb/hr	Manufacturer Data	6.86	30.1
Volatile Organic Compounds (non methane)	0.196 lb/hr	Manufacturer Data	0.20	0.9
Particulate Matter	0.0066 lb/MMBtu	AP-42, Table 3.1-2a	0.41	1.8
Sulfur Dioxide	10 grains/100 scf	FERC Limit	1.71	7.5
HAPs	Various see Attachment D	GRI HapCalc 3.0	0.34	1.5

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Table 2-4 Proposed Emergency Generator Engine Specifications and Stack Parameters

Parameter	Design
Compressor Engine	Gen 03
Type	Natural Gas, Lean Burn Reciprocating
Manufacturer	Waukesha
Model	H24GL
Unit Size	585 bhp
Heat Input	4.11 MM Btu/hr
Fuel Consumption ^a	0.00395 MMscf/h
Speed	1800 rpm
Stack Parameters	
Stack Height	20 ft
Stack Diameter	0.67 ft
Exhaust Gas Flow	5,300 lb/hr
Exhaust Gas Flow	2,911 acfm
Exhaust Temperature	842 °F
Exhaust Gas Velocity	138.85 ft/sec
<p>NOTE:</p> <p>acfm = actual cubic feet per minute. bhp = brake horsepower. Btu/hr = British thermal units per hour. °F = degrees Fahrenheit. ft = feet. ft/sec = feet per second. Lb/hr = pound per hour rpm = revolutions per minute.</p> <p>^a Based on heating value for natural gas of 1040 British thermal units per standard cubic foot (Btu/scf).</p>	

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Table 2-5 Emissions from FGT's Proposed Generator Engine

Pollutant	Emission Factor	Reference	lb/hr	TPY
Nitrogen Oxides	2.1 g/hp-hr	Manufacturer Data	2.71	0.68
Carbon Monoxide	1.4 g/hp-hr	Manufacturer Data	1.81	0.45
Volatile Organic Compounds (non methane)	0.24 g/hp-hr	Manufacturer Data	0.31	0.08
Particulate Matter	0.00999 lb/MMBtu	AP-42, Table 3.2-2	0.04	0.01
Sulfur Dioxide	10 grains/100 scf	FERC Limit	0.11	0.03

* based on 500 hours of operation per year

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publication EPA-453/R-95-017, November 1995, "Protocol for Equipment Leak Emission Estimates"). Table 2-6 lists the quantities of existing and new components to be added as part of the Phase V Expansion Project and an estimate of the fugitive emissions from these sources.

2.2.4 Emissions Summary

The total changes in emissions resulting from the project are listed on Table 2-7. As can be seen from the table, the emission increases are not significant under PSD. The calculations used to estimate these emissions are presented in Attachment D.

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Table 2-6 VOC Fugitive Emission Calculations and Summary

Component	Service	Component Count	Emissions Factor (ton/yr)	NM/NE Fraction	Emissions (ton/yr)
Valves	Gas	249	0.0434606	0.05	0.54
Connector	Gas	0	0.0019316	0.05	0.00
Flanges	Gas	189	0.0037666	0.05	0.04
Open-Ended Line	Gas	74	0.0193158	0.05	0.07
Pumps	Gas	1	0.023179	0.05	0.00
Other	Gas	0	0.0849895	0.05	0.00
Valves	Light Oil	16	0.0241448	1.00	0.39
Connector	Light Oil	0	0.0020282	1.00	0.00
Flanges	Light Oil	38	0.0010624	1.00	0.04
Open-Ended Line	Light Oil	2	0.0135211	1.00	0.03
Pumps	Light Oil	1	0.1255527	1.00	0.13
Other	Light Oil	0	0.0724343	1.00	0.00
Valves	Heavy Oil	6	0.0000811	1.00	0.00
Connector	Heavy Oil	0	0.0000724	1.00	0.00
Flanges	Heavy Oil	14	0.0000038	1.00	0.00
Open-Ended Line	Heavy Oil	2	0.0013521	1.00	0.00
Other	Heavy Oil	0	0.0002994	1.00	0.00
				TOTAL:	1.23

* EPA publication EPA-453/R-95-017, November 1995, "Protocol for Equipment Leak Emission Estimates"

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Table 2-7 Potential Annual Emissions (tpy) Summary

SOURCE ID	DESCRIPTION	NO _x	CO	VOC ^a	SO ₂	PM
EXISTING FACILITY						
1601	2000 bhp Recip. Engine	227.8	30.9	13.9	1.8	0.3
1602	2000 bhp Recip. Engine	227.8	30.9	13.9	1.8	0.3
1603	2000 bhp Recip. Engine	227.8	30.9	13.9	1.8	0.3
1604	2000 bhp Recip. Engine	227.8	30.9	13.9	1.8	0.3
1605	2000 bhp Recip. Engine	227.8	30.9	13.9	1.8	0.3
1606	4000 bhp Recip. Engine	77.3	96.6	38.6	3.8	0.7
GEN01	200 bhp Recip. Engine	2.3	0.2	0.1	0.0	0.0
GEN02	220 bhp Recip. Engine	2.7	0.2	0.1	0.0	0.0
Air Comp. No. 1	80 bhp Recip. Engine	0.6	0.2	0.0	0.0	0.0
	OTHER SOURCES: ^b	0.0	0.0	1.5	0.0	0.0
EXISTING ANNUAL POTENTIAL TOTALS:		1221.9	251.7	109.8	12.8	2.2

PROPOSED MODIFIED FACILITY						
1601	2000 bhp Recip. Engine	227.8	30.9	13.9	1.8	0.3
1602	2000 bhp Recip. Engine	227.8	30.9	13.9	1.8	0.3
1603	2000 bhp Recip. Engine	227.8	30.9	13.9	1.8	0.3
1604	2000 bhp Recip. Engine	227.8	30.9	13.9	1.8	0.3
1605	2000 bhp Recip. Engine	227.8	30.9	13.9	1.8	0.3
1606	4000 bhp Recip. Engine	77.3	96.6	38.6	3.8	0.7
1607	7,009 bhp Turbine Engine –new	24.5	30.1	0.9	7.5	1.8
GEN03	585 bhp Recip. Engine – new	0.7	0.5	0.1	0.0	0.0
Air Comp. No. 1	80 bhp Recip. Engine	0.6	0.2	0.0	0.0	0.0
	OTHER SOURCES: ^b	0.0	0.0	2.7	0.0	0.0
PROPOSED ANNUAL POTENTIAL TOTALS:		1242.1	281.9	111.8	20.3	4

NET CHANGES IN POTENTIAL EMISSIONS:	20.2	30.2	2	7.5	1.8
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(a) VOC = Non-methane/non-ethane HC

(b) Other Sources Includes ancillary equipment, storage tanks and equipment leaks

(c) Based on test data for a similar unit

3.0 REGULATORY ANALYSIS

This section presents a review of federal and Florida State air quality regulations, which govern the operations and proposed modifications to be conducted at Compressor Station No. 16.

3.1 Federal Regulations Review

The federal regulatory programs administered by the USEPA have been developed under the authority of the Clean Air Act. The following subsections review the essential elements of the federal regulatory program and the impact they have on the operations and proposed modifications at Compressor Station No. 16.

3.1.1 Classification of Ambient Air Quality

The 1970 Amendments to the CAA gave the USEPA specific authority to establish the minimum level of air quality that all states would be required to achieve. These minimum values or standards were developed in order to protect the public health (primary) and welfare (secondary). The federally promulgated standards and additional state standards are presented on Table 3-1.

Areas of the country that have air quality equal to or better than these standards (i.e., ambient concentrations less than a standard) are designated as "Attainment Areas", while those where monitoring indicates air quality is worse than the standards are known as "Non-attainment Areas." The designation of an area has particular importance for a proposed project as it determines the type of permit review to which the application will be subject.

Major new sources or major modifications to existing major sources located in attainment areas are required to obtain a PSD permit before initiation of construction. Similar sources located in areas designated as non-attainment or that adversely impact such areas undergo more stringent Non-attainment New Source Review (NNSR). In either case, it is necessary, as a first step, to determine the air quality classification of a project site.

All areas of all states are classified as either attainment, non-attainment or unclassifiable for each criteria pollutant. Bradford County is designated as unclassifiable or attainment for all criteria pollutants. These designations were obtained from 40 CFR 81.310, as updated in the June 5, 1998 Federal Register (FR31036) and 62-204.340 F.A.C.

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Table 3-1 National and State Ambient Air Quality Standards ($\mu\text{g}/\text{m}^3$)

POLLUTANT	AVERAGING PERIOD	EPA STANDARDS		FLORIDA STANDARDS
		PRIMARY	SECONDARY	
PM ₁₀	24-hour ¹	150	150	150
	annual ²	50	50	50
SO ₂	3-hour ¹	---	1,300	1,300
	24-hour ¹	365	---	260
	Annual ²	80	---	60
CO	1-hour ¹	---	40,000	40,000
	8-hour ¹	10,000	---	10,000
NO ₂	Annual ²	100	100	100
O ₃	1-hour ³	235	235	235

1) Not to be exceeded more than once per year.
 2) Never to be exceeded.
 3) Not to be exceeded on more than 3 days over 3 years.

Sources: 40 CFR 50; 36FR22384; Chap. 17-2.300.

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The designation of Unclassifiable indicates that there is insufficient monitoring data to prove that the area has attained the federal standards; however, the limited data available indicate that the standard has been achieved. Areas with this classification are treated as attainment areas for permitting purposes.

3.1.2 PSD Applicability

The 1977 CAA Amendments added Part C: Prevention of Significant Deterioration to the Act. This part required proposed new major stationary sources or existing sources planning a major modification in an area that has attained the National AAQS, to conduct a preconstruction review that includes a detailed analysis of the impacts from the source's emissions.

Federal air quality permitting regulations for attainment areas are codified in the Code of Federal Regulations (CFR), Title 40- Protection of the Environment, Part 52.21 - Prevention of Significant Deterioration (40 CFR 52.21).

For the PSD regulations to apply to a given project the proposed location must be in a PSD area, i.e., an area that has been classified as attainment or as unclassifiable for a particular pollutant. Bradford County is designated as attainment area for all criteria pollutants. A project's potential to emit is then reviewed to determine whether it constitutes a major stationary source or major modification to an existing major stationary source.

A major stationary source is defined as either one of the 28 sources identified in 40 CFR 52.21 that has a potential to emit 100 tons or more per year of any regulated pollutant, or any other stationary source that has the potential to emit 250 tons or more per year of a regulated pollutant. "Potential to emit" is determined on an annual basis after the application of air pollution control equipment, or any other federally enforceable restriction.

According to the "Draft New Source Review Workshop (NSR) Manual (USEPA, October 1990)," for a modification to be classified as major and therefore, subject to PSD review:

- (1) The modification must occur at an existing major stationary source, and
- (2) The net emissions increase of any pollutant emitted by the source, as a result of modification, is "significant", or
- (3) The modification results in emissions increases, which if considered alone would constitute a major stationary source.

"Significant" emission rates are defined as amounts equal to or greater than the emission rates given in Table 3-3.

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By these definitions, and based on the emissions presented in Section 2.0, the action proposed for Compressor Station No. 16 is a minor modification of an existing major stationary source. Since Compressor Station No. 16 is not one of the 28 named source categories, but does emit >250 TPY of at least one regulated pollutant, it is considered a major source. The increase in emissions resulting from the proposed action will not exceed the PSD significant rate; therefore, Compressor Station No. 16 is not subject to PSD pre-construction review.

Table 3-2 Applicability of PSD Significant Emission Rates

Pollutant	Emission Rate Tons/Year
Carbon Monoxide	100
Nitrogen Oxides	40
Sulfur Dioxide	40
Particulate Matter (PM/PM ₁₀)	25/15
Ozone (VOC)	40
Lead	0.6
Fluorides	3
Reduced Sulfur including Hydrogen Sulfide	10
Total Reduced Sulfur including Hydrogen Sulfide	10
Sulfuric Acid Mist	7
Lead	0.6
Mercury	0.1
VOC = Volatile Organic Compounds Sources: 40 CFR 52.21(b)(23); Table 212.400-2 62-212 F.A.C.	

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3.1.3 Non-Attainment New Source Review (NSR) Applicability

Based on the current non-attainment provisions, all new major stationary sources, or major modifications to such sources, located in a non-attainment area must undergo non-attainment New Source Review, if they have the potential to emit above an NSR significant threshold. For major new sources or major modifications in an attainment or unclassifiable area, the non-attainment provisions apply if the source or modification is located within the area of influence of a non-attainment area. The area of influence is defined as an area, which is outside the boundary of a non-attainment area, but within the locus of all points that are 50 kilometers outside the non-attainment area.

Compressor Station No. 16 is located in an area that is designated as either attainment or not classifiable for all criteria pollutants and is not located in an area of influence outside a non-attainment area. Therefore, this compressor station is not subject to federal non-attainment New Source Review.

3.1.4 Applicability of New Source Performance Standards (NSPS)

The regulation of new sources through the development of standards applicable to a specific category of sources was a significant step taken by the 1970 CAA Amendments. The Administrator was directed to publish a proposed regulation establishing a Standard of Performance for any category of new sources that cause or contribute significantly to air pollution and which may reasonably be anticipated to endanger public health. All Standards apply to all sources within a given category, regardless of geographic location or ambient air quality at the location.

Performance standards are published in 40 CFR 60. The new turbine to be installed at Compressor Station No. 16 is subject to Subpart GG, Standards of Performance for Stationary Gas Turbines, because it will have a maximum heat input at peak load of >10.7 gigajoules/hour (10 MMBtu/hr) based on the lower heating value of the natural gas fuel. This regulation establishes emission limits for NO_x and SO₂ and requires performance testing and daily monitoring of fuel nitrogen and sulfur. The applicable emission standards are provided in Table 3-4.

The NO_x emission limit for Subpart GG is calculated as follows:

$$STD = 0.0150 (14.4/Y) + F$$

$$STD = \text{Allowable NO}_x \text{ emissions}$$

$$Y = \text{Heat rate at peak load not to exceed 14.4 KJwatt-hour}$$

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$F = NO_x$ emission allowance

The fuel bound nitrogen in natural gas is less than 0.015% by weight. Therefore, the value of F as defined in 40 CFR 60.332(3) is equal to zero.

$$Y = Btu/bhp-hr \times 1.055 \text{ Kj/Btu} \times hp-hr/745.7 \text{ watt-hour}$$

$$Y = Btu/bhp-hr \times 1.055 \text{ Kj/Btu} \times hp-hr/745.7 \text{ watt-hour}$$

$$= 8,054 \text{ Btu/bhp-hr} \times 1.055 \text{ Kj/Btu} \times hp-hr/745.7 \text{ watt-hour}$$

$$= 11.4 \text{ Kj/watt-hr}$$

$$STD = 0.0150 (14.4/11.4) + 0$$

$$= 0.0190 \%$$

$$= 190 \text{ ppm}_v$$

Table 3-8 summarizes the NSPS applicability for the proposed gas engines.

2

The turbine at this facility will meet the NSPS for NO_x of 190 ppmv (i.e., manufacturer's estimation of 25 ppmv), and for SO_2 of 150 ppmv (estimated for this turbine to be 4 ppmv).

3.1.2.6 Good Engineering Practice (GEP) Stack Height Analysis

The 1977 CAA Amendments require that the emission limitation required for control of any pollutant not be affected by a stack that exceeds GEP height. Further, no dispersion credit is given during air quality modeling for stacks that exceed GEP. GEP stack height is defined as the highest of:

- 65 meters; or
- a height established by applying the formula

$$HGEP = H + 1.5 L$$

Where:

AQMcs

Table 3-3 Applicability of New Source Performance Standards

NSPS Subpart	NSPS Regulations	Equipment	Fuel	Pollutant	Heat Input Applicability	Equipment Design Maximum*	NSPS Emission Limits	Equipment Emissions
GG	60.332(a)(2)	Engine No. 1607 Gas Turbine	Gas	NO ₂	>10 MM Btu/hr	56.45 MMBtu/hr	190 ppm _v	25 ppm _v
GG	60.333(a)	Engine No. 1607 Gas Turbine	Gas	SO ₂	>10 MM Btu/hr	56.45 MMBtu/hr	150 ppm _v	4 ppm _v

Design maximum based on vendor data.

AQMcs

HGEP = GEP Stack Height,
H = Height of the structure or nearby structure, and
L = Lesser dimension (height or projected width) of the nearby structure; or

- a height demonstrated by fluid modeling or field study.

A structure or terrain feature is considered nearby if a stack is within a distance of five times the structure's height or maximum projected width. Only the smaller value of the height or projected width is used and the distance to the structure cannot be greater than 0.8 kilometers. Although GEP stack height regulations require that the stack height used in modeling for determining compliance with National AAQS and PSD increments not exceed GEP stack height, the actual stack height may be greater.

The stack height regulations also increase GEP stack height beyond that resulting from the formula in cases where plume impaction occurs. Plume impaction is defined as concentrations measured or modeled to occur when the plume interacts with elevated terrain. Elevated terrain is defined as terrain that exceeds the height calculated by the GEP stack height formula. Because terrain in the vicinity of the project site is generally flat, plume impaction was not considered in determining the GEP stack height.

The proposed stack at Compressor Station No. 16 will be 61.17 feet (18.64 meters) tall. Based on the proposed building dimensions, the calculated GEP stack height is less than 65 meters; therefore, GEP stack height is 65 meters. Since the stack is less than GEP stack height, it complies with the regulatory requirement.

3.2 Florida State Air Quality Regulations

Compressor Station No. 16 is currently operating under Permit No. 0070012-002-AV and is subject to the provisions of that permit. Rule 62, F.A.C., contains the air quality rules and regulations for the State of Florida. The primary federal regulations that affect Compressor Station No. 16 have been incorporated into or are referenced by these rules. The significant state regulations that are applicable to the new emission units are briefly listed below.

3.2.1 Rule 62-210.300 Permits Required

FGT is required to obtain a construction permit prior to construction of new emission units. This requirement is being met by the submittal of this application.

AQMcs

3.2.2 Rule 62-204.240 Ambient Air Quality Standards

FGT must not violate any of the ambient air quality standards listed under this rule.

3.2.3 Rule 62-296.320(2) Objectionable Odors

This rule prohibits the discharge of pollutants that will cause or contribute to an objectionable odor.

3.2.4 Rule 62-296.320(4)(b)1 General Particulate Emission Limiting Standards.

FGT is prohibited from allowing the new compressor engine to discharge into the atmosphere the emissions of air pollutants, the density of which is equal to or greater than that designated as Number 1 on the Ringelmann Chart (20 percent opacity).

3.2.5 Rule 62-210.300(3)(a) Exempt Emissions Units and/or Activities.

The emissions from the emergency generator and the fugitive leak emissions are insignificant sources and are exempt from the permitting requirements of Chapter 62-210 Stationary Sources - General Requirements, 62-213 Operation Permits For Major Sources Of Air Pollution and 62-4 Permits.

4.0 REFERENCES

Gas Research institute, 1999. GRI-HAPCalc Software Version 3.0, Radian International, LLC.

U.S. Environmental Protection Agency (USEPA). 1980. PSD Workshop Manual. Research Triangle Park, NC.

U.S. Environmental Protection Agency (USEPA). 2000. Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources (5th Ed.) AP-42. Supplement E, Research Triangle Park, NC.

Attachment A

DEP Forms



Department of Environmental Protection

Division of Air Resources Management

APPLICATION FOR AIR PERMIT - TITLE V SOURCE

See Instructions for Form No. 62-210.900(1)

I. APPLICATION INFORMATION

Identification of Facility

1. Facility Owner/Company Name: Florida Gas Transmission Company	
2. Site Name: Compressor Station No. 16	
3. Facility Identification Number: 0070012 [] Unknown	
4. Facility Location: Street Address or Other Locator: P.O. Box 8 City: Brooker County: Bradford Zip Code: 32622-0008	
5. Relocatable Facility? [] Yes [X] No	6. Existing Permitted Facility? [X] Yes [] No

Application Contact

1. Name and Title of Application Contact: Jim Thompson, Environmental Project Manager	
2. Application Contact Mailing Address: Organization/Firm: Florida Gas Transmission Company Street Address: 111 Kelsey Lane, Ste. A City: Tampa State: FL Zip Code: 33619	
3. Application Contact Telephone Numbers: Telephone: (800) 381-1477 Fax: (813) 655-3951	

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	4-13-01
2. Permit Number:	0070012-004-AC
3. PSD Number (if applicable):	
4. Siting Number (if applicable):	

Purpose of Application

Air Operation Permit Application

This Application for Air Permit is submitted to obtain: (Check one)

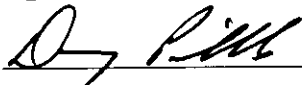
- Initial Title V air operation permit for an existing facility which is classified as a Title V source.
- Initial Title V air operation permit for a facility which, upon start up of one or more newly constructed or modified emissions units addressed in this application, would become classified as a Title V source.
Current construction permit number: _____
- Title V air operation permit revision to address one or more newly constructed or modified emissions units addressed in this application.
Current construction permit number: _____
Operation permit number to be revised: _____
- Title V air operation permit revision or administrative correction to address one or more proposed new or modified emissions units and to be processed concurrently with the air construction permit application. (Also check Air Construction Permit Application below.)
Operation permit number to be revised/corrected: 0070012-002-AV
- Title V air operation permit revision for reasons other than construction or modification of an emissions unit. Give reason for the revision; e.g., to comply with a new applicable requirement or to request approval of an "Early Reductions" proposal.
Operation permit number to be revised: _____
Reason for revision: _____

Air Construction Permit Application

This Application for Air Permit is submitted to obtain: (Check one)

- Air construction permit to construct or modify one or more emissions units.
- Air construction permit to make federally enforceable an assumed restriction on the potential emissions of one or more existing, permitted emissions units.
- Air construction permit for one or more existing, but unpermitted, emissions units.

Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official: Danny Pribble, Vice President Operations
2. Owner/Authorized Representative or Responsible Official Mailing Address: Organization/Firm: Florida Gas Transmission Company Street Address: 1400 Smith Street City: Houston State: TX Zip Code: 77002
3. Owner/Authorized Representative or Responsible Official Telephone Numbers: Telephone: (713)345-7162 Fax: (713) 646-3201
4. Owner/Authorized Representative or Responsible Official Statement: <i>I, the undersigned, am the owner or authorized representative*(check here [], if so) or the responsible official (check here [X], if so) of the Title V source addressed in this application, whichever is applicable. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions unit.</i>  _____ Signature Date <u>4/6/01</u>

* Attach letter of authorization if not currently on file.

Professional Engineer Certification

1. Professional Engineer Name: Kevin McGlynn Registration Number: 50908
2. Professional Engineer Mailing Address: Organization/Firm: McGlynn Consulting Company Street Address: 1967 Commonwealth Lane City: Tallahassee State: FL Zip Code: 32303
3. Professional Engineer Telephone Numbers: Telephone: (850)380-5035 Fax: (850) 350-5002

4. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this Application for Air Permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

If the purpose of this application is to obtain a Title V source air operation permit (check here [X], if so), I further certify that each emissions unit described in this Application for Air Permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance schedule is submitted with this application.

If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [X], if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

If the purpose of this application is to obtain an initial air operation permit or operation permit revision for one or more newly constructed or modified emissions units (check here [], if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

Kevin J. Mudge, P.E.

Signature

March 30, 2001

Date

Attach any exception to certification statement.

Scope of Application

Emissions Unit ID	Description of Emissions Unit	Permit Type	Processing Fee
	Cooper-Rolls 501-KC7 DLE Turbine rated at 7,200 bhp, Engine 1607	AC1D	\$0.00
	New Emergency generator, 585 bhp Waukesha H24GL Reciprocating engine, engine GEN03		
	New fugitive emissions from equipment leaks		

Application Processing Fee

Check one: [] Attached - Amount: \$ _____ [X] Not Applicable

Construction/Modification Information

1. Description of Proposed Project or Alterations:

Installation of a new gas fired Cooper-Rolls 501-KC7 DLE Turbine rated at 7,009 bhp,
Replacement of two existing gas fired emergency generators rated at 200 hp and 235 hp with a new gas fired 440 kW (585 hp) Waukesha Model H24GL

2. Projected or Actual Date of Commencement of Construction: 07/20/01

3. Projected Date of Completion of Construction: 10/20/01

Application Comment

This proposed modification is part of FGT's Phase V Expansion project, aimed at increasing the supply capacity of FGT's network servicing domestic, commercial, and industrial customers in Florida.

The existing facility is currently operating under Permit No.0070012-002-AV.

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates: Zone: 17 East (km): 371.98 North (km): 3310.57			
2. Facility Latitude/Longitude: Latitude (DD/MM/SS): 29/55/16 Longitude (DD/MM/SS): 82/19/34			
3. Governmental Facility Code: 0	4. Facility Status Code: A	5. Facility Major Group SIC Code: 49	6. Facility SIC(s): 4922
7. Facility Comment (limit to 500 characters): Compressor Station No. 16 is an existing natural gas pipeline compressor station with six existing compressor engines. It is classified as a major source under New Source Review and Title V definitions.			

Facility Contact

1. Name and Title of Facility Contact: Abe Kattawar, Team Environmental Leader	
2. Facility Contact Mailing Address: Organization/Firm: Florida Gas Transmission Company Street Address: P.O. Box 8 City: Brooker State: FL Zip Code: 32622-0008	
3. Facility Contact Telephone Numbers: Telephone: (850) 350-5350 Fax: (850) 350-5351	

Facility Regulatory Classifications

Check all that apply:

1. <input type="checkbox"/> Small Business Stationary Source?	<input type="checkbox"/> Unknown
2. <input checked="" type="checkbox"/> Major Source of Pollutants Other than Hazardous Air Pollutants (HAPs)?	
3. <input type="checkbox"/> Synthetic Minor Source of Pollutants Other than HAPs?	
4. <input checked="" type="checkbox"/> Major Source of Hazardous Air Pollutants (HAPs)?	
5. <input type="checkbox"/> Synthetic Minor Source of HAPs?	
6. <input checked="" type="checkbox"/> One or More Emissions Units Subject to NSPS?	
7. <input type="checkbox"/> One or More Emission Units Subject to NESHAP?	
8. <input type="checkbox"/> Title V Source by EPA Designation?	
<p>I. Facility Regulatory Classifications Comment (limit to 200 characters):</p> <p>Facility is a major source for PSD and Title V purposes. New turbine will be subject to NSPS Subpart GG. The project is not subject to PSD since the increases in emissions are less than the significant levels.</p>	

List of Applicable Regulations

FDEP Title V Core List	
62-296.320(4)(b)1 General Visible Emissions Standards	
40 CFR 60, Subpart GG Standards of Performance for Stationary Gas-fired Turbines	

B. FACILITY POLLUTANTS

List of Pollutants Emitted

1. Pollutant Emitted	2. Pollutant Classif.	3. Requested Emissions Cap		4. Basis for Emissions Cap	5. Pollutant Comment
		lb/hour	tons/year		
NO _x	A				
CO	A				
VOC	B				
SO ₂	B				
PM	B				

C. FACILITY SUPPLEMENTAL INFORMATION

Supplemental Requirements

1. Area Map Showing Facility Location: <input checked="" type="checkbox"/> Attached, Document ID: Narrative Fig. 1-1 <input type="checkbox"/> Not Applicable <input type="checkbox"/> Waiver Requested
2. Facility Plot Plan: <input checked="" type="checkbox"/> Attached, Document ID: _Att. B_ <input type="checkbox"/> Not Applicable <input type="checkbox"/> Waiver Requested
3. Process Flow Diagram(s): <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable <input checked="" type="checkbox"/> Waiver Requested
4. Precautions to Prevent Emissions of Unconfined Particulate Matter: <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Waiver Requested
5. Fugitive Emissions Identification: <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Waiver Requested
6. Supplemental Information for Construction Permit Application: <input checked="" type="checkbox"/> Attached, Document ID: _Attachment C_ <input type="checkbox"/> Not Applicable
7. Supplemental Requirements Comment:

Additional Supplemental Requirements for Title V Air Operation Permit Applications

8. List of Proposed Insignificant Activities: <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
9. List of Equipment/Activities Regulated under Title VI: <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Equipment/Activities On site but Not Required to be Individually Listed <input checked="" type="checkbox"/> Not Applicable
10. Alternative Methods of Operation: <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
11. Alternative Modes of Operation (Emissions Trading): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
12. Identification of Additional Applicable Requirements: <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
13. Risk Management Plan Verification: <input type="checkbox"/> Plan previously submitted to Chemical Emergency Preparedness and Prevention Office (CEPPO). Verification of submittal attached (Document ID: _____) or previously submitted to DEP (Date and DEP Office: _____) <input type="checkbox"/> Plan to be submitted to CEPPO (Date required: _____) <input checked="" type="checkbox"/> Not Applicable
14. Compliance Report and Plan: <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
15. Compliance Certification (Hard-copy Required): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through J as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

**A. GENERAL EMISSIONS UNIT INFORMATION
(All Emissions Units)**

Emissions Unit Description and Status

<p>1. Type of Emissions Unit Addressed in This Section: (Check one)</p> <p><input checked="" type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).</p> <p><input type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.</p> <p><input type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.</p>			
<p>2. Regulated or Unregulated Emissions Unit? (Check one)</p> <p><input checked="" type="checkbox"/> The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.</p> <p><input type="checkbox"/> The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.</p>			
<p>3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):</p> <p>7,009 bhp natural gas fired turbine compressor unit</p>			
<p>4. Emissions Unit Identification Number: ID:</p>		<p><input checked="" type="checkbox"/> No ID <input type="checkbox"/> ID Unknown</p>	
<p>5. Emissions Unit Status Code: C</p>	<p>6. Initial Startup Date: 10/20/01</p>	<p>7. Emissions Unit Major Group SIC Code: 49</p>	<p>8. Acid Rain Unit? <input type="checkbox"/></p>
<p>9. Emissions Unit Comment: (Limit to 500 Characters)</p> <p>The proposed turbine engine will be a Cooper-Rolls 501-KC7 DLE engine compressor unit ISO rated at 7,200 bhp and site rated at 7,009 bhp. Fuel will be exclusively natural gas from the FGT's gas pipeline. The proposed engine will incorporate dry, low NO_x combustion technology.</p>			

Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method):

The proposed engine will incorporate dry, low NOX combustion technology.

2. Control Device or Method Code(s): NA

Emissions Unit Details

1. Package Unit:
Manufacturer: Cooper-Rolls Model Number: 501-KC7 DLE

2. Generator Nameplate Rating: MW

3. Incinerator Information:
Dwell Temperature: °F
Dwell Time: seconds
Incinerator Afterburner Temperature: °F

**B. EMISSIONS UNIT CAPACITY INFORMATION
(Regulated Emissions Units Only)**

Emissions Unit Operating Capacity and Schedule

1. Maximum Heat Input Rate:	62.10	mmBtu/hr
2. Maximum Incineration Rate:		lb/hr
3. Maximum Process or Throughput Rate:		
4. Maximum Production Rate:		
5. Requested Maximum Operating Schedule:		
	24 hours/day	7 days/week
	52 weeks/year	8760 hours/year
6. Operating Capacity/Schedule Comment (limit to 200 characters):		
Heat input is 62.10 MM Btu/hr based on vendor specifications of 8,054 Btu/Bhp-hr plus 10% and 7,009 bhp.		

**C. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)**

List of Applicable Regulations

62-296.320(4)(b)1 General Visible Emissions Standards	
40 CFR 60, Subpart GG Standards of Performance for Stationary Gas-fired	
FDEP Title V Core List	

D. EMISSION POINT (STACK/VENT) INFORMATION
 (Regulated Emissions Units Only)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram? 1607		2. Emission Point Type Code: 1	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): NA			
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: NA			
5. Discharge Type Code: V	6. Stack Height: 61.16 feet	7. Exit Diameter: 7.17 feet	
8. Exit Temperature: 965 °F	9. Actual Volumetric Flow Rate: 96,903 acfm	10. Water Vapor: %	
11. Maximum Dry Standard Flow Rate: dscfm		12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates: Zone: 17 East (km): 371.98 North (km): 3310.57			
14. Emission Point Comment (limit to 200 characters):			

E. SEGMENT (PROCESS/FUEL) INFORMATION
(All Emissions Units)

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type) (limit to 500 characters): Natural gas fired turbine engine driving a natural gas compressor, operating full time.		
2. Source Classification Code (SCC): 2-02-002-01		3. SCC Units: Million cubic feet burned
4. Maximum Hourly Rate: 0.0597	5. Maximum Annual Rate: 523.07	6. Estimated Annual Activity Factor: NA
7. Maximum % Sulfur: 0.03	8. Maximum % Ash: NA	9. Million Btu per SCC Unit: 1040
10. Segment Comment (limit to 200 characters): Based on fuel rate of 62.10 MMBtu/hr. Percent sulfur is base on maximum Federal Energy Regulatory Commission (FERC) limit of 10 gr S/100 scf and gas density of 0.0455 lb/scf.		

Segment Description and Rate: Segment NA of

1. Segment Description (Process/Fuel Type) (limit to 500 characters): 		
2. Source Classification Code (SCC):		3. SCC Units:
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment (limit to 200 characters): 		

F. EMISSIONS UNIT POLLUTANTS
(All Emissions Units)

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
NOX	099		EL
CO			NS
VOC			NS
SO2			EL
PM			NS
PM10			NS
HAPS			NS

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: NOX		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 5.6 lb/hour 24.53 tons/year		4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year			
6. Emission Factor: 5.6 lb/hr Reference: Vendor's data		7. Emissions Method Code: 5	
8. Calculation of Emissions (limit to 600 characters): (5.60 lb/hr)(1 ton/2000 lb)(8760 hr/1 yr) = 24.53 tons/year			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Based on vendor's data. See Attachment C.			

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: RULE		2. Future Effective Date of Allowable Emissions: NA	
3. Requested Allowable Emissions and Units: 25 ppmv		4. Equivalent Allowable Emissions: 5.6 lb/hour 25.53 tons/year	
5. Method of Compliance (limit to 60 characters): Initial performance test.			
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): 40 CFR 60.332(3) limits NOX emissions to 190 ppmv.			

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: CO		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 6.86 lb/hour 30.1 tons/year		4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year			
6. Emission Factor: 6.86 lb/hr Reference: Vendor's data		7. Emissions Method Code: 5	
8. Calculation of Emissions (limit to 600 characters): (6.86 lb/hr)(1 ton/2000 lb)(8760 hr/1 yr) = 30.05 tons/year			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Based on vendor's data. See Attachment C.			

Allowable Emissions Allowable Emissions NA of _____

1. Basis for Allowable Emissions Code: NA		2. Future Effective Date of Allowable Emissions: NA	
3. Requested Allowable Emissions and Units:		4. Equivalent Allowable Emissions: lb/hour tons/year	
5. Method of Compliance (limit to 60 characters):			
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters):			

**G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)**

Potential/Fugitive Emissions

1. Pollutant Emitted: VOC		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 0.196 lb/hour 0.9 tons/year		4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year			
6. Emission Factor: 1.96 lb/hr THC Reference: Vendor's data		7. Emissions Method Code: 5	
8. Calculation of Emissions (limit to 600 characters): Vendor factor for total hydrocarbons (THC) = 1.96 lb/hr. Assume 10% is VOC. $(0.196 \text{ lb/hr})(1 \text{ ton}/2000 \text{ lb})(8760 \text{ hr}/1 \text{ yr}) = 0.86 \text{ tons/year}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Based on vendor's data. See Attachment C.			

Allowable Emissions Allowable Emissions NA of _____

1. Basis for Allowable Emissions Code: NA		2. Future Effective Date of Allowable Emissions: NA	
3. Requested Allowable Emissions and Units:		4. Equivalent Allowable Emissions: lb/hour tons/year	
5. Method of Compliance (limit to 60 characters):			
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters):			

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: SO2		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 1.71 lb/hour 7.5 tons/year		4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year			
6. Emission Factor: 10 gr/100scf Reference: Vendor's fuel use		7. Emissions Method Code: 2	
8. Calculation of Emissions (limit to 600 characters): $(10 \text{ gr S}/100 \text{ scf})(0.0597 \text{ MMscf/hr})(1 \text{ lb}/7000 \text{ gr}) = 0.85 \text{ lb S/hr}$ $(0.85 \text{ lb S/hr})(2 \text{ lb SO}_2/\text{lb S}) = 1.71 \text{ lb SO}_2/\text{hr}$ $(1.71 \text{ lb SO}_2/\text{hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) = 7.47 \text{ ton/yr}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): SO2 emission factor is based on maximum Federal Energy Regulatory Commission (FERC) limit of 10 gr S/100 scf and gas density of 0.0455 lb/scf.			

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: RULE		2. Future Effective Date of Allowable Emissions: NA	
3. Requested Allowable Emissions and Units: 4 ppmv		4. Equivalent Allowable Emissions: 1.71 lb/hour 7.5 tons/year	
5. Method of Compliance (limit to 60 characters): Initial performance test and fuel monitoring.			
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): 40 CFR 60.332(3) limits SO2 emissions to 150 ppmv.			

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: PM		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 0.41 lb/hour 1.80 tons/year		4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year			
6. Emission Factor: 0.0066 lb/MM Btu Reference: Table 3.1-2a, AP-42 4/00, Supplement E		7. Emissions Method Code: 4	
8. Calculation of Emissions (limit to 600 characters): $(0.0066 \text{ lb/MM Btu})(62.1 \text{ MM Btu/hr}) = 0.41 \text{ lb/hr}$ $(0.41 \text{ lb/hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) = 1.80 \text{ ton/yr}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Based on vendor's fuel use data plus 10%.			

Allowable Emissions Allowable Emissions NA of _____ -

1. Basis for Allowable Emissions Code: NA		2. Future Effective Date of Allowable Emissions: NA	
3. Requested Allowable Emissions and Units:		4. Equivalent Allowable Emissions: lb/hour tons/year	
5. Method of Compliance (limit to 60 characters):			
6. Allowable Emissions Comment (Desc. Of Operating Method) (limit to 200 characters):			

**G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)**

Potential/Fugitive Emissions

1. Pollutant Emitted: HAPS		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 0.34 lb/hour 1.5 tons/year		4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year			
6. Emission Factor: 0.0217 g/hp-hr Reference: GRI-HAPCalc 3.0		7. Emissions Method Code: 5	
8. Calculation of Emissions (limit to 600 characters): $(0.0217\text{g/hp-hr})(7,009\text{ hp})(1\text{ lb}/453.6\text{ g}) = 0.335\text{ lb/hr}$ $(0.335\text{ lb/hr})(8760\text{ hr/yr})(1\text{ ton}/2000\text{ lb}) = 1.47\text{ ton/yr}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Emission calculations based on Gas Research Institute's software GRI-HAPCALC. Emissions based on factors prioritized by field test data, USEPA factors and literature.			

Allowable Emissions Allowable Emissions NA of _____

1. Basis for Allowable Emissions Code: NA		2. Future Effective Date of Allowable Emissions: NA	
3. Requested Allowable Emissions and Units:		4. Equivalent Allowable Emissions: lb/hour tons/year	
5. Method of Compliance (limit to 60 characters):			
6. Allowable Emissions Comment (Desc. Of Operating Method) (limit to 200 characters):			

H. VISIBLE EMISSIONS INFORMATION
(Only Regulated Emissions Units Subject to a VE Limitation)

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype: VE20	2. Basis for Allowable Opacity: <input checked="" type="checkbox"/> Rule <input type="checkbox"/> Other <input type="checkbox"/>
3. Requested Allowable Opacity: Normal Conditions: 20 % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment (limit to 200 characters): Subject to 62-296-320(4)(b)1 General Visible Emissions Standards.	

I. CONTINUOUS MONITOR INFORMATION
(Only Regulated Emissions Units Subject to Continuous Monitoring)

Continuous Monitoring System: Continuous Monitor NA of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement: <input type="checkbox"/> Rule <input type="checkbox"/> Other	
4. Monitor Information: Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment (limit to 200 characters):	

**J. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
(Regulated Emissions Units Only)**

Supplemental Requirements

1. Process Flow Diagram <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable <input checked="" type="checkbox"/> Waiver Requested
2. Fuel Analysis or Specification <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable <input checked="" type="checkbox"/> Waiver Requested
3. Detailed Description of Control Equipment <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Waiver Requested
4. Description of Stack Sampling Facilities <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable <input checked="" type="checkbox"/> Waiver Requested
5. Compliance Test Report <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously submitted, Date: _____ <input checked="" type="checkbox"/> Not Applicable
6. Procedures for Startup and Shutdown <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable <input checked="" type="checkbox"/> Waiver Requested
7. Operation and Maintenance Plan <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Waiver Requested
8. Supplemental Information for Construction Permit Application <input checked="" type="checkbox"/> Attached, Document ID: Narrative <input type="checkbox"/> Not Applicable
9. Other Information Required by Rule or Statute <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
10. Supplemental Requirements Comment: Process flow diagrams and fuel analyses have been previously submitted. Supplemental information is provided in the narrative description accompanying these forms.

Additional Supplemental Requirements for Title V Air Operation Permit Applications

11. Alternative Methods of Operation <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
12. Alternative Modes of Operation (Emissions Trading) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
13. Identification of Additional Applicable Requirements <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
14. Compliance Assurance Monitoring Plan <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
15. Acid Rain Part Application (Hard-copy Required) NA <input type="checkbox"/> Acid Rain Part - Phase II (Form No. 62-210.900(1)(a)) Attached, Document ID: _____ <input type="checkbox"/> Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) Attached, Document ID: _____ <input type="checkbox"/> New Unit Exemption (Form No. 62-210.900(1)(a)2.) Attached, Document ID: _____ <input type="checkbox"/> Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) Attached, Document ID: _____ <input type="checkbox"/> Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) Attached, Document ID: _____ <input type="checkbox"/> Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) Attached, Document ID: _____ <input type="checkbox"/> Not Applicable

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through J as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

**A. GENERAL EMISSIONS UNIT INFORMATION
(All Emissions Units)**

Emissions Unit Description and Status

<p>1. Type of Emissions Unit Addressed in This Section: (Check one)</p> <p><input checked="" type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).</p> <p><input type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.</p> <p><input type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.</p>			
<p>2. Regulated or Unregulated Emissions Unit? (Check one)</p> <p><input type="checkbox"/> The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.</p> <p><input checked="" type="checkbox"/> The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.</p>			
<p>3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):</p> <p>Emergency generator Waukesha Model H24GL rated at 585 bhp</p>			
<p>4. Emissions Unit Identification Number:</p> <p><input type="checkbox"/> ID: <input checked="" type="checkbox"/> ID Unknown</p>			
<p>5. Emissions Unit Status Code:</p> <p>C</p>	<p>6. Initial Startup Date: 10/20/01</p>	<p>7. Emissions Unit Major Group SIC Code:</p> <p>49</p>	<p>8. Acid Rain Unit?</p> <p><input type="checkbox"/></p>
<p>9. Emissions Unit Comment: (Limit to 500 Characters)</p> <p>The proposed generator engine will be a Waukesha Model H24GL reciprocating engine rated at 440 kW (585 bhp). Fuel will be exclusively natural gas from the FGT's gas pipeline. The unit will be operated no more than 500 hours per year. This unit will replace an existing Waukesha Model 6WAK, 235 bhp emergency generator and a Ford LSG-875R, 200 bhp emergency generator.</p>			

Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method):

NA

2. Control Device or Method Code(s): NA

Emissions Unit Details

1. Package Unit:	
Manufacturer: Waukesha	Model Number: H24GL
2. Generator Nameplate Rating: 0.440 MW	
3. Incinerator Information:	
Dwell Temperature:	°F
Dwell Time:	seconds
Incinerator Afterburner Temperature:	°F

**B. EMISSIONS UNIT CAPACITY INFORMATION
(Regulated Emissions Units Only)**

Emissions Unit Operating Capacity and Schedule

1. Maximum Heat Input Rate:	4.11	mmBtu/hr	
2. Maximum Incineration Rate:	lb/hr		tons/day
3. Maximum Process or Throughput Rate:			
4. Maximum Production Rate:			
5. Requested Maximum Operating Schedule:			
	hours/day		days/week
	weeks/year	500	hours/year
6. Operating Capacity/Schedule Comment (limit to 200 characters):			
Heat input is 4.11 MM Btu/hr based on vendor specifications.			
Schedule will be limited to 500 hours per year.			

D. EMISSION POINT (STACK/VENT) INFORMATION
(Regulated Emissions Units Only)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram? GEN 03		2. Emission Point Type Code: 1	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): NA			
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: NA			
5. Discharge Type Code: V	6. Stack Height: 20 feet	7. Exit Diameter: 0.67 feet	
8. Exit Temperature: 846 °F	9. Actual Volumetric Flow Rate: 2911 acfm	10. Water Vapor: %	
11. Maximum Dry Standard Flow Rate: dscfm		12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates: Zone: 16 East (km): 371.98 North (km): 3310.57			
14. Emission Point Comment (limit to 200 characters): - This 585 bhp emergency generator will replace two existing emergency generators rated at 235 and 200 bhp. The unit will not be operated more than 500 hours per year.			

E. SEGMENT (PROCESS/FUEL) INFORMATION
(All Emissions Units)

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type) (limit to 500 characters): Natural gas fired reciprocating engine driving a 440 Kw generator, operating no more than 500 hours per year.		
2. Source Classification Code (SCC): 2-02-002-54		3. SCC Units: Million cubic feet burned
4. Maximum Hourly Rate: 0.00395	5. Maximum Annual Rate: 1.98	6. Estimated Annual Activity Factor: NA
7. Maximum % Sulfur: 0.03	8. Maximum % Ash: NA	9. Million Btu per SCC Unit: 1040
10. Segment Comment (limit to 200 characters): Based on vendor supplied heat rate of 4.11 MM Btu/hr and a fuel heat value of 1040 Btu/scf. Percent sulfur is base on maximum Federal Energy Regulatory Commission (FERC) limit of 10 gr S/100 scf and gas density of 0.0455 lb/scf.		

Segment Description and Rate: Segment NA of NA

1. Segment Description (Process/Fuel Type) (limit to 500 characters): NA		
2. Source Classification Code (SCC):		3. SCC Units:
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment (limit to 200 characters):		

F. EMISSIONS UNIT POLLUTANTS
(All Emissions Units)

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
NOX			NS
CO			NS
VOC			NS
SO2			NS
PM10			NS
PM25			NS

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: NOX		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 2.70 lb/hour 11.8 tons/year			4. Synthetically Limited? <input checked="" type="checkbox"/>
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year			
6. Emission Factor: 2.1 g/hp-hr Reference: Vendor's data			7. Emissions Method Code: 5
8. Calculation of Emissions (limit to 600 characters): $(2.1 \text{ g/hp-hr})(585 \text{ hp})/453.6 \text{ g/lb} = 2.70 \text{ lb/hr}$ $(2.70 \text{ lb/hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) = 11.82 \text{ tpy}$ $(2.70 \text{ lb/hr})(500 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) = 0.68 \text{ tpy}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Operation limited to 500 hours per year.			

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions: NA
3. Requested Allowable Emissions and Units: NA	4. Equivalent Allowable Emissions: NA lb/hour 0.68 tons/year
5. Method of Compliance (limit to 60 characters): Maintain record of hours of operation.	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Limitation on hours to 500 hrs/yr meets US EPA's definition of an emergency generator as insignificant source for Title V purposes.	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: CO		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 1.81 lb/hour 7.93 tons/year		4. Synthetically Limited? [X]	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year			
6. Emission Factor: 1.4 g/hp-hr Reference: Vendor's data		7. Emissions Method Code: 5	
8. Calculation of Emissions (limit to 600 characters): $(1.4 \text{ g/hp-hr})(585 \text{ hp})/453.6 \text{ g/lb} = 1.81 \text{ lb/hr}$ $(1.81 \text{ lb/hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) = 7.93 \text{ tpy}$ $(1.81 \text{ lb/hr})(500 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) = 0.45 \text{ tpy}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Operation limited to 500 hours per year.			

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER		2. Future Effective Date of Allowable Emissions: NA	
3. Requested Allowable Emissions and Units: NA		4. Equivalent Allowable Emissions: NA lb/hour 0.45 tons/year	
5. Method of Compliance (limit to 60 characters): Maintain record of hours of operation.			
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Limitation on hours to 500 hrs/yr meets US EPA's definition of an emergency generator as insignificant source for Title V purposes.			

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: VOC	2. Total Percent Efficiency of Control:
3. Potential Emissions: 0.31 lb/hour 1.36 tons/year	4. Synthetically Limited? [X]
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year	
6. Emission Factor: 0.24 g/hp-hr Reference: Vendor's data	7. Emissions Method Code: 5
8. Calculation of Emissions (limit to 600 characters): Vendor factor for non-methane hydrocarbons (NMHC) = 0.24 g/hp-hr. Assume all is VOC. $(0.24 \text{ g/hp-hr})(585 \text{ hp})/453.6 \text{ g/lb} = 0.31 \text{ lb/hr}$ $(0.31 \text{ lb/hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) = 1.36 \text{ tpy}$ $(0.31 \text{ lb/hr})(500 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) = 0.08 \text{ tpy}$	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Operation limited to 500 hours per year.	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions: NA
3. Requested Allowable Emissions and Units: NA	4. Equivalent Allowable Emissions: NA lb/hour 0.08 tons/year
5. Method of Compliance (limit to 60 characters): Maintain record of hours of operation.	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Limitation on hours to 500 hrs/yr meets US EPA's definition of an emergency generator as insignificant source for Title V purposes.	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: SO2		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 0.11 lb/hour 0.49 tons/year		4. Synthetically Limited? [X]	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year			
6. Emission Factor: 82 scfm natural gas fuel Reference: Vendor's data		7. Emissions Method Code: 2	
8. Calculation of Emissions (limit to 600 characters): $(10 \text{ gr S}/100 \text{ scf})(0.00395 \text{ MMscf/hr})(1 \text{ lb}/7000 \text{ gr}) = 0.056 \text{ lb S/hr}$ $(0.056 \text{ lb S/hr})(2 \text{ lb SO}_2/\text{lb S}) = 0.11 \text{ lb SO}_2/\text{hr}$ $(0.11 \text{ lb SO}_2/\text{hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) = 0.49 \text{ ton/yr}$ $(0.11 \text{ lb SO}_2/\text{hr})(500 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) = 0.03 \text{ ton/yr}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Operation limited to 500 hours per year. SO2 emission factor is based on maximum Federal Energy Regulatory Commission (FERC) limit of 10 gr S/100 scf and gas density of 0.0455 lb/scf.			

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER		2. Future Effective Date of Allowable Emissions: NA	
3. Requested Allowable Emissions and Units: NA		4. Equivalent Allowable Emissions: NA lb/hour 0.03 tons/year	
5. Method of Compliance (limit to 60 characters): Maintain record of hours of operation.			
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Limitation on hours to 500 hrs/yr meets US EPA's definition of an emergency generator as insignificant source for Title V purposes.			

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: PM		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 0.04 lb/hour 0.18 tons/year		4. Synthetically Limited? <input checked="" type="checkbox"/>	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year			
6. Emission Factor: 0.00999 lb/MM Btu Reference: AP-42 Section 3.2 Table 3.2-2, 4/00 Supplement E		7. Emissions Method Code: 4	
8. Calculation of Emissions (limit to 600 characters): $(0.00999 \text{ lb/MM Btu})(4.11 \text{ MM Btu/hr}) = 0.04 \text{ lb/hr}$ $(0.04 \text{ lb/hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) = 0.18 \text{ ton/y}$ $(0.04 \text{ lb/hr})(500 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) = 0.01 \text{ ton/y}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Operation limited to 500 hours per year. Based on vendor's fuel use data.			

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER		2. Future Effective Date of Allowable Emissions: NA	
3. Requested Allowable Emissions and Units: NA		4. Equivalent Allowable Emissions: NA lb/hour 0.01 tons/year	
5. Method of Compliance (limit to 60 characters): Maintain record of hours of operation.			
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Limitation on hours to 500 hrs/yr meets US EPA's definition of an emergency generator as insignificant source for Title V purposes.			

H. VISIBLE EMISSIONS INFORMATION
 (Only Regulated Emissions Units Subject to a VE Limitation)

Visible Emissions Limitation: Visible Emissions Limitation 1 of 1

1. Visible Emissions Subtype: VE20	2. Basis for Allowable Opacity: <input checked="" type="checkbox"/> Rule <input type="checkbox"/> Other
3. Requested Allowable Opacity: Normal Conditions: 20% Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment (limit to 200 characters): Subject to 62-296-320(4)(b)1 General Visible Emissions Standards.	

I. CONTINUOUS MONITOR INFORMATION
 (Only Regulated Emissions Units Subject to Continuous Monitoring)

Continuous Monitoring System: Continuous Monitor NA of

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement: <input type="checkbox"/> Rule <input type="checkbox"/> Other	
4. Monitor Information: Manufacturer: _____ Model Number: _____ Serial Number: _____	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment (limit to 200 characters):	

**J. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
(Regulated Emissions Units Only)**

Supplemental Requirements

1. Process Flow Diagram <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable <input checked="" type="checkbox"/> Waiver Requested
2. Fuel Analysis or Specification <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable <input checked="" type="checkbox"/> Waiver Requested
3. Detailed Description of Control Equipment <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Waiver Requested
4. Description of Stack Sampling Facilities <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable <input checked="" type="checkbox"/> Waiver Requested
5. Compliance Test Report <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously submitted, Date: _____ <input checked="" type="checkbox"/> Not Applicable
6. Procedures for Startup and Shutdown <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Waiver Requested
7. Operation and Maintenance Plan <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Waiver Requested
8. Supplemental Information for Construction Permit Application <input checked="" type="checkbox"/> Attached, Document ID: <u>Attach. C</u> <input type="checkbox"/> Not Applicable
9. Other Information Required by Rule or Statute <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
10. Supplemental Requirements Comment: Process flow diagrams and fuel analyses have been previously submitted. Supplemental information is provided in the narrative description accompanying these forms.

Additional Supplemental Requirements for Title V Air Operation Permit Applications

11. Alternative Methods of Operation <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
12. Alternative Modes of Operation (Emissions Trading) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
13. Identification of Additional Applicable Requirements <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
14. Compliance Assurance Monitoring Plan <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
15. Acid Rain Part Application (Hard-copy Required) <input type="checkbox"/> Acid Rain Part - Phase II (Form No. 62-210.900(1)(a)) Attached, Document ID: _____ <input type="checkbox"/> Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) Attached, Document ID: _____ <input type="checkbox"/> New Unit Exemption (Form No. 62-210.900(1)(a)2.) Attached, Document ID: _____ <input type="checkbox"/> Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) Attached, Document ID: _____ <input type="checkbox"/> Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) Attached, Document ID: _____ <input type="checkbox"/> Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable

Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method):

NA

2. Control Device or Method Code(s): NA

Emissions Unit Details

1. Package Unit:	
Manufacturer:	Model Number:
2. Generator Nameplate Rating:	MW
3. Incinerator Information:	
Dwell Temperature:	°F
Dwell Time:	seconds
Incinerator Afterburner Temperature:	°F

**B. EMISSIONS UNIT CAPACITY INFORMATION
(Regulated Emissions Units Only)**

Emissions Unit Operating Capacity and Schedule

1. Maximum Heat Input Rate:	mmBtu/hr		
2. Maximum Incineration Rate:	lb/hr		tons/day
3. Maximum Process or Throughput Rate:			
4. Maximum Production Rate:			
5. Requested Maximum Operating Schedule:			
	24	hours/day	7
			days/week
	52	weeks/year	8760
			hours/year
6. Operating Capacity/Schedule Comment (limit to 200 characters):			

D. EMISSION POINT (STACK/VENT) INFORMATION
(Regulated Emissions Units Only)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram? FUGITIVE		2. Emission Point Type Code: 4	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): NA			
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: NA			
5. Discharge Type Code: F	6. Stack Height: NA feet	7. Exit Diameter: NA feet	
8. Exit Temperature: 77 °F	9. Actual Volumetric Flow Rate: NA acfm	10. Water Vapor: NA %	
11. Maximum Dry Standard Flow Rate: NA dscfm		12. Nonstack Emission Point Height: 0 feet	
13. Emission Point UTM Coordinates: Zone: 17 East (km): 371.98 North (km): 3310.57			
14. Emission Point Comment (limit to 200 characters): -			

E. SEGMENT (PROCESS/FUEL) INFORMATION
(All Emissions Units)

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type) (limit to 500 characters): Fugitive emissions from component leaks.		
2. Source Classification Code (SCC): 3-10-888-11		3. SCC Units: MM cubic feet produced
4. Maximum Hourly Rate: 0	5. Maximum Annual Rate: 0	6. Estimated Annual Activity Factor: component count
7. Maximum % Sulfur: NA	8. Maximum % Ash: NA	9. Million Btu per SCC Unit: NA
10. Segment Comment (limit to 200 characters): Based on count of new components and USEPA emission factors provided in EPA publication EPA-453/R-95-017, November 1995, "Protocol for Equipment Leak Emission Estimates"		

Segment Description and Rate: Segment NA of NA

1. Segment Description (Process/Fuel Type) (limit to 500 characters):		
2. Source Classification Code (SCC):		3. SCC Units:
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment (limit to 200 characters):		

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: VOC		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 0.28 lb/hour 1.23 tons/year		4. Synthetically Limited? [Y]	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 to tons/year			
6. Emission Factor: lb/hr/component Reference: EPA-453/R-95-017, Protocol for Equipment Leak EmissionEstimates"		7. Emissions Method Code: 5	
8. Calculation of Emissions (limit to 600 characters): (EPA factor for specific component type) (number of components of specific type) = tpy. Assume non-methane/non-ethane fraction is 5%. (tons/year)(2000 lb/ton)(1 yr/8760 hr) = lb/hr See Attachment D for details.			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Factors vary by component type. See Attachment D for specific factors and calculations.			

Allowable Emissions Allowable Emissions NA of

1. Basis for Allowable Emissions Code: NA		2. Future Effective Date of Allowable Emissions: NA	
3. Requested Allowable Emissions and Units:		4. Equivalent Allowable Emissions: lb/hour tons/year	
5. Method of Compliance (limit to 60 characters):			
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters):			

**J. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
(Regulated Emissions Units Only)**

Supplemental Requirements

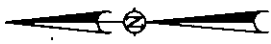
1. Process Flow Diagram <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable <input checked="" type="checkbox"/> Waiver Requested
2. Fuel Analysis or Specification <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable <input checked="" type="checkbox"/> Waiver Requested
3. Detailed Description of Control Equipment <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Waiver Requested
4. Description of Stack Sampling Facilities <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable <input checked="" type="checkbox"/> Waiver Requested
5. Compliance Test Report <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously submitted, Date: _____ <input checked="" type="checkbox"/> Not Applicable
6. Procedures for Startup and Shutdown <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Waiver Requested
7. Operation and Maintenance Plan <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable <input type="checkbox"/> Waiver Requested
8. Supplemental Information for Construction Permit Application <input checked="" type="checkbox"/> Attached, Document ID: <u>Narrative</u> <input type="checkbox"/> Not Applicable
9. Other Information Required by Rule or Statute <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
10. Supplemental Requirements Comment: Process flow diagrams and fuel analyses have been previously submitted. Supplemental information is provided in the narrative description accompanying these forms.

Additional Supplemental Requirements for Title V Air Operation Permit Applications

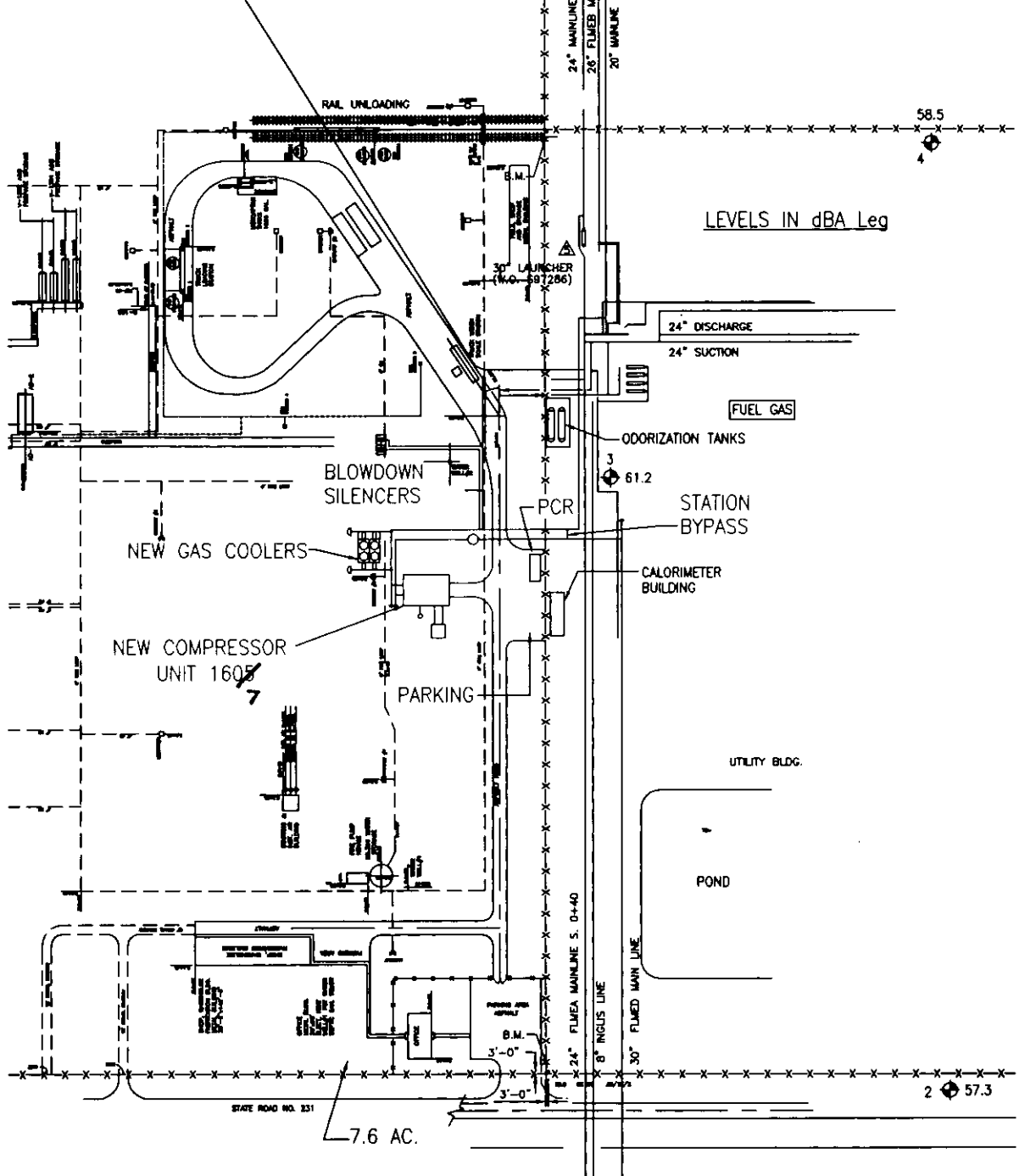
11. Alternative Methods of Operation <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
12. Alternative Modes of Operation (Emissions Trading) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
13. Identification of Additional Applicable Requirements <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
14. Compliance Assurance Monitoring Plan <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
15. Acid Rain Part Application (Hard-copy Required) <input type="checkbox"/> Acid Rain Part - Phase II (Form No. 62-210.900(1)(a)) Attached, Document ID: _____ <input type="checkbox"/> Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) Attached, Document ID: _____ <input type="checkbox"/> New Unit Exemption (Form No. 62-210.900(1)(a)2.) Attached, Document ID: _____ <input type="checkbox"/> Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) Attached, Document ID: _____ <input type="checkbox"/> Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) Attached, Document ID: _____ <input type="checkbox"/> Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable

Attachment B

Plot Plan



16" (JACS) JACKSONVILLE LATERAL



LEVELS IN dBA Leg

58.5

24" DISCHARGE

24" SUCTION

FUEL GAS

ODORIZATION TANKS

3 61.2

STATION BYPASS

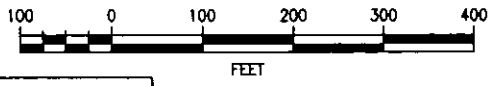
CALORIMETER BUILDING

UTILITY BLDG.

POND

2 57.3

7.6 AC.



NOISE DATA:

Avg. 3-15 Sec.
 LEQ taken 3:30 p.m. 1/24/91
 Temp. 50°F
 Wind: 6-12 MPH N

FLORIDA GAS TRANSMISSION COMPANY

PROPOSED FGT PHASE V
 COMPRESSOR STATION NO. 16
 PLOT PLAN

DWG. NO.

NV-6

10/24/00

Attachment C

Vendor Information

Cooper-Rolls 501 KC-7 Turbine

Waukesha Model H24GL Natural Gas-fired Reciprocating Engine

Cooper-Rolls 501 KC-7 Turbine

Allison Industrial Engine Performance & Emissions Estimate (EDR 17933A)

Date: July 17, 2000

Project: FGT Phase V Winter

Engine Configuration: 501-KC7

Parameter\Data Pt. No.	1	2	3	4	5	6
Altitude (feet)	295	295	295	296	295	295
Ambient Press. (psia)	14.54	14.54	14.54	14.54	14.54	14.54
Relative Humidity	100	100	100	100	100	100
Specific Humidity	0.010778	0.010778	0.010778	0.010778	0.010778	0.010778
Inlet Loss ("H2O)	4	4	4	4	4	4
Exhaust Loss ("H2O)	4	3	3	3	3	3
Inlet Pressure - CIP (psia)	14.395	14.395	14.395	14.396	14.395	14.395
Inlet Temperature-CIT (° F)	59	59	59	59	59	59
Inlet Flow (lb/sec)	44.332	42.921	41.601	40.946	40.127	39.525
CDT (° F)	747	724	703	681	659	645
MGT t/c (° F)	1376	1312	1313	1312	1311	1310
Control Temp. (° F)	1935	1859	1860	1880	1860	1860
BOT f/a (° F)	2012	1936	1937	1937	1937	1937
Fuel Flow (MMBTU/hr)	56.4511	51.9133	49.48	48.904	44.2873	42.6415
Fuel Flow (lb/hr)	2711.05	2493.12	2376.27	2252.55	2126.89	2047.85
Output Shaft Speed (rpm)	13600	12756	11912	11068	10224	9380
Gas Generator Speed (rpm)	14693	14364	14127	13916	13732	13631
Shaft Power (hp)	7009.2	6300.8	5606.3	4906.5	4209.3	3749.9
% of Full Load	100	90	80	70	60	50
SFC [lb/(hp*hr)]	0.3868	0.3957	0.4239	0.4591	0.6053	0.5461
HeatRate[Shaft] BTU/(shp*hr)	8054	8239	8826	9560	10521	11371
TOT t/c (° F)	965	933	953	9756	1000	1020
Exhaust Flow (lb/sec)	44.779	43.316	40.672	38.011	35.387	33.787
Exh. Temp. f/a (° F)	965	932	952	974	999	1018
Exhaust P (psia)	14.648	14.648	14.648	14.648	14.648	14.648
Fuel	FGT Phas	Alt Ga.	Alt Gas	Alt Gas	Alt Gas	Alt Gas
Fuel LHV (BTU/lb)	20822.6	20822.6	20822.6	20822.6	20822.6	20822.6
H/C (wt ratio)	0.3221	0.3221	0.3221	0.3221	0.3221	0.3221
Fuel Molecular Weight	16.217	16.217	16.217	16.217	16.217	16.217
Fuel Specific Gravity	0.59792	0.59792	0.59792	0.59792	0.59792	0.59792
Emissions @ 15% O2						
NOx ppm	25	25	25	25	25	26
CO ppm	50	50	50	50	50	50
Emissions (lb/eng-hr)						
NOx	5.6	6.2	4.9	4.5	4.2	4.0
CO	6.86	6.30	5.97	5.53	5.09	4.84
HC	1.96	1.80	1.71	1.58	1.45	1.38

Waukesha Model H24GL Natural Gas-fired Reciprocating Engine

03/21/01 WED 10:13 FAX 713 877 4165

GULF INTERSTATE ENGR.

013

03/18/01 MON 14:50 FAX 713 383 1334
03/18/01 MON 08:11 FAX 1 713 581 0874

THE HANOVER CO.
P.O. BOX 10000 HOUSTON, TEXAS 77255

010

APR 15 '01 06:25PM WILKESHA ENGINE SLS

P.18/12



SAA No. 2001 - 89

CERTIFICATION OF ENGINEERING APPROVAL

Are Special Codes or Equipment Required for this Approval? Y

List Code 1100: Power of 176 psi continuous duty.

Engineering Approval:

Ignition Timing 13 °BTDC Carb Setting (Lambda or MAFR) 7.8% O2

When operating per the site conditions listed and per the attached fuel analysis, WED approves a maximum continuous rating of 585 BHP @1800 RPM with no overload allowed.

For the site conditions listed and per the attached fuel analysis with the engine operating at the stated loads @1800 RPM, the following exhaust emissions are guaranteed not to exceed:

	- Guaranteed -		- Estimated -
BHP:	585	439	293
*NOx: (g/bhp-hr)	2.1	2.0	2.0
CO: (g/bhp-hr)	1.4	1.5	1.6
MMBC: (g/bhp-hr)	0.24	0.28	0.32

* NOx emission at absolute humidity of 75 grains H2O/lb dry air.

Fuel must conform to WED "Gaseous Fuel Specification" S7884-7.

Mark J. Helgren
Signed: Mark J. Helgren

3/15/01
Date: 03/15/2001

Joe Lange
Signed: Joe Lange

3/15/2001
Date: 03/15/2001

HEAT REJECTION

3

1.1 HEAT REJECTION AND OPERATING DATA						
MODEL H24GL/GLD						
130° F (54° C) AUX. WATER TEMPERATURE						
180° F (82° C) JACKET WATER TEMP.						
	BMEP (PSI)	2.0 ENGINE SPEED - RPM				
		1400	1500	1600	1700	1800
POWER (BHP)	185	-	515	545	580	615
	176	455	490	520	555	585
	160	415	445	475	505	530
	150	388	415	443	471	498
	125	323	346	369	392	415
	100	258	277	295	314	332
	75	194	208	222	235	249
	50	129	138	148	157	166
BRAKE SPEC FUEL CONS. (BTU/BHP-HR)	185	-	6786	6882	6933	6978
	176	6814	6831	6928	6980	7026
	160	6902	6923	7021	7076	7126
	150	6967	6991	7089	7147	7199
	125	7174	7208	7308	7374	7433
	100	7484	7533	7636	7714	7784
	75	8002	8076	8182	8281	8369
	50	9037	9161	9275	9414	9539
FUEL CONSUMPTION (BTU/HR) x 1000	185	-	3475	3760	4025	4290
	176	3100	3330	3600	3855	4110
	160	2855	3065	3320	3555	3790
	150	2700	2905	3140	3365	3590
	125	2315	2495	2700	2895	3085
	100	1935	2085	2255	2420	2585
	75	1550	1675	1810	1950	2085
	50	1168	1268	1370	1477	1585
HEAT TO JACKET WATER (BTU/HR) x 1000	185	-	912	972	1024	1077
	176	832	882	939	991	1042
	160	781	830	881	931	981
	150	749	798	845	893	942
	125	669	716	754	800	846
	100	590	634	663	707	750
	75	510	553	573	613	654
	50	430	471	482	520	557
HEAT TO LUBE OIL (BTU/HR) x 1000	185	-	94	110	121	131
	176	82	93	108	119	129
	160	79.5	90.5	106	116	126
	150	78	89	104	114	124
	125	74.5	85	100	110	120
	100	71	81.5	95.5	105	115
	75	67.5	77.5	91.5	101	110
	50	64	73.5	87	96	105
HEAT TO INTERCOOLER (BTU/HR) x 1000	185	-	185	213	243	273
	176	151	173	199	228	256
	160	132	152	175	201	227
	150	120	138	160	184	208
	125	89.5	104	123	142	162
	100	58.5	70	86	101	115
	75	28	36	49	59	68.5
	50	-2	2	12	17	22



HEAT REJECTION

3

2.1 HEAT REJECTION AND OPERATING DATA						
MODEL H24GL/GLD						
130° F (54° C) AUX. WATER TEMPERATURE						
3.0 180° F (82° C) JACKET WATER TEMP.						
	BMEP (PSI)	4.0 ENGINE SPEED - RPM				
		1400	5.0	1500	1600	1700
HEAT TO RADIATION (BTU/HR) x 1000	185	-	73	79.5	83.5	87.5
	176	72	73	79	83	87.5
	160	71	72.5	78.5	82.5	87
	150	71	72.5	78	82.5	86.5
	125	70	72	77.5	81.5	86
	100	69	71.5	76.5	81	85
	75	68	70.5	76	80	84
50	67.5	69.5	75	79	83	
TOTAL ENERGY IN EXHAUST (BTU/HR) x 1000	185	-	942	1030	1112	1196
	176	831	897	983	1061	1142
	160	756	818	898	970	1045
	150	709	769	844	913	984
	125	594	647	712	772	833
	100	483	527	581	632	684
	75	376	412	454	495	538
50	275	302	332	364	397	
EXHAUST TEMP AFTER TURBINE (+/- 50 °F)	185	-	810	823	834	844
	176	799	808	821	831	842
	160	794	804	816	827	838
	150	791	801	814	824	835
	125	783	795	807	818	829
	100	775	789	800	812	823
	75	768	782	793	805	817
50	760	776	786	798	811	
INDUCTION AIR FLOW (SCFM)	185	-	990	1065	1140	1215
	176	880	945	1020	1090	1160
	160	805	865	935	1000	1065
	150	760	815	885	945	1005
	125	640	690	750	800	855
	100	525	565	615	660	705
	75	410	445	485	520	555
50	300	325	355	385	410	
EXHAUST GAS FLOW (LBS/HR)	185	-	4520	4875	5205	5540
	176	4015	4315	4660	4980	5300
	160	3675	3955	4275	4575	4870
	150	3465	3725	4035	4315	4600
	125	2930	3155	3420	3670	3915
	100	2400	2585	2810	3020	3230
	75	1885	2030	2210	2380	2550
50	1380	1495	1625	1755	1890	



HEAT REJECTION

3

5.1 HEAT REJECTION AND OPERATING DATA						
MODEL H24GL/GLD						
130° F (54° C) AUX. WATER TEMPERATURE						
6.0 180° F (82° C) JACKET WATER TEMP.						
	BMEP (PSI)	Engine Speed - RPM				
		1400	1500	1600	1700	1800
NOx Emissions (g/bhp-hr)	185	-	2.66	2.66	2.54	2.42
	176	2.53	2.48	2.38	2.22	2.06
	160	2.50	2.42	2.35	2.18	2.00
	150	2.47	2.39	2.32	2.17	2.01
	125	2.40	2.33	2.26	2.12	1.99
	100	2.34	2.26	2.17	2.08	1.98
	75	2.26	2.19	2.12	2.03	1.94
	50	2.10	2.02	1.94	1.90	1.86
CO Emissions (g/bhp-hr)	185	-	1.25	1.24	1.25	1.27
	176	1.34	1.28	1.29	1.31	1.34
	160	1.32	1.40	1.35	1.34	1.32
	150	1.38	1.42	1.39	1.31	1.23
	125	1.43	1.45	1.42	1.42	1.43
	100	1.52	1.51	1.51	1.51	1.52
	75	1.66	1.62	1.61	1.63	1.66
	50	1.85	1.88	1.87	1.86	1.85
NMHC Emissions (g/bhp-hr)	185	-	0.30	0.28	0.26	0.24
	176	0.36	0.30	0.28	0.26	0.24
	160	0.33	0.31	0.30	0.28	0.25
	150	0.35	0.32	0.31	0.29	0.27
	125	0.36	0.32	0.32	0.30	0.29
	100	0.38	0.35	0.35	0.32	0.30
	75	0.44	0.39	0.38	0.36	0.35
	50	0.51	0.47	0.45	0.44	0.44
THC Emissions (g/bhp-hr)	185	-	1.99	1.84	1.60	1.53
	176	2.38	1.99	1.84	1.73	1.61
	160	2.22	2.07	1.99	1.84	1.69
	150	2.30	2.11	2.07	1.94	1.80
	125	2.38	2.15	2.15	2.03	1.92
	100	2.53	2.30	2.30	2.15	1.99
	75	2.91	2.61	2.53	2.42	2.30
	50	3.37	3.14	2.99	2.95	2.91



HEAT REJECTION

3

NOTES:

1. All data are based on ISO standard conditions of 29.54 inches Hg. (100 kPa) barometric pressure, 77° F (25° C) ambient and induction air temperature, 30% relative humidity (0.3 inches Hg. /1 kPa water vapor pressure), 180° F (82° C) engine jacket water outlet temperature, and standard ignition timing per Note 5 for 11:1 compression ratio.
2. All data are average values at the standard conditions and will vary for individual engines and with operating and ambient conditions and with changes to ignition timing or air/fuel ratio. An adequate reserve should be used for cooling system or heat recovery calculations. See also Cooling System Guidelines, S-6699-7, latest version.
3. ISO Standard (continuous) power ratings conform to ISO 3046/1, latest version, with a mechanical efficiency of 90% and auxiliary water temperature, T_{cra} , of 130° F (54.5° C) limited to $\pm 10^\circ F$ ($\pm 5.5^\circ C$). ISO Standard power rating of 176 BMEP requires Price Book Option Code 1100.
4. Fuel standard: dry natural gas, 900 BTU/scf (35.38 MJ/m³ [25, V (0; 101.325)]) saturated lower heating value (SLHV) with a minimum Waukesha Knock Index™ of 91. Refer to S-7884-6, latest version, for the full fuel specification.
5. Standard ignition timing is 13° BTDC with J-type 60999T or 60999W spark plugs and 15° BTDC with 4-ground 60999S spark plugs.
6. For heat rejection changes due to engine jacket water outlet temperature higher than standard (Note 1), refer to S-7613-3, latest version.
7. Total Exhaust Energy includes both recoverable and non-recoverable heat. For a procedure to calculate recoverable heat refer to S-8117-1, latest version.
8. Exhaust oxygen concentration set to 7.8% at rated speed and load at standard timing to provide 2 g/bhp-hr or less NOx. This oxygen level is measured at the port located in the exhaust manifold upstream of the turbocharger.
9. Low pressure (draw thru) fuel system on the GLD model.
10. Reference Engine Ratings and Fuel Consumption curve sheets C-1104-15 and C-1104-17.
11. Exhaust flow at nominal 29.54 inches Hg. (100 kPa) atmospheric pressure:

$$\text{Flow rate (English): ACFM} = \frac{(\text{Exh. Flow, lb/hr}) \times (\text{Exh. Temp. } ^\circ\text{F} + 460)}{2275}$$



Attachment D
Emission Calculations

Engine Emissions

Engine HAP Emissions

Fugitive Leak Emissions

Engine Emissions

Engine No. 1607 EPN:

NOx Emissions: (Based on Vendor Data)

$$\text{lb NOx/hr} = 5.60$$

$$\begin{aligned} \text{tons NOx/yr} &= (\text{lb NOx/hr})(\text{hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= (5.6 \text{ lb NOx/hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= 24.53 \end{aligned}$$

CO Emissions: (Based on Vendor Data)

$$\text{lb CO/hr} = 6.86$$

$$\begin{aligned} \text{tons CO/yr} &= (\text{lb CO/hr})(\text{hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= (6.9 \text{ lb CO/hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= 30.05 \end{aligned}$$

VOC Emissions: (Based on Vendor Data)

$$\text{lb VOC/hr} = 0.196$$

$$\begin{aligned} \text{tons VOC/yr} &= (\text{lb VOC/hr})(\text{hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= (0.196 \text{ lb VOC/hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= 0.86 \end{aligned}$$

SO2 Emissions: (Based on FERC Limits)

$$\begin{aligned} \text{lb S/hr} &= (\text{gr S}/100 \text{ scf})(\text{MMscf/hr})(1 \text{ lb}/7000 \text{ gr}) \\ &= (10 \text{ gr S}/100 \text{ scf})(0.0597 \text{ MMscf/hr})(1 \text{ lb}/7000 \text{ gr}) \\ &= 0.85 \end{aligned}$$

$$\begin{aligned} \text{lb SO}_2/\text{hr} &= (\text{lb S/hr})(2 \text{ lb SO}_2/\text{lb S}) \\ &= (0.85 \text{ lb S/hr})(2 \text{ lb SO}_2/\text{lb S}) \\ &= 1.71 \end{aligned}$$

$$\begin{aligned} \text{tons SO}_2/\text{yr} &= (\text{lb SO}_2/\text{hr})(\text{hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= (1.71 \text{ lb SO}_2/\text{hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= 7.47 \end{aligned}$$

PM 10/2.5 Emissions: (Based on AP-42 Table 3.1-2a, 4/00)

$$\begin{aligned} \text{lb PM/hr} &= (\text{lb PM}/\text{MMscf})(\text{MMBtu/hr}) \\ &= (0.0066 \text{ lb/Btu})(0.0597 \text{ MMBtu/hr}) \\ &= 0.4098 \end{aligned}$$

$$\begin{aligned} \text{tons PM/yr} &= (\text{lb PM/hr})(\text{hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= (0.41 \text{ lb PM/hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= 1.79 \end{aligned}$$

Engine No. Gen 3

NOx Emissions: (Based on Vendor Data)

$$\begin{aligned}\text{lb NOx/hr} &= (\text{g/bhp-hr})(\text{bhp})(1 \text{ lb}/453.59 \text{ g}) = \text{lb/hr} \\ &= (2.1 \text{ g/bhp-hr})(585 \text{ bhp})(1 \text{ lb}/453.59 \text{ g}) \\ &= 2.71\end{aligned}$$

$$\begin{aligned}\text{tons NOx/yr} &= (\text{lb NOx/hr})(\text{hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= (2.7 \text{ lb NOx/hr})(500 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= 0.677\end{aligned}$$

CO Emissions: (Based on Vendor Data)

$$\begin{aligned}2\text{lb CO/hr} &= (\text{g/bhp-hr})(\text{bhp})(1 \text{ lb}/453.59 \text{ g}) = \text{lb/hr} \\ &= (1.4 \text{ g/bhp-hr})(585 \text{ bhp})(1 \text{ lb}/453.59 \text{ g}) \\ &= 1.81\end{aligned}$$

$$\begin{aligned}\text{tons CO/yr} &= (\text{lb CO/hr})(\text{hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= (1.8 \text{ lb CO/hr})(500 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= 0.451\end{aligned}$$

VOC Emissions: (Based on Vendor Data)

$$\begin{aligned}\text{lb VOC/hr} &= (\text{g/bhp-hr})(\text{bhp})(1 \text{ lb}/453.59 \text{ g}) = 88 \text{ lb/hr} \\ &= (0.24 \text{ g/bhp-hr})(585 \text{ bhp})(1 \text{ lb}/453.59 \text{ g}) \\ &= 0.31\end{aligned}$$

$$\begin{aligned}\text{Tons VOC/yr} &= (\text{lb VOC/hr})(\text{hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= (0.31 \text{ lb VOC/hr})(500 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= 0.08\end{aligned}$$

SO2 Emissions: (Based on FERC Limits)

$$\begin{aligned}\text{lb S/hr} &= (\text{gr S}/100 \text{ scf})(\text{MMscf/hr})(1 \text{ lb}/7000 \text{ gr}) \\ &= (10 \text{ gr S}/100 \text{ scf})(0.0040 \text{ MMscf/hr})(1 \text{ lb}/7000 \text{ gr}) \\ &= 0.056\end{aligned}$$

$$\begin{aligned}\text{lb SO2/hr} &= (\text{lb S/hr})(2 \text{ lb SO2}/\text{lb S}) \\ &= (0.056 \text{ lb S/hr})(2 \text{ lb SO2}/\text{lb S}) \\ &= 0.11\end{aligned}$$

$$\begin{aligned}\text{tons SO2/yr} &= (\text{lb SO2/hr})(\text{hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= (0.11 \text{ lb SO2/hr})(500 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= 0.03\end{aligned}$$

PM Emissions: (Based on AP-42 Table 3.2-2, 4/00)

$$\begin{aligned}\text{lb PM/hr} &= (\text{lb PM}/\text{MMBtu})(\text{MMBtu/hr}) \\ &= (0.00999 \text{ MMBtu/hr})(4.1 \text{ MMBtu/hr}) \\ &= 0.0411\end{aligned}$$

$$\begin{aligned}\text{tons PM/yr} &= (\text{lb PM/hr})(\text{hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= (0.041 \text{ lb PM/hr})(500 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= 0.01\end{aligned}$$

Engine HAP Emissions

GRI-HAPCalc Version 3.0 is a personal computer-based database program that estimates emissions of hazardous air pollutants (HAPs) and criteria pollutants from natural gas industry operations. HAPCalc 3.0 estimates emissions from the following point sources: amine sweetening units, sulfur recovery units, reciprocating engines, combustion turbines, small external combustion devices, flares, liquid hydrocarbon storage tanks, truck loading, miscellaneous process vents, and fugitives.

Emissions are estimated with factors derived from data collected during various GRI Environment and Safety research programs or by the U.S. Environmental Protection Agency (EPA). The GRI Literature database, developed during Phase I of the Air Toxics Program (1990 to 1992), compiled available emission test results from 40 reciprocating engines, 2 gas turbines, and 1 steam generator. The GRI Field Test database, developed from 1994 to 1997, contains GRI test data from 26 engines, 9 gas turbines, and 8 external combustion devices operating at several natural gas transmission, storage, and processing facilities. EPA emission factors are obtained from AP-42, 5th Edition [U.S. Environmental Protection Agency].

Since data are not available for all pollutants for some of the emission factor sets, a hierarchical combination of EPA > GRI Field > GRI Literature was used. Emission factors are prioritized in the listed order.

Turbine 1607 HAP Emission Factors and Emissions

Chemical	Emis. Factor g/bhp-hr	tpy	lb/hr	Factor Set
Formaldehyde	0.0146323	0.99	0.22589822	EPA
Acetaldehyde	0.0003443	0.02	0.00531542	EPA
1,3-Butadiene	0.0000019	0.00	0.00002933	EPA
Acrolein	0.000034	0.00	0.0005249	EPA
Propional	0.000865	0.06	0.01335415	GRI Field
Propylene Oxide	0.0001248	0.01	0.0019267	EPA
n-Nitrosodimethylamine	0.000001	0.00	0.00001544	EPA
Benzene	0.0006025	0.04	0.00930159	EPA
Toluene	0.0005595	0.04	0.00863774	EPA
Ethylbenzene	0.0001033	0.01	0.00159478	EPA
Xylenes(m,p,o)	0.0001162	0.01	0.00179393	EPA
2,2,4-Trimethylpentane	0.0016053	0.11	0.02478314	GRI Field
n-Hexane	0.0015058	0.10	0.02324703	GRI Field
Phenol	0.0001101	0.01	0.00169976	GRI Field
n-Nitrosomorpholine	0.000001	0.00	0.00001544	EPA
Naphthalene	0.0006025	0.04	0.00930159	EPA
2-Methylnaphthalene	0.0000013	0.00	0.00002007	GRI Field
Biphenyl	0.0003305	0.02	0.00510237	GRI Field
Phenanthrene	0.0000005	0.00	0.00000772	GRI Field
Chrysene	0.000001	0.00	0.00001544	GRI Field
Beryllium	0.0000001	0.00	0.00000154	GRI Field
Phosphorous	0.0000652	0.00	0.00100658	GRI Field
Chromium	0.0000056	0.00	0.00008645	EPA
Chromium	0.0000082	0.00	0.00012659	GRI Field
Manganese	0.0000069	0.00	0.00010652	EPA
Nickel	0.0000061	0.00	0.00009417	GRI Field
Cobalt	0.0000016	0.00	0.0000247	GRI Field
Arsenic	0.0000002	0.00	0.00000309	EPA
Selenium	0.0000003	0.00	0.00000463	GRI Field
Cadmium	0.0000036	0.00	0.00005558	EPA
Mercury	0.0000019	0.00	0.00002933	EPA
Lead	0.0000689	0.00	0.0010637	EPA
TOTALS:	0.0217114	1.47	0.33518764	

Fugitive Leak Emissions

Fugitive Emissions Factors				
Component	Service	Emissions *		
		Factor tpy	Factor lb/hr	Factor kg/hr
Valves	Gas	0.0434606	0.00992251	0.00450085
Connector	Gas	0.0019316	0.00044100	0.00020004
Flanges	Gas	0.0037666	0.00085995	0.00039008
Open-Ended Line	Gas	0.0193158	0.00441000	0.00200038
Pumps	Gas	0.023179	0.00529201	0.00240046
Other	Gas	0.0849895	0.01940400	0.00880165
Valves	Light Oil	0.0241448	0.00551251	0.00250048
Connector	Light Oil	0.0020282	0.00046306	0.00021004
Flanges	Light Oil	0.0010624	0.00024256	0.00011002
Open-Ended Line	Light Oil	0.0135211	0.00308701	0.00140027
Pumps	Light Oil	0.1255527	0.02866500	0.01300244
Other	Light Oil	0.0724343	0.01653751	0.00750142
Valves	Heavy Oil	0.0000811	0.00001852	0.00000840
Connector	Heavy Oil	0.0000724	0.00001653	0.00000750
Flanges	Heavy Oil	0.0000038	0.00000087	0.00000039
Open-Ended Line	Heavy Oil	0.0013521	0.00030870	0.00014003
Pumps	Heavy Oil	NA	0.00529	NA
Other	Heavy Oil	0.0002994	0.00006836	0.00003101

*EPA publication EPA-453/R-95-017, November 1995, "Protocol for Equipment Leak Emission Estimates"

New Components

Component	Service	Component Count	Emissions * Factor (ton/yr)	NM/NE Fraction	Emissions (ton/yr)
Valves	Gas	249	0.0434606	0.05	0.54
Connector	Gas	0	0.0019316	0.05	0.00
Flanges	Gas	189	0.0037666	0.05	0.04
Open-Ended Line	Gas	74	0.0193158	0.05	0.07
Pumps	Gas	1	0.023179	0.05	0.00
Other	Gas	0	0.0849895	0.05	0.00
Valves	Light Oil	16	0.0241448	1.00	0.39
Connector	Light Oil	0	0.0020282	1.00	0.00
Flanges	Light Oil	38	0.0010624	1.00	0.04
Open-Ended Line	Light Oil	2	0.0135211	1.00	0.03
Pumps	Light Oil	1	0.1255527	1.00	0.13
Other	Light Oil	0	0.0724343	1.00	0.00
Valves	Heavy Oil	6	0.0000811	1.00	0.00
Connector	Heavy Oil	0	0.0000724	1.00	0.00
Flanges	Heavy Oil	14	0.0000038	1.00	0.00
Open-Ended Line	Heavy Oil	2	0.0013521	1.00	0.00
Other	Heavy Oil	0	0.0002994	1.00	0.00
				TOTAL:	1.2318