



## Florida Gas Transmission Company

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January 14, 2004

UPS 2<sup>nd</sup> Day – 1Z F62 059 37 1001 159 6

Ms. Trina Vielhauer  
Bureau of Air Regulation  
Florida Department of Environmental Protection  
Twin Towers Office Bldg.  
2600 Blairstone  
Tallahassee, FL 32399-2400

RECEIVED

JAN 15 2004

Reference: Facility: 1130037  
Compressor Station No. 12, Santa Rosa County

BUREAU OF AIR REGULATION

Dear Ms. Vielhauer:

**Subject: Application for Air Permit Modification**

Florida Gas Transmission Company (FGT) has installed a Nuovo Pignone PGT-10B compressor turbine at the above referenced facility under Permit No. 1130037-003-AC.

This facility is a major source under New Source Review (NSR) definitions and the turbine was installed with permit limits on the hours of operation allowed at levels lower than full load. These restrictions were requested in order to avoid exceeding the NSR trigger for carbon monoxide (CO). Subsequent emissions testing of this turbine have demonstrated that CO emissions are considerably lower than the emission rates that were represented by the manufacturer prior to construction. The manufacturer's emission rates were used as a basis for the permitting and the load schedule restrictions. FGT is proposing to modify the permitted CO and volatile organic compound (VOC) emission rates and to remove the current load schedule restrictions. Specific provision changes are proposed in the attached narrative.

Attached is an application with supporting documentation for an air permit modification to change the CO and VOC emission rates and to remove the load restrictions. Emissions test data are provided in support of this proposed change. 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 (850) 350-5042.

Sincerely,

Jacob Krautsch  
Environmental Specialist

## ATTACHMENTS

CC: Rick Craig, w/o attachments  
David Parham, P.E.  
Duane Pierce, AQMcS, LLC  
Compressor Station No. 12

**Florida Gas Transmission Company**

**Phase V Expansion Project**

**Compressor Station No. 12**

**APPLICATION  
For  
AIR PERMIT  
MODIFICATION**

**November 2003**

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**Prepared by AQMcs, LLC**

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## 1.0 INTRODUCTION

Florida Gas Transmission Company (FGT) of Houston, Texas, is proposing to revise Air Permit No. 1130037-005-AV for its existing natural gas pipeline facility near Munson, in Santa Rosa County, Florida (Compressor Station No. 12). This proposed modification will revise the CO emission rates and load restrictions for a 15,700 brake horsepower (bhp), natural gas-fired, turbine compressor engine that was installed as part of FGT's Phase V Expansion Project.

Compressor Station No. 12 is located in Santa Rosa County, Florida, north of Munson on Highway 191, approximately 5 miles north of Highway 4. Figure 1-1 shows the location of the existing compressor station.

The construction permit application requested load restrictions on the turbine based upon the carbon monoxide (CO) and nitrogen oxides (NO<sub>x</sub>) emission rates that were provided by the turbine manufacturer. The projected annual emission rates from the new turbine potentially constituted a significant modification at an existing major stationary source under Prevention of Significant Deterioration (PSD) regulations. FGT reduced the NO<sub>x</sub> emissions from two existing 2,000 bhp reciprocating compressor engines by modifying the engines. CO emissions were reduced by accepting limits on the hours of operation that were allowed at lower loads for the Nuovo Pignone turbine. Based on the projected net annual emission rate change, there was no PSD significant increase in the emissions of any contaminant and a state only construction permit was required.

Subsequent emissions testing demonstrated that CO emissions from the turbine were much lower than expected at all loads and that the load restrictions would not have been necessary if permitting had been based on CO emission rates consistent with the emission test values. FGT is proposing to delete the load restrictions and to establish a single CO emission rate for all loads. There will be no change in the total annual CO emissions.

A change in VOC emission limits is also being requested in order to delete the load restrictions. There are no test data on VOC emissions; however, the VOC emissions can be expected to vary as the CO emissions vary. In any case, FGT is proposing that the VOC emission limit be changed to the 50% load lb/hr emission rate for all loads. This is the highest currently permitted lb/hr rate.

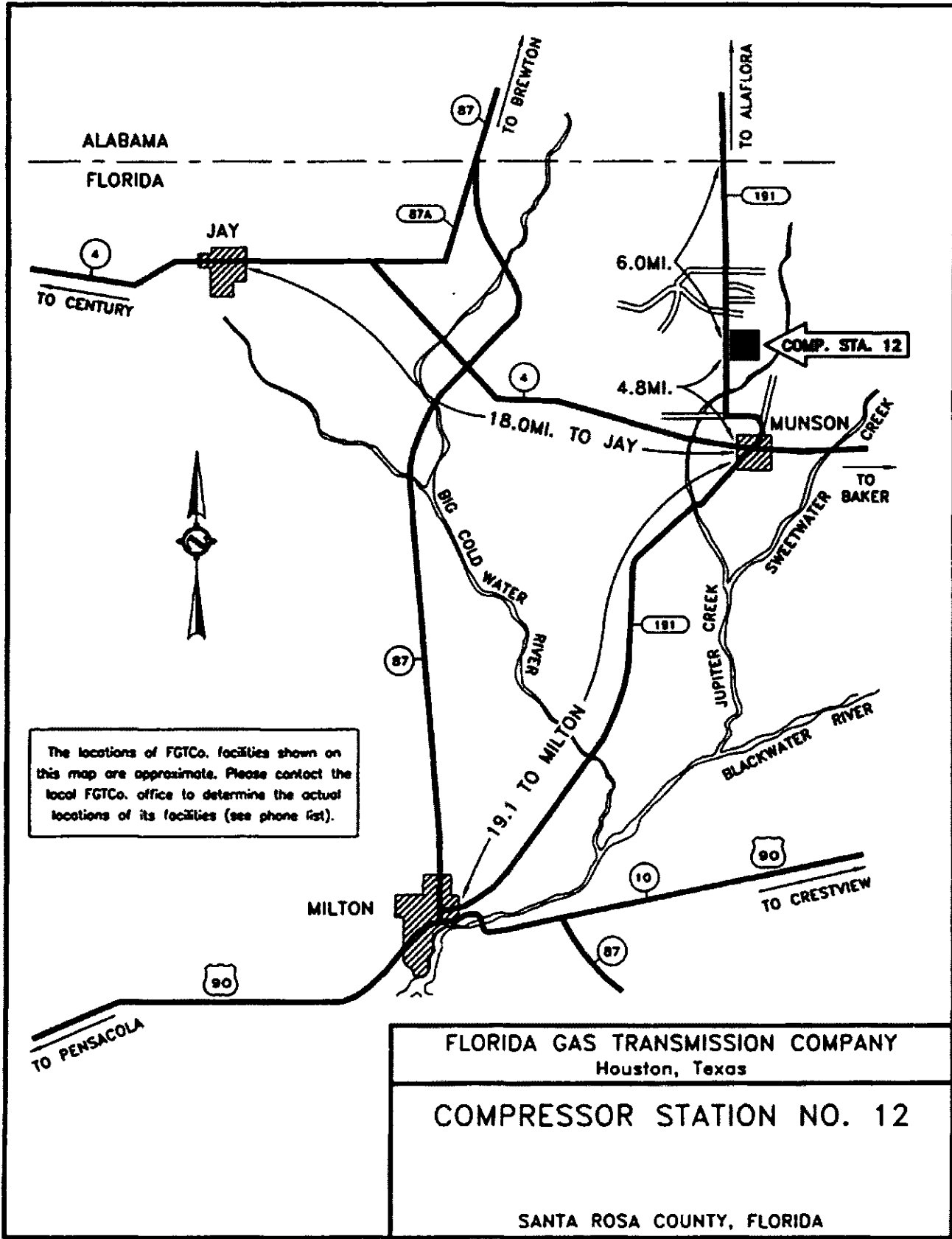
This narrative contains four additional sections. Descriptions of the existing operation at FGT's Compressor Station No. 12 and the proposed modifications are presented in Section 2.0. The air quality review requirements and applicability of state and federal regulations are discussed in Section 3.0. References are included in Section 4.0.

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FDEP permit application forms are provided in Attachment A. Attachment B contains a plot plan of the facility. Attachment C contains emissions test data and Attachment D contains emission calculations.

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## 2.0 PROJECT DESCRIPTION

A plot plan of FGT's Compressor Station No. 12, 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 Compressor Station No. 12 currently consists of five 2,000 bhp and one 4,100 bhp natural-gas-fired reciprocating internal combustion (IC) engines, and two natural gas-fired turbines rated at 13,000 bhp and 15,700 bhp. 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 1201 through 1203). Engine 1204 was installed in 1966 and engine 1205 was installed in 1968. An addition referred to as Phase II was constructed in 1991 (Compressor Engine 1206) and was subject to PSD review. Compressor Engine 1207 was installed in 2001 as part of the Phase IV Expansion Project at 10,350 bhp. In 2002, as part of the Phase V Expansion, Compressor Engine No. 1207 was upgraded to 13,000 bhp and Engine No. 1208 was installed. Engines Nos. 1204 and 1205 were also modified to reduce NO<sub>x</sub> and CO emissions in 2002 as part of the Phase V Expansion Project.

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

### 2.2 Proposed Modifications

FGT proposes to revise the permitted CO emission rates for Turbine No. 1208 (EU 010). The initial permit application was based on CO emission rates provided by the manufacturer. Subsequent emission testing has shown the CO emission rates to be considerably lower than those initially provided by the manufacturer. The current air permit limits the hours of operation at low loads due to the expected high CO emission rates. These restrictions would not have been necessary if the CO emission rates from the manufacturer had been more realistic. Based on the results of emissions testing, FGT proposes to change the CO emission rate to a constant emission rate for all loads and to remove the low load operating restrictions. The total annual CO emissions will not change as a result of this revision.

Additionally, FGT is proposing to change the VOC emission rates to a single rate for all loads based on the worse case emissions rate. Also HAP emission estimates are being revised by basing them on the current U.S.EPA AP-42 emission factors instead of the GRI HAPCalc

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software factors.

## 2.2.1 Compressor Turbine Engine No. 1208 Change

Turbine engine No. 1208 is a Pignone PGT-10B engine compressor unit rated at 15,700 bhp (ISO). Fuel is exclusively natural gas from the FGT's natural gas pipeline. Engine specifications and stack parameters for the engine are presented in Table 2-2. There will be no changes in these parameters with the proposed change.

**Table 2-1 Summary of Existing Compressor Engines**

<b>Engine No.</b>	<b>Year of Installation</b>	<b>Engine Type</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Brake Horse Power (bhp)</b>
1201	1958	Reciprocating	Cooper-Bessemer	LS-8-SG	2,000
1202	1958	Reciprocating	Cooper-Bessemer	LS-8-SG	2,000
1203	1958	Reciprocating	Cooper-Bessemer	LS-8-SG	2,000
1204	1966	Reciprocating	Cooper-Bessemer	LS-8-SG	2,000
1205	1968	Reciprocating	Cooper-Bessemer	LS-8-SG	2,000
1206	1991	Reciprocating	Dresser-Rand	TVC-10	4,100
1207	2001	Turbine	Solar	Mars 90 T-13000S	13,000
1208	2002	Turbine	Nuovo Pignone	PGT-10B	15,700

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**Table 2-2 Compressor Turbine (1208) Specifications and Stack Parameters**

<b>Parameter</b>	<b>Design</b>
Compressor Engine	1208
Type	Gas Turbine
Manufacturer	Nuovo Pignone
Model	PGT10B
Unit Size	15,700 bhp
Heat Input <sup>a</sup>	134.77 MMBtu/hr
Maximum Fuel Consumption <sup>b</sup>	0.1296 MMscf/hr
Speed	7,900 rpm
Stack Parameters	
Stack Height	61.5 ft
Stack Diameter	7.6 ft
Exhaust Gas Flow	215,175 acfm
Exhaust Temperature	909 °F
Exhaust Gas Velocity	79.1 ft/sec
<p><b>NOTE:</b></p> <p>acfm = actual cubic feet per minute.</p> <p>bhp = brake horsepower.</p> <p>Btu/hp-hr = British thermal units per brake horsepower per hour.</p> <p>°F = degrees Fahrenheit.</p> <p>ft = feet.</p> <p>ft/sec = feet per second.</p> <p>MMscf/hr = million standard cubic feet per hour</p> <p>rpm = revolutions per minute.</p> <p><sup>a</sup> Based on vendor heat rate value plus 10%</p> <p><sup>b</sup> Based on heating value for natural gas of 1040 British thermal units per standard cubic foot (Btu/scf).</p>	

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The currently permitted hourly and annual emissions of regulated pollutants from the engine under normal operating conditions as presented in Table 2-3. Emissions of oxides of nitrogen (NO<sub>x</sub>), carbon monoxide (CO) and non-methane hydrocarbons (NMHC) are based on the engine manufacturer's initially supplied information.

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

All contaminants have decreasing lb/hr emission rates with decreasing engine load except CO and VOCs. The CO and VOC emission rates on the PGT-10B increase with decreasing engine load. Permitted emission rates were based on 100% load (worse case) for all contaminants except CO and VOC. CO and VOC emission rates were based on operation at 100% load for 75% of the time (6570 hr/yr) 70% load for 20% (1752 hr/yr) and 50% load for 5% of the time (438 hr/yr). This was done in order for the project to remain minor with respect to Prevention of Significant Deterioration (PSD) permitting requirements for CO emissions.

Emissions tests on EU No. 010 (Engine No. 1208) have demonstrated significantly lower CO emission rates than those represented by the manufacturer. Three separate emissions tests showed lb/hr emission rates ranging from 0.410 lb/hr to 1.694 lb/hr over the load range from 50% to 100%. Results of the tests are provided in Table 2-4. The test reports have been submitted to the Florida DEP and the test summary tables from the reports are attached as Attachment C.

FGT is also proposing to revise the VOC emission limit to a single rate for all loads. The worse case emission rate is at 50% load and is 1.5 lb/hr. FGT is proposing to use this limit for all loads. This will obviously be a very conservative estimate of VOC emissions.

The proposed new emission rates are provided in Table 2-5. The multiple lb/hr CO and VOC emission rates have been changed to single rates of 7.03 lb/hr and 1.5 lb/hr at all loads.

Finally, HAP emissions have changed since they are now estimated using the current AP-42 emission factors. This change does not represent any real change in actual HAP emissions.

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**Table 2-3 Current Emissions for Compressor Turbine Engine (1208)**

<b>Pollutant</b>	<b>Emission Factor</b>	<b>Reference</b>	<b>lb/hr</b>	<b>TPY</b>
Nitrogen Oxides	14.1 lb/hr	Manufacturer Data	14.10	61.8
Carbon Monoxide	5.14 lb/hr @ 100% load 10.23 lb/hr @ 70% load 22.50 lb/hr @ 50% load	Manufacturer Data	7.03 <sup>a</sup>	30.8 <sup>b</sup>
Volatile Organic Compounds	0.29 lb/hr @ 100% load 0.80 lb/hr @ 70% load 1.46 lb/hr @ 50% load	Manufacturer Data	0.45 <sup>c</sup>	2.0 <sup>b</sup>
Particulate Matter	0.0066 lb/MMBtu	AP-42, Table 3.1-2a	0.89	3.9
Sulfur Dioxide	10 grains/100 scf	FERC Limit	3.70	16.2
HAPs	Various	GRI HapCalc 3.0	0.75	3.3

- a) Nominal CO (annual) rate, maximum 22.50 lb/hr
- b) @ 100% load for 75% of time, 70% load for 20% of time & 50% load for 5% of time
- c) Nominal VOC (annual) rate, maximum 1.46 lb/hr

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**Table 2-4 CO Emissions Test Results for Compressor Turbine Engine (1208)**

Test on 06/20/02						
	Test Results			Permit Limits		
Load	CO ppmv @ 15% O2	CO lb/hr	CO tpy*	CO ppmv @ 15% O2	CO lb/hr	CO tpy**
52.3%	2.13	0.419	1.83	75	22.5	30.8
60.0%	3.40	0.858	3.76	75	22.5	30.8
69.3%	2.41	1.694	7.42	30	10.2	30.8
77.0%	1.83	0.448	1.96	15	5.1	30.8

\* Assumes 8760 hrs/yr

\*\* 30.8 tpy limit is based on load restrictions

Test on 11/06/02						
	Test Results			Permit Limits		
Load	CO ppmv @ 15% O2	CO lb/hr	CO tpy*	CO ppmv @ 15% O2	CO lb/hr	CO tpy**
95.7%	1.88	0.531	2.33	15	5.1	30.8

\* Assumes 8760 hrs/yr

\*\* 30.8 tpy limit is based on load restrictions

Test on 06/12/03						
	Test Results			Permit Limits		
Load	CO ppmv @ 15% O2	CO lb/hr	CO tpy*	CO ppmv @ 15% O2	CO lb/hr	CO tpy**
50.6%	2.30	0.410	1.80	75	22.5	30.8
67.9%	2.24	0.496	2.17	75	22.5	30.8
81.6%	1.88	0.459	2.01	30	10.2	30.8
95.8%	1.87	0.525	2.30	15	5.1	30.8

\* Assumes 8760 hrs/yr

\*\* 30.8 tpy limit is based on load restrictions

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**Table 2-5 Proposed Emissions for Compressor Turbine Engine (1208)**

Pollutant	Emission Factor	Reference	lb/hr	TPY
Nitrogen Oxides	14.1 lb/hr	Manufacturer Data	14.10	61.8
Carbon Monoxide	7.03 lb/hr	Test Data <sup>a</sup>	7.03	30.8
Volatile Organic Compounds	1.5 lb/hr	Manufacturer Data	1.5	6.6
Particulate Matter	0.0066 lb/MMBtu	AP-42, Table 3.1-2a	0.89	3.9
Sulfur Dioxide	10 grains/100 scf	FERC Limit	3.70	16.2
HAPs	Various see Attachment D	AP-42, Table 3.1-3	0.14	0.6

a) See Attachment C

## 2.2.2 Emissions Summary

There are no changes in total annual CO emissions as a result of the proposed change. VOC emissions will increase 4.4 tpy. The calculations used to estimate emissions are presented in Attachment C.

## 2.2.3 Proposed Permit Provision Changes

FGT proposes the following changes to the current operating permit (Permit No. 1130037-005-AV).

### Section III. Subsection E. Requirement E3

#### Current:

**E.3 Restricted Hours of Operation:** The total hours of operation for the gas turbine are not limited (8760 hours per year). Except for startup and shutdown, operation below 50% base load is prohibited. Operation between 50% and 90% of base load shall not exceed 2190 hours during any consecutive 12 months. Of this authorized low-load operation, operation between 50% and 70% of base load shall not exceed 438 hours during any consecutive 12 months. [Rules 62-4.160(2) and 62-210.200(PTE), F.A.C.; construction permit 1130037-003-AC, issued August 15, 2001]

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Proposed:

**E.3 Restricted Operation:** The hours of operation for the gas turbine are not limited (8760 hours per year). Except for startup and shutdown, operation below 50% base load is prohibited. [Rules 62-4.160(2) and 62-210.200(PTE), F.A.C.; Construction Permit 1130037-003-AC, issued August 15, 2001]

## Section III. Subsection E. Requirement E4

Current:

**E.4 Emissions from the gas turbine shall not exceed the following limits:**

<u>Pollutant</u>	<u>Standards</u>	<u>Equivalent Emissions</u>	
		<u>lb/hr</u>	<u>tons/year</u>
Nitrogen Oxides	25.0 ppmvd @ 15% O <sub>2</sub>	14.1	61.8
CO	15.0 ppmvd at 90-100%	5.1	30.8
	30.0 ppmvd at 70-90%	10.2	
	75.0 ppmvd at 50-70%	22.5	
	(all @ 15% O <sub>2</sub> )		
SO <sub>2</sub>	10.0 grains of sulfur/100 SCF	3.7	16.2
Opacity	10% opacity, 6-minute average		
PM	Good combustion practices	0.9	3.9
VOC	Good combustion practice at 90-100%	0.3	2.0
	Good combustion practice at 70-90%	0.8	
	Good combustion practice at 50-70%	1.5	

Proposed:



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**E.4** Emissions from the gas turbine shall not exceed the following limits:

<u>Pollutant</u>	<u>Standards</u>	<u>Equivalent Emissions</u>	
		<u>lb/hr</u>	<u>tons/year</u>
Nitrogen Oxides	25.0 ppmvd @ 15% O <sub>2</sub>	14.1	61.8
CO	21.0 ppmvd	7.03	30.8
SO <sub>2</sub>	10.0 grains of sulfur/100 SCF	3.7	16.2
Opacity	10% opacity, 6-minute average		
PM	Good combustion practices	0.9	3.9
VOC	Good combustion practice	1.5	6.6

## **Section III. Subsection E. Requirement E11**

### Current:

**E.11** Operation of this turbine compressor shall be monitored by an automated gas turbine control system monitoring and recording heat input (MMBtu), power output (bhp), and hours of gas turbine operation within each of the following load ranges: 50% to 70% load, 70% to 90% load; and 90% to 100% load. Within the first 10 days of each month, the permittee shall summarize the following information: average heat input (MMBtu per hour); average power output (bhp); total hours of gas turbine operation; hours of gas turbine operation between 50% to 70% load; hours of gas turbine operation between 70% to 90% load; and hours of gas turbine operation between and 90% to 100% load. The average heat input for the month shall be based on the actual heat content (MMBtu per SCF) of the natural gas for the given month. This information shall also be used for submittal of the required Annual Operating Report. [Rule 62-4.070, F.A.C., Construction Permit 1130037-003-AC issued August 15, 2001]

### Proposed:

**E.11** Operation of this turbine compressor shall be monitored by an automated gas turbine control system. As a minimum, this system shall maintain a continuous record of heat input (MMBtu), power output (bhp), and hours of gas turbine operation. Within the first 10 days of each month, the permittee shall summarize the following information: average heat input (MMBtu per hour); average power output (bhp); and total hours of gas turbine operation. The average heat input for the month shall be based on the actual heat content (MMBtu per SCF) of the natural gas for the given month. This information shall also be used for submittal of the required Annual Operating Report. [Rule 62-4.070, F.A.C., Construction Permit 1130037-003-AC issued August 15, 2001]

## 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. 12.

### 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 modification at Compressor Station No. 12.

#### 3.1.1 Applicability of New Source Performance Standards (NSPS)

Standards of Performance for New Sources are published in 40 CFR 60. All Standards apply to all new sources within a given category, regardless of geographic location or ambient air quality at the location.

The turbine at Compressor Station No. 12 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<sub>x</sub> and SO<sub>2</sub> and requires performance testing and daily monitoring of fuel nitrogen and sulfur.

The NO<sub>x</sub> emission limit for Subpart GG is calculated as follows:

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

$$STD = \text{Allowable NO}_x \text{ emissions \% by volume}$$

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

$$F = \text{NO}_x \text{ emission allowance}$$

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.

For new Engine No. 1208

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

$$= 7,807 \text{ Btu/bhp-hr} \times 1.055 \text{ Kj/Btu} \times \text{hp-hr/745.7 watt-hour}$$

$$= 11.0 \text{ Kj/watt-hr}$$

$$\text{STD} = 0.0150 (14.4/11.0) + 0$$

$$= 0.0196 \%$$

$$= 196 \text{ ppm}_v$$

Table 3-6 summarizes the NSPS applicability for the gas engine. This turbine will both the NSPS for NO<sub>x</sub> of 196 ppmv (i.e., manufacturer's estimation of 25 ppmv), and for SO<sub>2</sub> of 150 ppmv (estimated for these turbines to be 4 ppmv). There has been no change in these values.

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**Table 3-1 Applicability of New Source Performance Standards**

<b>NSPS Subpart</b>	<b>NSPS Regulations</b>	<b>Equipment</b>	<b>Fuel</b>	<b>Pollutant</b>	<b>Heat Input Applicability</b>	<b>Equipment Design Maximum*</b>	<b>NSPS Emission Limits</b>	<b>Equipment Emissions</b>
GG	60.332(a)(2)	Engine No. 1208 Gas Turbine	Gas	NO <sub>2</sub>	>10 MM Btu/hr	122 MM Btu/hr	196 ppm <sub>v</sub>	25 ppm <sub>v</sub>
GG	60.333(a)	Engine No. 1208 Gas Turbine	Gas	SO <sub>2</sub>	>10 MM Btu/hr	122 MM Btu/hr	150 ppm <sub>v</sub>	~4 ppm <sub>v</sub>

Design maximum based on vendor data.

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## 3.1.2 Applicability of National Emission Standards for Hazardous Air Pollutants (NESHAPS)

Currently the only NESHAPS potentially applicable to this compressor station is 40 CFR 63 Subpart HHH. Compressor Station No. 12 has no affected sources as defined by 40 CFR 63 Subpart HHH and is, therefore, not subject to this subpart.

40 CFR 63 Subpart YYYY has been proposed for turbines, but these regulations have not been promulgated at this time.

## 3.2 Florida State Air Quality Regulations

Compressor Station No. 12 is currently operating under Permit No.1130037-005-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. 12 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.

### 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. The proposed new emissions will not violate any air quality standards. Potential NO<sub>x</sub> emissions and impacts will be decreased.

### 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. There will be no odors from the proposed changes.

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

FGT is prohibited from allowing the 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). The new and modified engines will not violate this standard.

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

The emissions from 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.

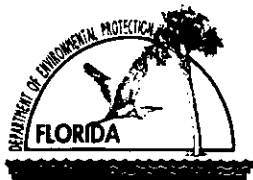
## 4.0 REFERENCES

U.S. Environmental Protection Agency (USEPA). 2000. Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources (5<sup>th</sup> 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. 12	
3. Facility Identification Number: 1130037 [ ] Unknown	
4. Facility Location: Street Address or Other Locator: Rt. 1, Box 146 City: Milton County: Santa Rosa Zip Code: 32570-9740	
5. Relocatable Facility? [ ] Yes [X] No	6. Existing Permitted Facility? [X] Yes [ ] No

##### Application Contact

1. Name and Title of Application Contact: Jacob Krautsch, Division Environmental Specialist	
2. Application Contact Mailing Address: Organization/Firm: Florida Gas Transmission Company Street Address: 1967 Commonwealth Lane City: Tallahassee State: FL Zip Code: 32303	
3. Application Contact Telephone Numbers: Telephone: (850) 350-5042 Fax: (850) 350-5001	

##### Application Processing Information (DEP Use)

1. Date of Receipt of Application:	1-15-04
2. Permit Number:	1130037-008-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: \_\_\_\_ 1130037-004-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: \_\_\_\_\_

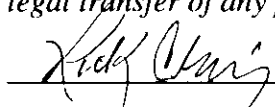
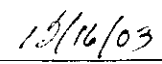
Reason for revision: \_\_\_\_\_

### 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: Rick Craig, Vice President, Southeastern Operations
2. Owner/Authorized Representative or Responsible Official Mailing Address: Organization/Firm: Florida Gas Transmission Company Street Address: P.O. Box 1188 City: Houston State: TX Zip Code: 77251
3. Owner/Authorized Representative or Responsible Official Telephone Numbers: Telephone: (713) 646-7227 - Fax: (713) 646-6128
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

\* Attach letter of authorization if not currently on file.

**Professional Engineer Certification**

1. Professional Engineer Name: David Holmes Parham Registration Number: 50834
2. Professional Engineer Mailing Address: Organization/Firm: Florida Gas Transmission Company Street Address: 601 S. Lake Destiny Dr. Suite 450 City: Maitland State: FL Zip Code: 32751
3. Professional Engineer Telephone Numbers: Telephone: (407)838-7119 Fax: (407)838-7101

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.*

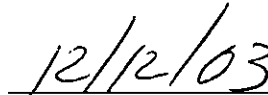
*If the purpose of this application is to obtain a Title V source air operation permit (check here [  ], if so), I further certify that each emissions unit described in this Application for Air Permit, when properly operated and maintained, will comply with the applicable requirements identified in this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



Signature



Date

(seal)

\* Attach any exception to certification statement.

DAVID PARHAM, P.E.  
P.E. NUMBER 50834  
601 SOUTH LAKE DESTINY DRIVE, SUITE 450  
MAITLAND, FLORIDA 32794-5100



**Construction/Modification Information**

1. Description of Proposed Project or Alterations:

Florida Gas Transmission Company (FGT) is proposing to revise permitted CO emission rates for a Pignone PGT-10B 15,700 bhp compressor turbine. There will be no change in the annual tpy emission rate. The change will eliminate the current CO lb/hr emissions rates that vary with the engine load and replace them with a single lb/hr rate for all loads.

2. Projected or Actual Date of Commencement of Construction: 12/01/03

3. Projected Date of Completion of Construction: 12/31/03

**Application Comment**

This proposed modification is intended to adjust the current permitted emission rates that were based on manufacturer estimates to rates that are based on emissions testing and that more accurately reflect the actual emission rates of the turbine.

The existing facility is currently operating under Permit No. 1130037-005-AV.

## II. FACILITY INFORMATION

### A. GENERAL FACILITY INFORMATION

#### Facility Location and Type

1. Facility UTM Coordinates: Zone: 16                      East (km): 510.83                      North (km): 3419.03			
2. Facility Latitude/Longitude: Latitude (DD/MM/SS): 30/54/42                      Longitude (DD/MM/SS): 86/53/12			
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. 12 is an existing natural gas pipeline compressor station with six reciprocating compressor engines and two compressor turbines.			

#### Facility Contact

1. Name and Title of Facility Contact: Wesley Orso, Team Environmental Leader			
2. Facility Contact Mailing Address: Organization/Firm: Florida Gas Transmission Company Street Address: Rt. 1, Box 146 City: Milton                      State: FL                      Zip Code: 32570-9740			
3. Facility Contact Telephone Numbers: Telephone: (850) 850-5200                      Fax: (850) 850-5201			

**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 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?	
9. Facility Regulatory Classifications Comment (limit to 200 characters):	

**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 <sub>x</sub>	A				
CO	A				
VOC	B				
SO <sub>2</sub>	B				
PM	B				
HAPs	A				

## C. FACILITY SUPPLEMENTAL INFORMATION

### Supplemental Requirements

1. Area Map Showing Facility Location: <input checked="" type="checkbox"/> Attached, Document ID: <i>Narrative Fig. 1-1</i> <input type="checkbox"/> Not Applicable <input type="checkbox"/> Waiver Requested
2. Facility Plot Plan: <input checked="" type="checkbox"/> Attached, Document ID: <i>Att. B</i> <input type="checkbox"/> Not Applicable <input checked="" 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 type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
7. Supplemental Requirements Comment:  Attachment B contains a plot plan.  Attachment C consists three test report summaries for turbine 1208.  Attachment D has supporting calculations.

**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>15,700 bhp natural gas fired turbine compressor unit, Engine No. 1208</p>			
<p>4. Emissions Unit Identification Number:</p> <p><input type="checkbox"/> No ID</p> <p>ID: 010</p>			
<p>5. Emissions Unit Status Code:</p> <p style="text-align: center;">A</p>	<p>6. Initial Startup Date: 03/02</p>	<p>7. Emissions Unit Major Group SIC Code:</p> <p style="text-align: center;">49</p>	<p>8. Acid Rain Unit?</p> <p style="text-align: center;"><input type="checkbox"/></p>
<p>9. Emissions Unit Comment: (Limit to 500 Characters)</p> <p>The turbine engine is a Pignone PGT10B engine compressor unit ISO rated at 15,700 bhp. Fuel is exclusively natural gas from FGT's gas pipeline. The engine incorporates dry, low NO<sub>x</sub> combustion technology.</p>			

**Emissions Unit Control Equipment**

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

The proposed engine incorporates dry, low NOX combustion technology.

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

**Emissions Unit Details**

1. Package Unit:

Manufacturer: Pignone

Model Number: PGT10B

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:	134.77
2. Maximum Incineration Rate:    NA	lb/hr
3. Maximum Process or Throughput Rate: NA	
4. Maximum Production Rate:    NA	
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 134.77 MM Btu/hr based on vendor specifications of 122.52 MM Btu/hr plus 10%.	







**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 internal combustion 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: 0.1296	5. Maximum Annual Rate: 1135.3	6. Estimated Annual Activity Factor: NA
7. Maximum % Sulfur: 0.03	8. Maximum % Ash: 0.0	9. Million Btu per SCC Unit: 1040
10. Segment Comment (limit to 200 characters):  Percent Sulfur is based on maximum Federal Energy Regulatory Commission (FERC) limit of 10 gr S/100scf 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):	CC 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
VOC			EL
SO <sub>2</sub>			EL
PM			EL
NO <sub>x</sub>			EL
CO			EL
PM <sub>10</sub>			EL
HAPs			5.0NS

**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: 14.10 lb/hour 61.8 tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: 14.1 lb/hr Reference: Vendor's data	7. Emissions Method Code: 5
8. Calculation of Emissions (limit to 600 characters):  (14.10 lb/hr)(1 ton/2000 lb)(8760hr/1 yr) = 61.76 tons/year	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):  Vendor's data based on ISO conditions and site elevation.	

**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: 14.10 lb/hour 61.8 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 196 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: 7.03 lb/hour 30.8 tons/year	4. Synthetically Limited? [ Y ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: 7.03 lb/hr Reference: Test data	7. Emissions Method Code: 1
8. Calculation of Emissions (limit to 600 characters):  (7.03 lb/hr)(1 ton/2000 lb)(8760 hr/yr) = 30.79 tons/yr	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):  Emissions based on three separate test events.	

**Allowable Emissions** Allowable Emissions  1  of  1

1. Basis for Allowable Emissions Code: ESCPSD	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units:	4. Equivalent Allowable Emissions: 7.03 lb/hour 30.8 tons/year
5. Method of Compliance (limit to 60 characters): Compliance test and Recordkeeping of hours of operation and load.	
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: 1.46 lb/hour 6.4 tons/year		4. Synthetically Limited? [ Y ]	
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year			
6. Emission Factor: 1.46 lb/hr Reference: Vendor's data		7. Emissions Method Code: 5	
8. Calculation of Emissions (limit to 600 characters):  (1.46 lb/hr)(1 ton/2000 lb)(8760 hr/yr) = 6.39 tons/yr			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):  Vendor's data based on ISO conditions at lowest load for total hydrocarbons (THC). VOCs assumed to be 10% of THC			

**Allowable Emissions** Allowable Emissions  1  of  1

1. Basis for Allowable Emissions Code: ESCPD		2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units:		4. Equivalent Allowable Emissions: 1.46 lb/hour 6.4 tons/year	
5. Method of Compliance (limit to 60 characters):  CO compliance test and good combustion practices			
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: 3.70 lb/hour 16.2 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 and FERC limitation		7. Emissions Method Code: 3	
8. Calculation of Emissions (limit to 600 characters):  $(10 \text{ gr S}/100 \text{ scf})(129,600 \text{ scf/hr})(1 \text{ lb}/7000 \text{ gr}) = 1.85 \text{ lb S/hr}$ $(1.85 \text{ lb S/hr})(2 \text{ lb SO}_2/\text{lb S}) = 3.70 \text{ lb SO}_2/\text{hr}$ $(3.70 \text{ lb SO}_2/\text{hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) = 16.22 \text{ ton/yr}$			
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:	
3. Requested Allowable Emissions and Units: 4 ppmv		4. Equivalent Allowable Emissions: 3.70 lb/hour 16.2 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: 0.89 lb/hour 3.90 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 lb/MM Btu)(134.77 MM Btu/hr) = 0.89 lb/hr (0.89 lb/hr)(8760 hr/yr)(1 ton/2000 lb) = 3.90 ton/yr			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):			

**Allowable Emissions** Allowable Emissions  NA  of  \_\_\_\_\_

1. Basis for Allowable Emissions Code:		2. Future Effective Date of Allowable Emissions:	
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: 0.14 lb/hour 0.6 tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: 0.00103 lb/MM Btu Reference: AP-42 Table 3.1-3, 4/00	7. Emissions Method Code: 5
10. Calculation of Emissions (limit to 600 characters):  (0.00103 lb/MM Btu)(134.77 MM Btu/hr) = 0.14 lb/hr (0.14 lb/hr)(8760 hr/yr)(1 ton/2000 lb) = 0.61 ton/yr	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):  Detailed calculations provided in Attachment D. HAP emissions are also included in VOC emissions.	

**Allowable Emissions** Allowable Emissions  NA  of  \_\_\_\_\_

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
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: VE10	2. Basis for Allowable Opacity: <input checked="" type="checkbox"/> Rule <input type="checkbox"/> Other
3. Requested Allowable Opacity: Normal Conditions: 10 %      Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: Annual test with EPA Method 9	
5. Visible Emissions Comment (limit to 200 characters):   	

**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: Other	<input type="checkbox"/> Rule <input type="checkbox"/>
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**

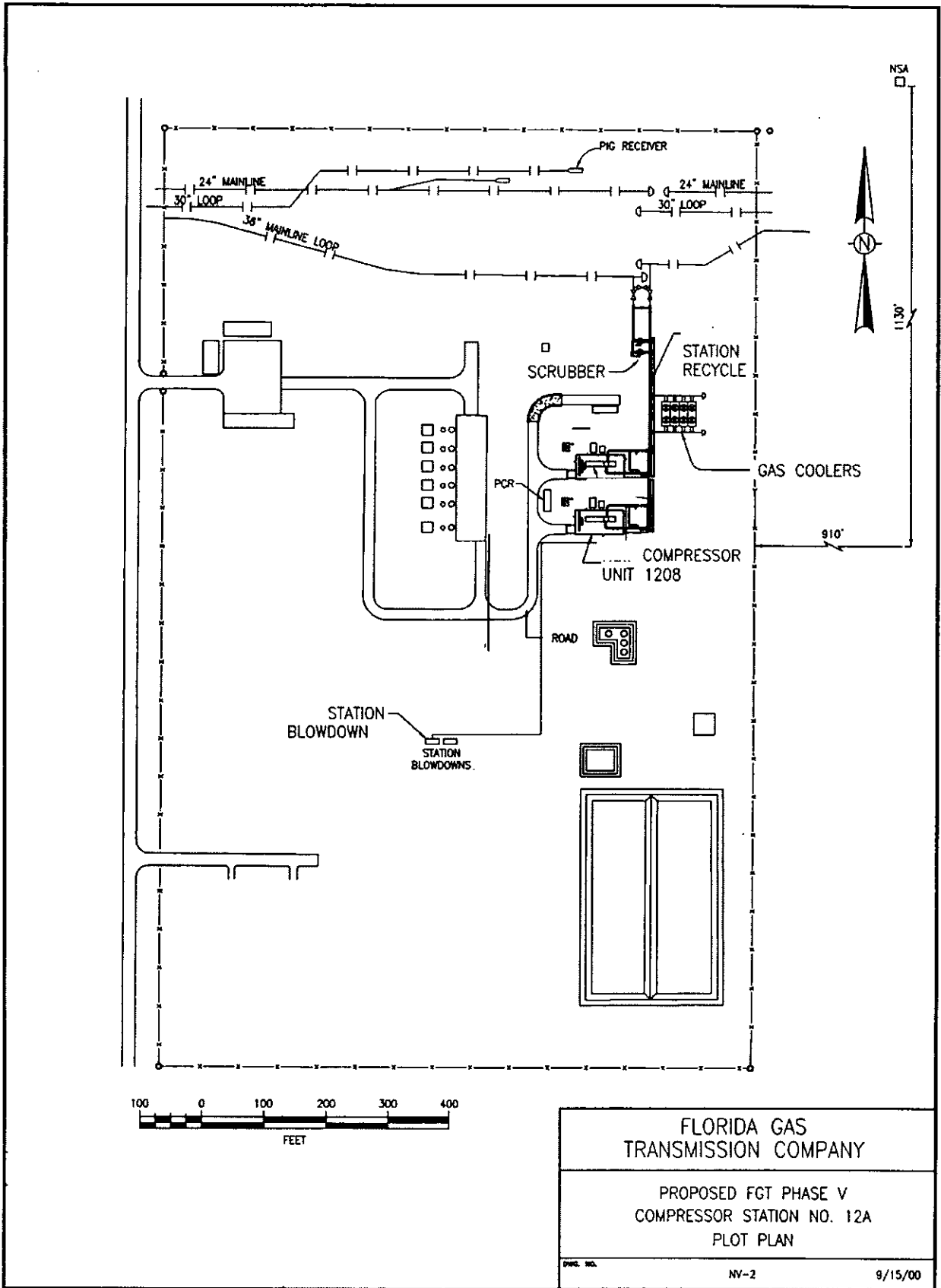
1. Process Flow Diagram <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable <input checked="" type="checkbox"/> Waiver Requested
2. Fuel Analysis or Specification <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable <input 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: <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:  <p>Supplemental information is provided in the narrative description and Attachment D accompanying these forms.</p>

**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

**Attachment B**

**Plot Plan**



07/24/00/0000 - 06-17

## **Attachment C**

### **Test Reports**

**Engine 1208 Report Dated 06/20/02**  
**Engine 1208 Report Dated 11/06/02**  
**Engine 1208 Report Dated 06/12/03**

**Engine 1208 Report Dated 06/20/02**

**Table 3  
Unit 1208  
Full Load Testing**

Company: Florida Gas Transmission Company  
 Facility: Compressor Station No. 12  
 Location: Munson, Santa Rosa County, Florida  
 Source: GE Nuovo Pignone Model No. PGT-10B combustion turbine  
 Technicians: TR, SO

Test Number	1208-C-4	1208-C-5	1208-C-6		FDEP Permit Limits
Date	6/20/02	6/20/02	6/20/02		
Start Time	13:03	14:12	15:19		
Stop Time	14:03	15:12	16:19		
Turbine/Compressor Operation	Full Load			Averages	
Gas Producer Speed (NGP, %)	10997	10997	10998	10997	
Power Turbine Speed (NPT, %)	6497	6486	6478	6487	
Turbine Load (Engine Horsepower, Hp)	9,986	9,977	9,943	9969	15,700 ISO
Turbine Capacity (as Horsepower Output)	12,967	12,932	12,936	12,945	
Percent Load (% of max HP at inlet temp and %NPT)	77.0%	77.2%	76.9%	77.0%	
Thermal Load (% load available, Pignone)	76.5%	76.3%	76.3%	76.4%	
Engine Compressor Discharge Pressure (96CD, psia)	194.7	194.2	194.1	194.4	
Turbine Air Inlet Temperature (CT-1A, °F)	91.9	92.2	92.2	92.1	
Air Inlet Duct Losses (combined, psig)	1.11	1.11	1.11	1.11	
Power Turbine Inlet Temperature (TT-XD, °F)	960.8	961.7	961.8	961.4	
Gas Compressor Suction Pressure (psig)	841.2	844.2	848.2	844.5	
Gas Compressor Suction Temperature (°F)	82.0	82.9	82.7	82.5	
Gas Compressor Discharge Pressure (psig)	1159.0	1161.0	1164.2	1161.4	
Gas Compressor Discharge Temperature (°F)	133.8	134.2	374.2	214.1	
Gas Pilot Valve Command (% open)	8.70	8.74	8.74	8.73	
Turbine Fuel Data (Natural Gas)					
Fuel Heating Value (Btu/SCF, HHV)	1048.4	1033.5	1033.5	1038.5	
Fuel Specific Gravity	0.5942	0.5838	0.5838	0.5873	
O <sub>2</sub> "F-factor" (DSCFex/MMBtu @ 0% excess air)	8647	8641	8641	8643	
CO <sub>2</sub> "F-factor" (DSCFex/MMBtu @ 0% excess air)	1030	1026	1026	1028	
Total Sulfur in Fuel (grains S/per 100SCF of NG)	0.031	0.031	0.031	0.031	10
Fuel Flow (MSCFH)	105.824	105.556	105.692	105.691	
Heat Input (MMBtu/hr, Higher Heat Value)	110.94	109.09	109.23	109.76	134.8 ISO
Heat Input (MMBtu/hr, Lower Heat Value)	99.85	98.18	98.31	98.78	
Ambient Conditions					
Atmospheric Pressure ("Hg)	30.09	30.09	30.08	30.09	
Temperature (°F): Dry bulb	92.0	90.5	90.5	91.0	
(°F): Wet bulb	79.0	79.0	79.0	79.0	
Humidity (lbs moisture/lb of air)	0.0177	0.0180	0.0180	0.0179	
Measured Emissions					
NO <sub>x</sub> (ppmv, dry basis)	15.24	15.24	15.17	15.22	
NO <sub>x</sub> (ppmv, dry @ 15% O <sub>2</sub> )	17.7	17.6	17.5	17.6	25.0
NO <sub>x</sub> (ppmv @ 15% O <sub>2</sub> , ISO Day)	19.9	20.0	19.9	19.9	
CO (ppmv, dry basis)	1.52	1.34	1.89	1.58	
CO (ppmv, dry @ 15% O <sub>2</sub> )	1.76	1.55	2.19	1.83	15.0
O <sub>2</sub> (% volume, dry basis)	15.81	15.79	15.80	15.80	
CO <sub>2</sub> (% volume, dry basis)	2.97	2.97	2.96	2.96	
Visible Emissions (% opacity)	-	-	0.00	0	10
F <sub>o</sub> (fuel factor, range = 1.600-1.836 for NG)	1.71	1.72	1.73	1.72	
Stack Volumetric Flow Rates					
via O <sub>2</sub> "F <sub>o</sub> -factor" (SCFH, dry basis)	3.94E+06	3.86E+06	3.87E+06	3.89E+06	
via CO <sub>2</sub> "F <sub>o</sub> -factor" (SCFH, dry basis)	3.85E+06	3.77E+06	3.79E+06	3.80E+06	
Calculated Emission Rates (via EPA Method 19)					
NO <sub>x</sub> (lbs/hr)	7.17	7.02	7.00	7.06	14.1
CO (lbs/hr)	0.436	0.376	0.532	0.448	5.1



Company: Florida Gas Transmission Company  
 Facility: Compressor Station No. 12  
 Location: Munson, Santa Rosa County, Florida  
 Source: GE Nuovo Pignone Model No. PGT-10B combustion turbine  
 Technicians: TR, SO

**Table 4: Summary of Results  
 Unit 1208, Reduced Load Testing**

Test Number	1208-C-1	1208-C-2	1208-C-3	1208-C-7	1208-C-8	1208-C-9	1208-C-10	1208-C-11	1208-C-12
Date	6/20/02	6/20/02	6/20/02	6/20/02	6/20/02	6/20/02	6/20/02	6/20/02	6/20/02
Start Time	10:50	11:57	12:25	16:39	17:09	17:40	18:14	18:43	19:12
Stop Time	11:43	12:17	12:45	16:59	17:29	18:00	18:34	19:03	19:32
<b>Turbine/Compressor Operation</b>	<b>Low Load</b>			<b>Mid-High Load</b>			<b>Mid-Low Load</b>		
Gas Producer Speed (NGP, rpm)	10590	10604	10604	10986	10993	10999	10723	10692	10685
Power Turbine Speed (NPT, rpm)	5694	5694	5694	6238	6238	6238	5980	5982	5982
Turbine Horsepower (Hp)	6,916	6,830	6,788	8,944	8,980	9,022	7,976	7,983	7,894
Turbine Capacity (Pignone Curve, bhp vs. T-1/NPT)	13,196	13,063	13,023	12,944	12,944	13,003	13,142	13,281	13,326
Percent Load (% of max HP at inlet temp and %NPT)	52.4%	52.3%	52.1%	69.1%	69.4%	69.4%	60.7%	60.1%	59.2%
Thermal Load (% load available, Pignone)	60.7%	60.3%	60.4%	73.1%	70.7%	73.5%	67.8%	67.4%	67.1%
Engine Compressor Discharge Pressure (96CD, psia)	172.4	172.5	172.5	192.4	192.8	192.4	183.5	183.2	182.7
Turbine Air Inlet Temperature (CT-1A, °F)	87.5	89.9	90.7	91.7	91.9	91.5	88.4	86.3	85.5
Air Inlet Duct Losses (combined, °H <sub>2</sub> O)	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Power Turbine Inlet Temperature (TT-XD, °F)	977.0	976.6	976.5	965.1	937.7	964.5	919.9	915.3	913.1
Gas Compressor Suction Pressure (psig)	884.4	880.7	878.0	865.4	867.4	868.8	879.3	878.2	879.6
Gas Compressor Suction Temperature (°F)	88.4	87.7	87.9	85.6	85.7	85.8	86.5	86.4	87.7
Gas Compressor Discharge Pressure (psig)	1130.8	1125.4	1122.0	1162.1	1165.0	1166.9	1152.7	1152.2	1151.3
Gas Compressor Discharge Temperature (°F)	127.9	127.2	126.9	133.2	133.2	133.1	130.3	130.0	130.8
Gas Pilot Valve Command (% open)	13.83	13.89	13.90	9.38	9.34	9.31	10.87	11.07	11.20
<b>Turbine Fuel Data (Natural Gas)</b>									
Fuel Heating Value (Btu/SCF, HHV)	1048.4	1048.4	1048.4	1048.4	1048.4	1048.4	1048.4	1048.4	1048.4
Fuel Specific Gravity	0.5942	0.5942	0.5942	0.5942	0.5942	0.5942	0.5942	0.5942	0.5942
O <sub>2</sub> "F-factor" (DSCFex/MMBtu @ 0% excess air)	8647	8647	8647	8647	8647	8647	8647	8647	8647
CO <sub>2</sub> "F-factor" (DSCFex/MMBtu @ 0% excess air)	1030	1030	1030	1030	1030	1030	1030	1030	1030
Total Sulfur in Fuel (grains/100SCF)	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031
Fuel Flow (MSCFH)	84.625	84.447	84.037	100.057	100.657	100.593	93.397	92.830	92.567
Heat Input (MMBtu/hr, Higher Heat Value)	88.72	88.53	88.10	104.90	105.52	105.46	97.91	97.32	97.04
Heat Input (MMBtu/hr, Lower Heat Value)	79.85	79.68	79.29	94.41	94.97	94.91	88.12	87.59	87.34
<b>Ambient Conditions</b>									
Atmospheric Pressure ("Hg)	30.12	30.12	30.12	30.06	30.06	30.06	30.06	30.06	30.06
Temperature (°F): Dry bulb	90.0	90.0	93.0	89.0	89.0	90.0	87.0	85.0	82.0
(°F): Wet bulb	80.0	79.0	80.0	79.0	79.0	79.0	78.0	77.0	77.0
Humidity (lbs moisture/lb of air)	0.0191	0.0181	0.0184	0.0184	0.0184	0.0182	0.0180	0.0176	0.0183
<b>Cubix Measurements</b>									
NO <sub>x</sub> (ppmv, dry basis)	14.40	14.71	14.97	13.26	13.18	12.98	12.51	12.57	12.52
CO (ppmv, dry basis)	1.76	1.67	1.46	1.89	1.76	2.30	1.80	3.64	3.95
O <sub>2</sub> (% volume, dry basis)	16.32	16.38	16.44	16.02	16.04	16.05	16.24	16.23	16.22
CO <sub>2</sub> (% volume, dry basis)	2.63	2.62	2.61	2.84	2.84	2.81	2.71	2.71	2.71
F <sub>0</sub> (fuel factor, range = 1.600-1.836 for NG)	1.75	1.73	1.71	1.72	1.71	1.72	1.72	1.72	1.73
<b>Stack Volumetric Flow Rates</b>									
via O <sub>2</sub> "F <sub>0</sub> -factor" (SCFH, dry basis)	3.50E+06	3.54E+06	3.57E+06	3.89E+06	3.93E+06	3.93E+06	3.80E+06	3.77E+06	3.75E+06
via CO <sub>2</sub> "F <sub>0</sub> -factor" (SCFH, dry basis)	3.48E+06	3.49E+06	3.48E+06	3.81E+06	3.82E+06	3.87E+06	3.72E+06	3.70E+06	3.69E+06
<b>Cubix Calculated Values</b>									
NO <sub>x</sub> (ppmv, dry @ 15% O <sub>2</sub> )	18.5	19.2	19.8	16.0	16.0	15.8	15.9	15.9	15.8
NO <sub>x</sub> (ppmv @ 15% O <sub>2</sub> , ISO Day)	21.7	21.9	22.7	18.3	18.3	18.0	18.1	18.2	18.3
CO (ppmv, dry @ 15% O <sub>2</sub> )	2.26	2.18	1.94	2.29	2.13	2.80	2.29	4.60	4.98
NO <sub>x</sub> (lbs/hr)	6.02	6.21	6.39	6.15	6.18	6.10	5.68	5.66	5.61
CO (lbs/hr)	0.447	0.429	0.380	0.535	0.502	0.657	0.499	0.998	1.078

Testing by Cubix Corporation - Austin, Texas - Gainesville, Florida

**Engine 1208 Report Dated 11/06/02**

**TABLE 3**  
**Summary of Results**  
**Unit 1208**

Company: Florida Gas Transmission Company  
 Facility: Compressor Station No. 12  
 Location: Munson, Santa Rosa County, Florida  
 Source: GE Nuovo Pignone Model No. PGT-10B combustion turbine  
 Technicians: LJB, JTH

Test Number	1208-C-1	1208-C-2	1208-C-3		FDEP Permit Limits	
Date	11/6/02	11/6/02	11/6/02			
Start Time	9:25	10:45	12:00			
Stop Time	10:25	11:45	13:00			
<b>Turbine/Compressor Operation</b>	<b>Full Load</b>			<b>Averages</b>		
Gas Producer Speed (NGP, %)	11,003	10,997	10,998	10,999	15,700 ISO	
Power Turbine Speed (NPT, %)	7,130	7,103	7,071	7,101		
Turbine Load (Engine Horsepower, Hp)	13,648	13,523	13,442	13,538		
Turbine Capacity (as Horsepower Output)	14,293	14,149	13,990	14,144		
Percent Load (% of max HP at inlet temp and %NPT)	95.5%	95.6%	96.1%	95.7%		
Thermal Load (% load available, Pignone)	87.3%	87.0%	86.6%	87.0%		
Engine Compressor Discharge Pressure (96CD, psia)	208.5	207.7	206.9	207.7		
Turbine Air Inlet Temperature (CT-1A, °F)	61.5	63.5	65.5	63.5		
Air Inlet Duct Losses (combined, psig)	1.62	1.62	1.62	1.62		
Power Turbine Inlet Temperature (TT-XD, °F)	936.3	938.0	939.2	937.9		
Gas Compressor Suction Pressure (psig)	814.3	815.7	811.5	813.8		
Gas Compressor Suction Temperature (°F)	78.0	78.1	78.1	78.1		
Gas Compressor Discharge Pressure (psig)	1189.6	1188.3	1177.8	1185.3		
Gas Compressor Discharge Temperature (°F)	139.0	138.7	137.9	138.5		
Gas Pilot Valve Command (% open)	8.00	8.00	8.00	8.00		
Compressor Flow (MMSCFD)	636.1	632.8	638.4	635.8		
<b>Turbine Fuel Data (Natural Gas)</b>						
Fuel Heating Value (Btu/SCF, HHV)	1035.9	1035.9	1035.9	1035.9	10 134.8 ISO	
Fuel Specific Gravity	0.5858	0.5858	0.5858	0.5858		
O <sub>2</sub> "F-factor" (DSCFex/MMBtu @ 0% excess air)	8641	8641	8641	8641		
CO <sub>2</sub> "F-factor" (DSCFex/MMBtu @ 0% excess air)	1028	1028	1028	1028		
Total Sulfur in Fuel (grains S/per 100SCF of NG)	0.133	0.133	0.133	0.133		
Fuel Flow (SCFH)	121,033	120,355	119,611	120,333		
Heat Input (MMBtu/hr, Higher Heat Value)	125.38	124.68	123.90	124.65		
Heat Input (MMBtu/hr, Lower Heat Value)	112.84	112.21	111.51	112.19		
<b>Ambient Conditions</b>						
Atmospheric Pressure ("Hg)	29.86	29.86	29.85	29.86		
Temperature (°F): Dry bulb	61.0	62.2	64.0	62.4		
(°F): Wet bulb	53.9	54.4	54.4	54.2		
Humidity (lbs moisture/lb of air)	0.0071	0.0071	0.0067	0.0070		
<b>Measured Emissions</b>						
NO <sub>x</sub> (ppmv, dry basis)	19.10	19.17	19.07	19.11	25.0 15.0 10	
NO <sub>x</sub> (ppmv, dry @ 15% O <sub>2</sub> )	21.4	21.4	21.5	21.4		
NO <sub>x</sub> (ppmv @ 15% O <sub>2</sub> , ISO Day)	21.6	21.5	21.2	21.4		
CO (ppmv, dry basis)	2.05	2.02	0.97	1.68		
CO (ppmv, dry @ 15% O <sub>2</sub> )	2.30	2.25	1.09	1.88		
O <sub>2</sub> (% volume, dry basis)	15.64	15.61	15.65	15.64		
CO <sub>2</sub> (% volume, dry basis)	3.12	3.11	3.10	3.11		
Visible Emissions (% opacity)	-	0	-	0		
F <sub>o</sub> (fuel factor, range = 1.600-1.836 for NG)	1.68	1.70	1.69	1.69		
<b>Stack Volumetric Flow Rates</b>						
via O <sub>2</sub> "F <sub>o</sub> -factor" (SCFH, dry basis)	4.38E+06	4.34E+06	4.34E+06	4.35E+06		
via CO <sub>2</sub> "F <sub>o</sub> -factor" (SCFH, dry basis)	4.20E+06	4.19E+06	4.18E+06	4.19E+06		
<b>Calculated Emission Rates (via EPA Method 19)</b>						
NO <sub>x</sub> (lbs/hr)	10.0	9.92	9.89	9.94	14.1	
CO (lbs/hr)	0.653	0.636	0.305	0.531	5.1	
SO <sub>2</sub> (lbs/hr, based on fuel flow and fuel sulfur)	0.0459	0.0457	0.0454	0.0457	3.7	

Testing by Cubix Corporation - Austin, Texas - Gainesville, Florida

**Engine 1208 Report Dated 06/12/03**

**Table 3: Summary of Results  
Unit 1208  
Full Load Testing**

Company: Florida Gas Transmission Company  
 Facility: Compressor Station No. 12  
 Location: Munson, Santa Rosa County, Florida  
 Source: GE Nuovo Pignone Model No. PGT-10B combustion turbine  
 Technicians: LJB, JTH

Test Number	1208-C-10	1208-C-11	1208-C-12		FDEP Permit Limits
Date	6/12/03	6/12/03	6/12/03		
Start Time	13:40	16:31	17:42		
Stop Time	14:40	17:31	18:42		
<b>Turbine/Compressor Operation</b>	<b>Full Load</b>			<b>Averages</b>	
Gas Producer Speed (NGP, rpm)	10,999	11,000	10,993	10,997	
Power Turbine Speed (NPT, rpm)	7,256	7,473	7,499	7,409	
Compressor Shaft Horsepower (Turbine Horsepower, bhp)	12,425	13,102	12,973	12,833	15,700 ISO
Turbine Capacity (Calculated, bhp @ current conditions)	12,952	13,630	13,605	13,396	
Percent Load (% of turbine capacity @ current conditions)	95.9%	96.1%	95.4%	95.8%	
Engine Compressor Discharge Pressure (96CD, psia)	208.8	214.5	214.5	212.6	
Turbine Air Inlet Temperature (CT-1A, °F)	85.1	75.5	76.4	79.0	
Air Inlet Duct Losses (combined, psig)	2.75	2.81	2.81	2.79	
Power Turbine Inlet Temperature (TT-XD, °F)	946.1	934.0	933.7	937.9	
Inlet Guide Main Valve Command (% open)	93.8	93.8	93.8	93.8	
Gas Pilot Valve Command (% open)	8.70	8.56	8.58	8.61	
Gas Compressor Suction Pressure (psig)	824	797	797	806	
Gas Compressor Suction Temperature (°F)	75.6	75.4	76.4	75.8	
Gas Compressor Discharge Pressure (psig)	1188	1171	1183	1181	
Gas Compressor Discharge Temperature (°F)	131.3	134.0	136.9	134.0	
Compressor Flow (MMSCFD)	653.2	652.7	625.5	643.8	
<b>Turbine Fuel Data (Natural Gas)</b>					
Fuel Heating Value (Btu/SCF, HHV)	1049.3	1049.3	1049.3	1049.3	
Fuel Specific Gravity	0.5956	0.5956	0.5956	0.5956	
O <sub>2</sub> "F-factor" (DSCFex/MMBtu @ 0% excess air)	8648	8648	8648	8648	
CO <sub>2</sub> "F-factor" (DSCFex/MMBtu @ 0% excess air)	1032	1032	1032	1032	
Total Sulfur in Fuel (ppm, weight basis)	2.531	2.531	2.531	2.531	8000
Total Sulfur in Fuel (grains S/100 SCF natural gas fuel)	0.165	0.165	0.165	0.165	10
Fuel Flow (SCFH)	114,976	119,084	118,143	117,401	
Heat Input (MMBtu/hr, Higher Heat Value)	120.64	124.95	123.96	123.18	134.8 ISO
Heat Input (MMBtu/hr, Lower Heat Value)	108.57	112.45	111.57	110.86	
<b>Ambient Conditions</b>					
Atmospheric Pressure ( "Hg)	29.72	29.73	29.70	29.71	
Temperature (°F): Dry bulb	80.2	73.1	73.5	75.6	
(°F): Wet bulb	77.1	72.6	72.8	74.2	
Humidity (lbs moisture/lb of air)	0.0190	0.0169	0.0169	0.0176	
<b>Measured Emissions</b>					
NO <sub>x</sub> (ppmv, dry basis)	16.12	16.79	16.10	16.33	
NO <sub>x</sub> (ppmv, dry @ 15% O <sub>2</sub> )	18.3	19.2	18.3	18.6	25.0
NO <sub>x</sub> (ppmv @ 15% O <sub>2</sub> , ISO Day)	21.7	22.5	21.5	21.9	196
CO (ppmv, dry basis)	1.12	1.78	2.02	1.64	
CO (ppmv, dry @ 15% O <sub>2</sub> )	1.28	2.04	2.31	1.87	15.0
O <sub>2</sub> (% volume, dry basis)	15.70	15.74	15.72	15.72	
CO <sub>2</sub> (% volume, dry basis)	3.10	3.11	3.08	3.10	
Visible Emissions (% opacity)	0	-	-	0	10
F <sub>o</sub> (fuel factor, range = 1.600-1.836 for NG)	1.68	1.66	1.68	1.67	
<b>Stack Volumetric Flow Rates:</b>					
via O <sub>2</sub> "F <sub>o</sub> -factor" (SCFH, dry basis)	4.27E+06	4.46E+06	4.41E+06	4.38E+06	
via CO <sub>2</sub> "F <sub>o</sub> -factor" (SCFH, dry basis)	4.09E+06	4.22E+06	4.22E+06	4.18E+06	
<b>Calculated Emission Rates (via EPA Method-19)</b>					
NO <sub>x</sub> (lbs/hr)	8.22	8.94	8.47	8.54	14.1
CO (lbs/hr)	0.349	0.578	0.648	0.525	5.1
SO <sub>2</sub> (lbs/hr, based on fuel flow and fuel sulfur)	0.0541	0.0560	0.0556	0.0552	3.70
NO <sub>x</sub> (tons/yr)	36.0	39.1	37.1	37.4	61.8
SO <sub>2</sub> (tons/yr, based on fuel flow and fuel sulfur)	0.24	0.25	0.24	0.24	16.2

Testing conducted by Cubix Corporation - Gainesville, Florida

Company: Florida Gas Transmission Company  
 Facility: Compressor Station No. 12  
 Location: Minson, Santa Rosa County, Florida  
 Source: GE Nuovo Pignone Model No. PGT-10B combustion turbine  
 Technicians: LJB, JTH

**Table 4: Summary of Results  
 Unit 1208  
 Reduced Load Testing**

Test Number	O. Traverso								
	1208-C-1	1208-C-2	1208-C-3	1208-C-4	1208-C-5	1208-C-6	1208-C-7	1208-C-8	1208-C-9
Date	6/12/03	6/12/03	6/12/03	6/12/03	6/12/03	6/12/03	6/12/03	6/12/03	6/12/03
Start Time	8:32	9:32	10:01	10:32	11:05	11:34	12:04	12:33	13:02
Stop Time	9:22	9:52	10:21	10:52	11:25	11:54	12:24	12:53	13:22
<b>Turbine/Compressor Operation</b>	<b>Low Load</b>		<b>Mid-Low Load</b>			<b>Mid-High Load</b>			
Gas Producer Speed (NGP, rpm)	10,330	10,334	10,343	10,630	10,615	10,626	10,930	10,743	10,718
Power Turbine/Compressor Speed (NPT, rpm)	5,484	5,477	5,482	6,123	6,072	6,076	6,507	6,626	6,734
Compressor Shaft Horsepower (Turbine Horsepower, bhp)	6,020	5,875	5,812	8,163	8,114	8,227	10,195	9,992	9,897
Turbine Capacity (Available bhp @ current conditions)	11,731	11,688	11,598	12,106	12,025	11,961	12,207	12,286	12,373
Percent Load (% of turbine capacity @ current conditions)	51.3%	50.3%	50.1%	67.4%	67.5%	68.8%	83.5%	81.3%	80.0%
Engine Compressor Discharge Pressure (96CD, psia)	161.6	160.7	161.0	184.1	183.3	183.5	201.8	193.5	192.5
Turbine Air Inlet Temperature (CT-1A, °F)	86.9	88.0	89.0	89.9	90.4	92.0	91.8	92.3	91.6
Air Inlet Duct Losses (combined, °F)	2.53	2.53	2.53	2.72	2.72	2.53	2.81	2.81	2.81
Power Turbine Inlet Temperature (TT-XD, °F)	854.2	853.6	855.4	900.6	903.6	907.1	934.6	928.0	921.6
Inlet Guide Vane Command (% open)	71.6	71.2	71.2	87.5	86.4	86.1	93.8	92.2	91.3
Gas Pilot Valve Command (% open)	15.9	16.3	16.2	9.3	9.4	9.3	9.0	9.0	9.0
Gas Compressor Suction Pressure (psig)	960	963	966	952	951	948	923	859	849
Gas Compressor Suction Temperature (°F)	78.4	78.2	78.2	77.7	77.8	77.7	79.2	75.5	75.9
Gas Compressor Discharge Pressure (psig)	1055	1048	1050.3	1067	1072	1074	1101	1159	1175
Gas Compressor Discharge Temperature (°F)	97.3	96.0	96.1	100.8	101.2	101.6	109.4	120.9	125.2
Compressor Flow (MMSCFD)	948.1	973.9	967.2	1051.8	1031.4	1021.7	1000.7	648.2	588.9
<b>Turbine Fuel Data (Natural Gas)</b>									
Fuel Heating Value (Btu/SCF, HHV)	1049.3	1049.3	1049.3	1049.3	1049.3	1049.3	1049.3	1049.3	1049.3
Fuel Specific Gravity	0.5956	0.5956	0.5956	0.5956	0.5956	0.5956	0.5956	0.5956	0.5956
O <sub>2</sub> "F-factor" (DSCFex/MMBtu @ 0% excess air)	8648	8648	8648	8648	8648	8648	8648	8648	8648
CO <sub>2</sub> "F-factor" (DSCFex/MMBtu @ 0% excess air)	1032	1032	1032	1032	1032	1032	1032	1032	1032
Total Sulfur in Fuel (grains S/100 SCF natural gas fuel)	0.0807	0.0807	0.0807	0.0807	0.0807	0.0807	0.0807	0.0807	0.0807
Fuel Flow (SCFH)	75,326	74,918	75,092	93,369	92,508	92,651	106,599	100,848	99,604
Heat Input (MMBtu/hr, Higher Heat Value)	79.04	78.61	78.79	97.97	97.06	97.21	111.85	105.82	104.51
Heat Input (MMBtu/hr, Lower Heat Value)	71.13	70.75	70.91	88.17	87.36	87.49	100.66	95.23	94.06
<b>Ambient Conditions</b>									
Atmospheric Pressure ("Hg)	29.77	29.75	29.75	29.75	29.75	29.74	29.74	29.74	29.74
Temperature (°F): Dry bulb	81.9	83.9	86.2	86.9	87.2	88.9	89.1	90.3	89.0
Temperature (°F): Wet bulb	78.4	78.1	78.0	78.8	78.2	78.2	77.8	78.0	78.0
Humidity (lbs moisture/lb of air)	0.0197	0.0190	0.0184	0.0189	0.0183	0.0179	0.0175	0.0174	0.0177
<b>Measured Emissions</b>									
NO <sub>x</sub> (ppmv, dry basis)	14.03	14.26	14.68	12.76	13.12	13.31	14.81	14.43	14.03
CO (ppmv, dry basis)	1.77	1.60	1.47	2.07	1.63	1.55	1.60	1.51	1.52
O <sub>2</sub> (% volume, dry basis)	16.76	16.75	16.74	16.29	16.30	16.28	16.00	16.07	16.11
CO <sub>2</sub> (% volume, dry basis)	2.50	2.50	2.50	2.76	2.77	2.76	2.93	2.88	2.86
F <sub>o</sub> (fuel factor, range = 1.600-1.836 for NG)	1.66	1.66	1.66	1.67	1.66	1.67	1.67	1.67	1.68
<b>Stack Volumetric Flow Rates</b>									
via O <sub>2</sub> "F-factor" (SCFH, dry basis)	3.51E+06	3.49E+06	3.48E+06	3.91E+06	3.88E+06	3.88E+06	4.20E+06	4.03E+06	4.02E+06
via CO <sub>2</sub> "F-factor" (SCFH, dry basis)	3.33E+06	3.31E+06	3.31E+06	3.73E+06	3.68E+06	3.70E+06	4.02E+06	3.86E+06	3.85E+06
<b>Calculated Emission Rates</b>									
NO <sub>x</sub> (ppmv, dry @ 15% O <sub>2</sub> )	20.0	20.3	20.8	16.3	16.8	17.0	17.8	17.6	17.3
NO <sub>x</sub> (ppmv @ 15% O <sub>2</sub> ISO Day)	23.9	23.9	24.1	19.1	19.4	19.4	20.2	19.9	19.7
CO (ppmv, dry @ 15% O <sub>2</sub> )	2.52	2.28	2.09	2.65	2.09	1.99	1.92	1.84	1.88
NO <sub>x</sub> (lbs/hr)	5.88	5.93	6.11	5.95	6.08	6.16	7.43	6.95	6.73
CO (lbs/hr)	0.452	0.406	0.374	0.589	0.460	0.438	0.488	0.443	0.445
NO <sub>x</sub> (tons/yr)	25.8	26.0	26.8	26.1	26.6	27.0	32.6	30.5	29.5
CO (tons/yr)	1.98	1.78	1.64	2.58	2.01	1.92	2.14	1.94	1.95

Testing by Cubix Corporation - Gainesville, Florida

**Attachment D**  
**Emission Calculations**

**Engine No. 1208 EPN: 010**

CO Emissions: (Based on Vendor Data)

$$\text{lb CO/hr} = 7.03$$

$$\begin{aligned} \text{tons CO} &= (\text{lb CO/hr})(\text{hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= (7.03 \text{ lb CO/hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= 30.79 \end{aligned}$$

VOC Emissions: (Based on Vendor Data)

$$\text{lb VOC/hr} = 1.46$$

$$\begin{aligned} \text{tons VOC/yr} &= (\text{lb VOC/hr})(\text{hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= (1.46 \text{ lb VOC/hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= 6.39 \end{aligned}$$

HAPs Emissions: (Based on AP-42 Table 3.1-3, 4/00)

$$\begin{aligned} \text{lb HAP/hr} &= (\text{lb HAP/MMBtu})(\text{MMBtu/hr}) \\ &= (0.00102733 \text{ lb/MMBtu})(134.7700 \text{ MMBtu/hr}) \\ &= 0.14 \end{aligned}$$

$$\begin{aligned} \text{tons HAP/yr} &= (\text{lb HAP/hr})(\text{hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= (0.14 \text{ lb HAP/hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= 0.61 \end{aligned}$$

NOx Emissions: (Based on Vendor Data)

$$\text{lb NOx/hr} = 14.10$$

$$\begin{aligned} \text{tons NOx/yr} &= (\text{lb NOx/hr})(\text{hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= (14.10 \text{ lb NOx/hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= 61.76 \end{aligned}$$

SO2 Emissions: (Based on FERC Limits)

$$\begin{aligned} \text{lb S/hr} &= (\text{gr S}/100 \text{ scf})(\text{MMscf/hr})(1 \text{ lb}/7000 \text{ gr}) \\ &= (10 \text{ gr S}/100 \text{ scf})(0.1296 \text{ MMscf/hr})(1 \text{ lb}/7000 \text{ gr}) \\ &= 1.85 \end{aligned}$$

$$\begin{aligned} \text{lb SO}_2/\text{hr} &= (\text{lb S/hr})(2 \text{ lb SO}_2/\text{lb S}) \\ &= (1.85 \text{ lb S/hr})(2 \text{ lb SO}_2/\text{lb S}) \\ &= 3.70 \end{aligned}$$

$$\begin{aligned} \text{tons SO}_2/\text{yr} &= (\text{lb SO}_2/\text{hr})(\text{hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= (3.70 \text{ lb SO}_2/\text{hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= 16.22 \end{aligned}$$

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

$$\begin{aligned} \text{lb PM/hr} &= (\text{lb PM} / \text{MMBtu})(\text{MMBtu/hr}) \\ &= (0.0066 \text{ MMBtu/hr})(134.77 \text{ MMBtu/hr}) \\ &= 0.89 \end{aligned}$$

$$\begin{aligned} \text{tons PM/yr} &= (\text{lb PM/hr})(\text{hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= (0.89 \text{ lb PM/hr})(8760 \text{ hr/yr})(1 \text{ ton}/2000 \text{ lb}) \\ &= 3.90 \end{aligned}$$



## Turbine 1208 HAP Emission Factors

HAP	Turbine
	Factor lb/MMBtu
1,3-Butadiene	4.30E-07
Acetaldehyde	4.00E-05
Acrolein	6.40E-06
Benzene	1.20E-05
Ethylbenzene	3.20E-05
Formaldehyde	7.10E-04
Naphthalene	1.30E-06
PAH	2.20E-06
Propylene Oxide	2.90E-05
Toluene	1.30E-04
Xylenes	6.40E-05
<b>Total Hazardous Cmpds</b>	<b>1.027E-03</b>

Reference:

AP-42, 5th Edition, Supplement F, 04/00, Table3.1-3