Memorandum

Florida Department of Environmental Protection

TO: Howard Rhodes

THRU: Clair Fancy
Al Linero aa for CHF

FROM: Jeff Koerner JK

DATE: February 26, 2002

SUBJECT: Florida Gas Transmission Company - Gadsden Compressor Station No. 14
Extension of Air Construction Permit Expiration Date
Air Permit No. 0390029-003-AC

Attached for your approval and signature is a permit modification that extends the permit expiration date for the above referenced project.

Day 74 is April 19, 2002. I recommend your approval and signature.

Attachments

CHF/AAL/jfk

Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

February 26, 2002

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Florida Gas Transmission Company
1400 Smith Street
Houston, TX 77002

Authorized Representative:
Mr. Danny Pribble, V.P. of Operations

Re: Florida Gas Transmission Company - Gadsden Compressor Station No. 14
Extension of Air Construction Permit Expiration Date
Air Permit No. 0390029-003-AC

Dear Mr. Pribble:

On February 5, 2002, Florida Gas Transmission Company requested an extension of the expiration date of air construction Permit No. 0390029-003-AC for the Gadsden Compressor Station No. 14 located at Route 3, Box 3390, on Highway 65 South near Quincy in Gadsden County, Florida. Florida Gas Transmission Company requests the additional time to complete construction, perform the required tests and submit a timely Title V operation permit. The Department approves this request.

The expiration date is hereby extended from **June 1, 2002** to **October 1, 2002** to provide the necessary time to complete construction and submit a complete application for a Title V air operation permit. This permitting action does not authorize any new construction. A copy of this letter shall be filed with the referenced permit and shall become part of the permit. This permitting decision is issued pursuant to Chapter 403, Florida Statutes.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57 of the Florida Statutes (F.S.). The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen (14) days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to written notice under section 120.60(3), F.S., must be filed within fourteen (14) days of publication of the public notice or within fourteen (14) days of receipt of this notice of intent, whichever occurs first. Under Section 120.60(3), F.S., however, any person who asked the Department for notice of agency action may file a petition within fourteen (14) days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205 of the Florida Administrative Code (F.A.C.)

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action; (f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action; and (g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the agency to take with respect to the agency's proposed action.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301, F.A.C.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

Mediation is not available in this proceeding.

In addition to the above, a person subject to regulation has a right to apply for a variance from or waiver of the requirements of particular rules, on certain conditions, under Section 120.542, F.S. The relief provided by this state statute applies only to state rules, not statutes, and not to any federal regulatory requirements. Applying for a variance or waiver does not substitute or extend the time for filing a petition for an administrative hearing or exercising any other right that a person may have in relation to the action proposed in this notice of intent.

The application for a variance or waiver is made by filing a petition with the Office of General Counsel of the Department, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000. The petition must specify the following information: (a) The name, address, and telephone number of the petitioner; (b) The name, address, and telephone number of the attorney or qualified representative of the petitioner, if any; (c) Each rule or portion of a rule from which a variance or waiver is requested; (d) The citation to the statute underlying (implemented by) the rule identified in (c) above; (e) The type of action requested; (f) The specific facts that would justify a variance or waiver for the petitioner; (g) The reason why the variance or waiver would serve the purposes of the underlying statute (implemented by the rule); and (h) A statement whether the variance or waiver is permanent or temporary and, if temporary, a statement of the dates showing the duration of the variance or waiver requested.

The Department will grant a variance or waiver when the petition demonstrates both that the application of the rule would create a substantial hardship or violate principles of fairness, as each of those terms is defined in Section 120.542(2), F.S., and that the purpose of the underlying statute will be or has been achieved by other means by the petitioner.

Persons subject to regulation pursuant to any federally delegated or approved air program should be aware that Florida is specifically not authorized to issue variances or waivers from any requirements of any such federally delegated or approved program. The requirements of the program remain fully enforceable by the Administrator of the EPA and by any person under the Clean Air Act unless and until the Administrator separately approves any variance or waiver in accordance with the procedures of the federal program.

This permitting decision is final and effective on the date filed with the clerk of the Department unless a petition is filed in accordance with the above paragraphs or unless a request for extension of time in which to file a petition is filed within the time specified for filing a petition pursuant to Rule 62-110.106, F.A.C., and the petition conforms to the content requirements of Rules 28-106.201 and 28-106.301, F.A.C. Upon timely filing of a petition or a request for extension of time, this action will not be effective until further order of the Department.

Any party to this permitting decision (order) has the right to seek judicial review of it under Section 120.68, F.S., by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department of Environmental Protection in the Office of General Counsel, Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The notice must be filed within thirty (30) days after this order is filed with the clerk of the Department.

Executed in Tallahassee, Florida.

Howard L. Rhodes
Howard L. Rhodes, Director
Division of Air Resources Management

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this order was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 2/27/02 to the person(s) listed:

Mr. Danny Pribble, FGTC*
Mr. Jim Thompson, FGTC
Mr. Kevin McGlynn, McGlynn Consulting Co.
Mr. V. Duane Pierce, AQMcs
Ms. Sandra Veazey, NWD

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to §120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Barbara J. Friday (Clerk) 2/27/02 (Date)

7001 0320 0001 3692 8659

U.S. Postal Service
CERTIFIED MAIL RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

OFFICIAL USE

Postage	$	Postmark Here
Certified Fee		
Return Receipt Fee (Endorsement Required)		
Restricted Delivery Fee (Endorsement Required)		
Total Pos[illegible]		

Sent To Mr. Danny Pribble
Vice President of Operations
Florida Gas Transmission Company
Street, Apt. or PO Box N P.O. Box 1188
City, State, Houston, TX 77251

PS Form 3800, January 2001 — See Reverse for Instructions

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Mr. Danny Pribble
Vice President of Operations
Florida Gas Transmission Company
P.O. Box 1188
Houston, TX 77251

COMPLETE THIS SECTION ON DELIVERY

A. Received by (*Please Print Clearly*)

B. Date of Delivery MAR - 4 2002

C. Signature

X

☐ Agent
☐ Addressee

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

RECEIVED
MAR 7 2002
Bureau of Air Monitoring & Mobile Sources

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number *(Copy from service label)*
7001 0320 0001 3692 4659

PS Form 3811, July 1999 Domestic Return Receipt 102595-00-M-0952

Florida Gas Transmission Company

Capital Projects Field Office, 111 Kelsey Lane, Ste. A., Tampa, FL 33619
813.655.7441 / 800.381.1477

RECEIVED
FEB 05 2002
BUREAU OF AIR REGULATION

January 29, 2002

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Jeff Koerner, P.E.
New Source Review Section
Bureau of Air Regulation
Florida Department of Environmental Protection
Twin Towers Office Bldg.
2600 Blairstone Road
Tallahassee, FL 32399-2400

Reference: Permit No. 1130037-003-AC
FGT Compressor Station No. 12, Santa Rosa County

Permit No. 0390029-003-AC
Compressor Station No. 14, Gadsden County

Dear Mr. Koerner:

Subject: Extension of Construction Permit Expiration

The above referenced construction permits have expiration dates of June 1, 2002. It will not be possible for Florida Gas Transmission Company (FGT) to complete the modifications to these facilities, perform the required initial emissions compliance tests and apply for a Title V operating permit at least 90 days before their expiration dates.

FGT requests a 90-day extension to both of the referenced construction permits in order to complete construction, perform the required initial emissions performance tests and to submit applications for the Title V operating permits.

If you have any questions or need additional information, please call me at (800) 381-1477 or Dr. Duane Pierce at (281) 373-5365.

Sincerely,

Jim Thompson

Jim Thompson
Project Manager, Environmental

ATTACHMENTS

CC: Jake Krautsch
Duane Pierce

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Mr. Danny Pribble
Florida Gas Transmission Co.
1400 Smith Street
Houston, TX 77002

COMPLETE THIS SECTION ON DELIVERY

A. Received by *(Please Print Clearly)* N. WYATT B. Date of Delivery

C. Signature X N. Wyatt ☐ Agent ☐ Addressee

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number *(Copy from service label)* 7000 0600 0026 4129 9198

PS Form 3811, July 1999 Domestic Return Receipt 102595-99-M-1789

U.S. Postal Service
CERTIFIED MAIL RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

7000 0600 0026 4129 9198

Mr. Danny Pribble

Postage	$	Postmark Here
Certified Fee		
Return Receipt Fee (Endorsement Required)		
Restricted Delivery Fee (Endorsement Required)		
Total Postage & Fees	$	

Recipient's Name *(Please Print Clearly) (to be completed by mailer)*
Fla. Gas Transmission Co.
Street, Apt. No.; or PO Box No.
1400 Smith St.
City, State, ZIP+4
Houston, TX 77002

PS Form 3800, February 2000 See Reverse for Instructions

U.S. Postal Service

CERTIFIED MAIL RECEIPT

(Domestic Mail Only; No Insurance Coverage Provided)

7000 0600 0026 4129 9799

Postage	$
Certified Fee	
Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	

Postmark Here

Mr. Danny Pribble
Vice President of Operations
Florida Gas Transmission Company
P.O. Box 1188
Houston, TX 77251

...se for Instructions

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Mr. Danny Pribble
Vice President of Operations
Florida Gas Transmission Co.
PO Box 1188
Houston, TX 77251

COMPLETE THIS SECTION ON DELIVERY

A. Received by (*Please Print Clearly*) D W Yatt

B. Date of Delivery APR 23 2001

C. Signature

X D W Yatt

☐ Agent
☐ Addressee

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (*Extra Fee*) ☐ Yes

2. Article Number (*Copy from service label*)
7099 3400 0000 1450 2859

PS Form 3811, July 1999 Domestic Return Receipt 102595-00-M-0952

U.S. Postal Service
CERTIFIED MAIL RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

7099 3400 0000 1450 2859

Article Sent To:
Mr. Danny Pribble

Postage	$
Certified Fee	
Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Gadsden County

Postmark
Here

Name (Please Print Clearly) (to be completed by mailer)
Mr. Danny Pribble
Street, Apt. No.; or PO Box No.
PO Box 1188
City, State, ZIP+4
Houston, TX 77251

PS Form 3800, July 1999 See Reverse for Instructions

SENDER: *COMPLETE THIS SECTION*

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1. Article Addressed to:

Mr. Danny Pribble
Florida Gas Transmission Co.
1400 Smith Street
Houston, TX 77002

COMPLETE THIS SECTION ON DELIVERY

A. Received by (*Please Print Clearly*) N. WYATT B. Date of Delivery AUG 3 0 2001

C. Signature
X N. Wyatt ☐ Agent ☐ Addressee

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail ☐ Express Mail
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7000 0600 0026 4129 9198

Mr. Danny Pribble

Postage	$
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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Recipient's Name (Please Print Clearly) (to be completed by mailer)
Fla. Gas Transmission Co.
Street, Apt. No.; or PO Box No.
1400 Smith St.
City, State, ZIP+4
Houston, TX 77002

PS Form 3800, February 2000 See Reverse for Instructions

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

NOTICE OF FINAL PERMIT

In the Matter of an
Application for Permit by:

Florida Gas Transmission Company
1400 Smith Street
Houston, TX 77002

Authorized Representative:
Mr. Danny Pribble, V.P. of Operations

Gadsden Compressor Station No. 14
Air Permit No. 0390029-003-AC
Phase V Modifications

Enclosed is Final Air Permit No. 0390029-003-AC, which authorizes the construction of a new 15,700 bhp gas turbine compressor engine (No. 1408), the up-rating of an existing gas turbine compressor engine (No. 1407) to 13,000 bhp, and modification of one existing reciprocating internal combustion compressor engine (No. 1404). The new equipment will be installed at existing Compressor Station No. 14, which is located at Route 3, Box 3390, on Highway 65 South near Quincy in Gadsden County, Florida. As noted in the Final Determination (attached), only minor changes to correct typographical errors were made. This permit is issued pursuant to Chapter 403, Florida Statutes.

Any party to this order has the right to seek judicial review of it under Section 120.68 of the Florida Statutes, by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department of Environmental Protection in the Office of General Counsel, Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The notice must be filed within thirty (30) days after this order is filed with the clerk of the Department.

Executed in Tallahassee, Florida.

[signature] P.E.

for C. H. Fancy, P.E., Chief
Bureau of Air Regulation

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this Notice of Final Permit (including the Final permit) was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 8/15/01 to the person(s) listed:

Mr. Danny Pribble, FGT*
Mr. Jim Thompson, FGT
Mr. Kevin McGlynn, McGlynn Consulting Co.
Mr. V. Duane Pierce, AQMcs
Ms. Sandra Veazey, NWD

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to §120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Barbara J. Friday 8/15/01
(Clerk) (Date)

FINAL DETERMINATION

PERMITTEE

Florida Gas Transmission Company
1400 Smith Street
Houston, TX 77002

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation
New Source Review Section
2600 Blair Stone Road, MS #5505
Tallahassee, Florida, 32399-2400

PROJECT

Air Permit No. 0390029-003-AC
Santa Rosa Compressor Station No. 14

This permit authorizes the construction of a new 15,700 bhp gas turbine compressor engine (No. 1408), the uprating of an existing gas turbine compressor engine (No. 1407) to 13,000 bhp, and modification of one existing reciprocating internal combustion compressor engine (No. 1404). The new equipment will be installed at Compressor Station No. 14, which is at Route 3, Box 3390, on Highway 65 South near Quincy in Gadsden County, Florida.

NOTICE AND PUBLICATION

The Department distributed an "Intent to Issue Permit" package on July 20, 2001. The applicant published the "Public Notice of Intent to Issue" in the Tallahassee Democrat on July 26, 2001. The Department received the proof of publication on August 2, 2001. No requests for administrative hearings were filed.

COMMENTS

No comments on the Draft Permit were received from the public, the Department's Northwest District Office, or the applicant.

CONCLUSION

Only minor revisions were made to correct typographical errors. The final action of the Department is to issue the permit with the changes described above.

Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

PERMITTEE:

Florida Gas Transmission Company
1400 Smith Street
Houston, TX 77002

Authorized Representative:
Danny Pribble, V.P. of Operations

Gadsden Compressor Station No. 14
Air Permit No. 0390029-003-AC
Facility ID No. 0390029
SIC No. 4922
Permit Expires: June 1, 2002

PROJECT AND LOCATION

This permit authorizes the construction of a new 15,700 bhp gas turbine compressor engine (No. 1408), the up-rating of an existing gas turbine compressor engine (No. 1407) to 13,000 bhp, and modification of one existing reciprocating internal combustion compressor engine (No. 1404). The new equipment will be installed at existing Compressor Station No. 14, which is located at Route 3, Box 3390, on Highway 65 South near Quincy in Gadsden County, Florida. The UTM coordinates are Zone 16, 719.97 km East, and 3377.39 km North.

STATEMENT OF BASIS

This air pollution construction permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.) and Title 40, Part 60 of the Code of Federal Regulations. The permittee is authorized to install the proposed equipment in accordance with the conditions of this permit and as described in the application, approved drawings, plans, and other documents on file with the Department.

CONTENTS

Section 1. General Information
Section 2. Administrative Requirements
Section 3. Emissions Units Specific Conditions
Section 4. Appendices

Howard L Rhodes 8/14/01

Howard L. Rhodes, Director (Date)
Division of Air Resources Management

FACILITY AND PROJECT DESCRIPTION

The existing facility operates as a compressor station in Gadsden County for the Florida Gas Transmission Company's natural gas pipeline. The project will add a new 15,700 bhp gas turbine compressor engine (No. 1408), up-rate existing gas turbine compressor engine (No. 1407) to 13,000 bhp, and modify one existing reciprocating internal combustion compressor engine (No. 1404). After the project is complete, the facility will consist of the following emissions units.

ID	Emission Unit Description
004	**FGT No. 1404**: One modified 2000 bhp natural gas-fired reciprocating internal combustion engine (Worthington Model No. SEHG-8) was installed as a compressor engine in 1966.
006	**FGT No. 1406**: One 2700 bhp natural gas-fired reciprocating internal combustion engine (Cooper-Bessemer Model No. GMVR-12C) was installed as a compressor engine in 1991.
007	**FGT Nos. 1401, 1402, 1403, and 1405**: Four 2000 bhp natural gas-fired reciprocating internal combustion engines (Worthington Model No. SEHG-8) installed as compressor engines. FGT Nos. 1401, 1402, and 1403 were installed in 1958 and FGT No. 1405 was installed in 1968.
008	**FGT No. 1407**: One 13,000 bhp gas turbine (Solar Model No. Mars 90-T-13000S) was originally installed as a compressor engine in February 2001 and up-rated later in 2001.
009	**Miscellaneous Unregulated Emissions Units**
010	**FGT No. 1408**: A new 15,700 bhp gas turbine (Nuovo Pignone Model No. PGT-10B) to be installed as a compressor engine in 2001.

{Note: Emissions units 001, 002, 003 and 005 are "inactive".}

REGULATORY CLASSIFICATION

Title III: The existing facility is identified as a potential major source of hazardous air pollutants (HAP).

Title IV: The facility has no units subject to the acid rain provisions of the Clean Air Act.

Title V: Because potential emissions of at least one regulated pollutant exceed 100 tons per year, the facility is a Title V major source of air pollution in accordance with Chapter 213, F.A.C. Regulated pollutants include pollutants such as carbon monoxide (CO), nitrogen oxides (NOx), particulate matter (PM/PM_{10}), sulfur dioxide (SO_2), and volatile organic compounds (VOC).

PSD: The project is located in an area designated as "attainment" or "unclassifiable" for each pollutant subject to a National Ambient Air Quality Standard. Potential emissions of at least one regulated pollutant exceed 250 tons per year. Therefore, the facility is classified as a major source of air pollution with respect to Rule 62-212.400, F.A.C, the Prevention of Significant Deterioration (PSD) of Air Quality. Because the net actual emissions increase from this project do not exceed the PSD Significant Emissions Rates (Table 62-212.400-2), the project is not subject to the PSD preconstruction review requirements.

NSPS: The new gas turbine and the existing gas turbine are subject to the New Source Performance Standards of 40 CFR 60, Subpart GG.

RELEVANT DOCUMENTS

The permit application and additional information received to make it complete are not a part of this permit; however, the information is specifically related to this permitting action and is on file with the Department.

1. Permitting Authority: All documents related to applications for permits to construct or modify emissions units regulated by this permit shall be submitted to the Bureau of Air Regulation of the Florida Department of Environmental Protection (DEP) at 2600 Blair Stone Road (MS #5505), Tallahassee, Florida 32399-2400. All documents related to applications for permits to operate an emissions unit shall be submitted to the Department's Northwest District Office at 160 Governmental Center, Pensacola, Florida 32501-5794 and phone number 850/595-8364.

2. Compliance Authority: All documents related to compliance activities such as reports, tests, and notifications shall be submitted to the Department's Northwest District Office at 160 Governmental Center, Pensacola, Florida 32501-5794 and phone number 850/595-8364.

3. Appendices: The following Appendices are attached as part of this permit.
   - Appendix CF: Citation Format
   - Appendix FM: Custom Fuel Monitoring Plan for Gas Turbines Subject to NSPS Subpart GG
   - Appendix GC: General Conditions [Rule 62-4.160, F.A.C.]
   - Appendix GG: NSPS Subpart GG Requirements for Gas Turbines
   - Appendix SC: Standard Conditions [applicable requirements from Chapters 62-4, 62-210, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.).]

4. Applicable Regulations, Forms and Application Procedures: Unless otherwise indicated in this permit, the construction and operation of the subject emissions unit shall be in accordance with the capacities and specifications stated in the application. The facility is subject to all applicable provisions of: Chapter 403 of the Florida Statutes (F.S.); Chapters 62-4, 62-204, 62-210, 62-212, 62-213, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.); and Title 40, Part 60 of the Code of Federal Regulations (CFR), adopted by reference in Rule 62-204.800, F.A.C. The terms used in this permit have specific meanings as defined in the applicable chapters of the Florida Administrative Code. The permittee shall use the applicable forms listed in Rule 62-210.900, F.A.C. and follow the application procedures in Chapter 62-4, F.A.C. Issuance of this permit does not relieve the permittee from compliance with any applicable federal, state, or local permitting or regulations. [Rules 62-204.800, 62-210.300 and 62-210.900, F.A.C.]

5. New or Additional Conditions: For good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions, and on application of the permittee, the Department may grant additional time. [Rule 62-4.080, F.A.C.]

6. Modifications: The permittee shall notify the Compliance Authority upon commencement of construction. No emissions unit or facility subject to this permit shall be constructed or modified without obtaining an air construction permit from the Department. Such permit shall be obtained prior to beginning construction or modification. [Rules 62-210.300(1) and 62-212.300(1)(a), F.A.C.]

7. Title V Permit: This permit authorizes construction of the permitted emissions units and initial operation to determine compliance with Department rules. A Title V operation permit is required for regular operation of the permitted emissions unit. The permittee shall apply for a Title V operation permit at least 90 days prior to expiration of this permit, but no later than 180 days after commencing operation. To apply for a Title V operation permit, the applicant shall submit the appropriate application form, compliance test results, and such additional information as the Department may by law require. The application shall be submitted to the Department's Bureau of Air Regulation, and copies to each Compliance Authority. [Rules 62-4.030, 62-4.050, 62-4.220, and Chapter 62-213, F.A.C.]

A. EU-004: FGT No. 1404, Modified Reciprocating Compressor Engine

This section of the permit addresses the following modified emissions units.

Emissions Unit No. 004 (FGT No. 1404) **Modified Reciprocating Compressor Engine**
Description: The modified reciprocating internal combustion engine is a Worthington Model No. SEHG-8 that is used as a compressor engine for the natural gas pipeline. Engine No. 1404 was installed in 1966. *Fuel*: The engine fires pipeline-quality natural gas (SCC No 2-02-002-54). The maximum natural gas firing rate is approximately 15,900 cubic feet per hour based on a heat content of 1040 BTU per SCF of gas. *Capacity*: At 16.5 mmBTU per hour of heat input, the engine produces approximately 2000 bhp. After initial startup, the engine is intended to operate at or near capacity. *Controls*: The efficient combustion of pipeline-quality natural gas at high temperatures minimizes emissions of PM/PM_{10}, SO_2, and VOC. A catalytic converter reduces emissions of CO and VOC. Modifications to the engine turbocharger increase the air manifold pressure and airflow to each cylinder, which reduces NOx emissions. *Stack Parameters*: When operating at capacity, exhaust gases exit a 28 feet tall stack that is 1.44 feet in diameter with a flow rate of approximately 11,600 acfm at 700° F.

{Permitting Note: The existing natural gas compressor station is a major source with respect to the PSD preconstruction review program. The compressor engine was installed prior to implementation of the PSD program. However, specific modifications are being made in this project to obtain actual emissions decreases for use in a netting analysis that shows the total project to be minor with respect PSD. Therefore, the control systems, fuel specifications, operational restrictions, emissions standards, monitoring provisions, and reporting requirements of this section are established in accordance with Rule 62-212.400, F.A.C.}

EQUIPMENT

1. Engine Turbocharger Modifications: The permittee is authorized to physically modify the turbocharger of the reciprocating compressor engine in order to increase the air manifold pressure and airflow to each cylinder. The purpose of this modification is to increase the air-to-fuel mixture and decrease the cylinder temperatures, which will result in lower NOx emissions. The control system shall be readjusted to include the new engine performance parameters and operating set points. The permittee shall tune, maintain, and operate the modified engine and control system to preserve the reduced NOx emissions. [Applicant Request]

PERFORMANCE RESTRICTIONS

2. Permitted Capacity: The maximum heat input rate to the modified reciprocating compressor engine shall not exceed 16.5 mmBTU per hour while producing approximately 2000 bhp based on a higher heating value (HHV) of 1040 BTU per SCF for natural gas. [Rule 62-210.200(PTE), F.A.C.]
3. Authorized Fuel: The modified reciprocating compressor engine shall fire only pipeline-quality natural gas with a maximum of 10 grains of sulfur per 100 standard cubic feet of natural gas. The custom fuel-monitoring plan for the gas turbines (FGT Unit Nos. 1407 and 1408) shall serve as the compliance demonstration for the fuel sulfur limit. [Applicant Request; Rule 62-210.200(PTE), F.A.C.]
4. Restricted Operation: The hours of operation of the modified reciprocating compressor engine are not limited (8760 hours per year). [Rules 62-4.070(3) and 62-210.200(PTE), F.A.C.]

EMISSIONS STANDARDS

5. Emissions Standards: Emissions from the modified reciprocating compressor engine shall not exceed the following limits for carbon monoxide (CO), nitrogen oxides (NOx), opacity, particulate matter (PM), sulfur dioxide (SO_2), and volatile organic compounds (VOC).

Pollutant	Standards	Equivalent Maximum Emissions [f]		Rule Basis [g]
		lb/hour	TPY	
CO [a]	0.8 gram/bhp-hour	3.5	15.33	Avoid Rule 62-212.400, F.A.C.
NOx [b]	9.2 gram/bhp-hour	40.6	177.83	Avoid Rule 62-212.400, F.A.C.
SO2 [c]	10 grains of sulfur per 100 SCF of gas	0.5	2.19	Avoid Rule 62-212.400, F.A.C.
Opacity [d]	10% opacity, 6-minute average	Not Applicable		Avoid Rule 62-212.400, F.A.C.
PM [e]	Good combustion practices (Factor: 0.00999 lb/mmBTU)	0.2	0.88	Avoid Rule 62-212.400, F.A.C.
VOC [e]	Good combustion practices (Factor: 0.1 gram/bhp-hour)	0.4	1.75	Avoid Rule 62-212.400, F.A.C.

a. The CO standards are based on a 3-hour test average as determined by EPA Method 10.

b. The NOx standards are based on a 3-hour test averages as determined EPA Method 7E.

c. The fuel sulfur specification is based on the maximum limit specified by Federal Energy Regulatory Commission (FERC) and effectively limits the potential SO_2 emissions. Expected fuel sulfur levels are less than 1 grain per 100 SCF of natural gas from the pipeline. Compliance by record keeping.

d. The opacity standard is based on a 6-minute average, as determined by EPA Method 9.

e. For both PM and VOC, the efficient combustion of clean fuels is indicated by compliance with opacity and CO standards. Equivalent maximum PM emissions are based on data in Table 3.2-2 of AP-42. Equivalent maximum VOC emissions are based on test data. No testing required.

f. Equivalent maximum emissions are based on the maximum expected emissions (or the emissions standard) at permitted capacity and 8760 hours of operation per year.

g. The emissions standards of this permit ensure that the project does not trigger the PSD preconstruction review requirements of Rule 62-212.400, F.A.C.

EMISSIONS PERFORMANCE TESTING

6. Initial Compliance Tests: The modified reciprocating compressor engine shall be tested to demonstrate initial compliance with the emissions standards for CO, NOx, and visible emissions. The initial tests shall be conducted within 60 days after achieving at least 90% of the maximum permitted capacity, but not later than 180 days after initial operation of the modified engine. CO and NOx performance tests shall be conducted concurrently at permitted capacity. SO_2 emissions shall be calculated based on fuel flow and vendor analysis of fuel sulfur content. [Rule 62-297.310(7)(a)1, F.A.C.]

7. Annual Compliance Tests: During each federal fiscal year (October 1st to September 30th), the modified reciprocating compressor engine shall be tested to demonstrate compliance with the emissions standards for

NOx and visible emissions. SO_2 emissions shall be calculated based on fuel flow and vendor analysis of fuel sulfur content. [Rule and 62-297.310(7)(a)4, F.A.C. and to avoid Rule 62-212.400, F.A.C.]

8. Tests Prior to Renewal: Within the 12-month period prior to expiration of the operation permit, the modified reciprocating compressor engine shall be tested to demonstrate compliance with the emission standards for CO, NOx, and visible emissions. CO and NOx performance tests shall be conducted concurrently at permitted capacity. SO_2 emissions shall be calculated based on fuel flow and vendor analysis of fuel sulfur content. [Rule 62-297.310(7)(a)3, F.A.C.]

9. Test Notification: The permittee shall notify the Compliance Authority in writing at least 15 days prior to any required tests. [Rule 62-297.310(7)(a)9, F.A.C.]

10. Test Methods: Required tests shall be performed in accordance with the following reference methods.

Method	Description of Method and Comments
1-4	Traverse Points, Velocity and Flow Rate, Gas Analysis, and Moisture Content
7E	Determination of Nitrogen Oxide Emissions from Stationary Sources
9	Visual Determination of the Opacity of Emissions from Stationary Sources
10	Determination of Carbon Monoxide Emissions from Stationary Sources {Note: The method shall be based on a continuous sampling train.}
19	Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide, and Nitrogen Oxides Emission Rates (Optional F-factor method may be used to determine flow rate and gas analysis to calculate mass emissions in lieu of Methods 1-4.)

Tests shall also be conducted in accordance with the requirements specified in Section 4, Appendix SC of this permit. The above methods are described in 40 CFR 60, Appendix A, and adopted by reference in Rule 62-204.800, F.A.C. No other methods may be used for compliance testing unless prior written approval is received from the administrator of the Department's Emissions Monitoring Section in accordance with an alternate sampling procedure pursuant to 62-297.620, F.A.C. [Rules 62-204.800 and 62-297.100, F.A.C.; 40 CFR 60, Appendix A]

RECORDS AND REPORTS

11. Test Reports: The permittee shall prepare and submit reports for all required tests in accordance with the requirements specified in Section 4, Appendix SC of this permit. For each test run, the report shall also indicate the natural gas firing rate (cubic feet per hour), heat input rate (mmBTU per hour), and the power output (bhp). [Rule 62-297.310(8), F.A.C.]

12. Operational Data: The permittee shall adequately monitor the fuel consumption rate and hours of operation for use in submittal of the required Annual Operating Report. At least once per calendar quarter, a trained engine analyst shall inspect the modified engine, estimate the exhaust NOx concentration with a portable analyzer, and adjust engine performance as necessary. These inspections shall be recorded in a permanent log and made available for inspection upon request of the Department. [Rule 62-4.070(3), F.A.C.]

B. EU-008: FGT No. 1407, Up-Rated Gas Turbine Compressor Engine

This section of the permit addresses the following modified emissions unit.

Emissions Unit No. 008 (FGT No. 1407): Up-Rated Gas Turbine Compressor Engine
Description: The up-rated 13,000 bhp gas turbine is a Solar Model No. Mars 90-T-13000S that is used as a compressor engine for the natural gas pipeline. Engine No. 1407 was originally installed in early 2001.
Fuel: The gas turbine fires pipeline-quality natural gas (SCC No 2-02-002-01). The maximum natural gas firing rate is approximately 108,470 cubic feet per hour based on a heat content of 1040 BTU per SCF of gas.
Capacity: At 112.8 mmBTU per hour of heat input, the gas turbine produces approximately 13,000 bhp. After initial startup, the gas turbine is intended to operate at or near capacity.
Controls: The efficient combustion of pipeline-quality natural gas at high temperatures minimizes emissions of CO, PM/PM_{10}, SO_2, and VOC. NOx emissions are reduced with dry low-NOx combustion technology.
Stack Parameters: When operating at capacity, exhaust gases exit a rectangular stack (7.5 feet by 8 feet) that is 58 feet tall with a flow rate of approximately 179,500 acfm at 870° F.

{Permitting Note: The existing natural gas compressor station is a major source with respect to the PSD preconstruction review program. The project includes up-rating the existing gas turbine (FGT No. 1407) installed in early 2001. As such, it is part of the netting analysis that shows the project to be minor with respect to PSD. Therefore, the control systems, fuel specifications, operational restrictions, emissions standards, monitoring provisions, and reporting requirements of this section are established in accordance with Rule 62-212.400, F.A.C.}

APPLICABLE STANDARDS AND REGULATIONS

1. NSPS Requirements: The gas turbine shall comply with the New Source Performance Standards (NSPS) of Subpart GG in 40 CFR 60. The applicable NSPS requirements are provided in Appendix GG of this permit. The Department determines that the conditions in this section are at least as stringent, or more stringent than, the NSPS requirements of Subpart GG. [Rule 62-4.070(3), F.A.C.; 40 CFR 60, Subpart GG]

EQUIPMENT

2. Up-Rated Gas Turbine (FGT No. 1407): The permittee is authorized to up-rate the recently installed Solar Model No. Mars 90-T-13000S gas turbine from 10,350 bhp to 13,000 bhp. The permittee shall tune, operate and maintain the gas turbine's dry low-NOx combustion system to reduce emissions of nitrogen oxides below the permitted limits. Ancillary equipment includes the automated Solar Turbotronic gas turbine control system, an inlet air filtration system, and a rectangular stack (7.5 feet by 8.0 feet) that is 58 feet tall. [Applicant Request]

PERFORMANCE RESTRICTIONS

3. Permitted Capacities: The maximum heat input rate to the gas turbine shall not exceed 112.8 mmBTU per hour while producing approximately 13,078 bhp based on a compressor inlet air temperature of 59° F, 100% load, and a higher heating value (HHV) of 1040 BTU per SCF for natural gas. Heat input rates will vary depending upon gas turbine characteristics, load, and ambient conditions. For the gas turbine, the permittee shall provide manufacturer's performance curves (or equations) that correct for site conditions to the Permitting and Compliance Authorities within 45 days of completing the initial testing. Performance data shall be adjusted for the appropriate site conditions in accordance with the performance curves and/or equations on file with the Department. [Rule 62-210.200(PTE), F.A.C.]

4. Authorized Fuel: The gas turbine shall fire only pipeline-quality natural gas with a maximum of 10 grains of sulfur per 100 standard cubic feet of natural gas. [Applicant Request; Rule 62-210.200(PTE), F.A.C.]

5. 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 62-4.070(3) and 62-210.200(PTE), F.A.C.]

EMISSIONS STANDARDS

6. Emissions Standards: Emissions from the gas turbine shall not exceed the following limits for carbon monoxide (CO), nitrogen oxides (NOx), opacity, particulate matter (PM), sulfur dioxide (SO_2), and volatile organic compounds (VOC).

Pollutant	Standards	Equivalent Maximum Emissions [f]		Rule Basis [g]
		lb/hour	TPY	
CO [a]	50.0 ppmvd @ 15% O_2	12.4	54.31	Avoid Rule 62-212.400, F.A.C.
NOx [b]	25.0 ppmvd @ 15% O_2	10.2	44.68	Avoid Rule 62-212.400, F.A.C. 40 CFR 60.332
SO_2 [c]	10.0 grains of sulfur per 100 SCF of gas	3.1	13.58	Avoid Rule 62-212.400, F.A.C. 40 CFR 60.332
Opacity [d]	10% opacity, 6-minute average	Not Applicable		Avoid Rule 62-212.400, F.A.C.
PM [e]	Good combustion practices (Factor: 0.00999 lb/mmBTU)	0.7	3.3	Avoid Rule 62-212.400, F.A.C.
VOC [e]	Good combustion practices (Factor: 2.5 ppmvd @ 15% O_2)	0.4	1.75	Avoid Rule 62-212.400, F.A.C.

a. The CO standards are based on a 3-hour test average as determined by EPA Method 10.

b. The NOx standard are based a 3-hour test average as determined EPA Method 20.

c. The fuel sulfur specification is based on the maximum limit specified by Federal Energy Regulatory Commission (FERC) and effectively limits the potential SO_2 emissions. Expected fuel sulfur levels are less than 1 grain per 100 SCF of natural gas from the pipeline.

d. The opacity standard is based on a 6-minute average, as determined by EPA Method 9.

e. For both PM and VOC, the efficient combustion of clean fuels is indicated by compliance with opacity and CO standards. Equivalent maximum PM emissions are based on vendor data. Equivalent maximum VOC emissions were conservatively assumed to be 10% of the vendor's data for total unburned hydrocarbon. No testing required.

f. Equivalent maximum emissions are based on the maximum expected emissions, permitted capacity, a compressor inlet air temperature of 59° F, and 8760 hours of operation per year. For comparison purposes, the permittee shall provide a reference table with the initial compliance test report of mass emission rates versus the compressor inlet temperatures. Each test report shall include measured mass emission rates for CO, NOx and SO_2. Mass emission rates for SO_2 shall be calculated based on actual fuel sulfur content and fuel flow rate. For tests conducted at 59° F or greater, measured mass emission rates shall be compared to the equivalent maximum emissions above. For tests conducted below 59° F, measured mass emission rates shall be compared to the tabled mass emission rates provided by the manufacturer based on compressor inlet temperatures.

g. The emissions standards of this permit ensure that the project does not trigger the PSD preconstruction review requirements of Rule 62-212.400, F.A.C.

EMISSIONS PERFORMANCE TESTING

7. Initial Compliance Tests: The gas turbine shall be tested to demonstrate initial compliance with the emission standards for CO, NOx, and visible emissions. The initial tests shall be conducted within 60 days after achieving at least 90% of the maximum permitted capacity, but not later than 180 days after initial operation of the gas turbine. The initial NOx performance tests shall be conducted at approximately four evenly spaced points between the minimum normal operating load and 100% of peak load. Each of the three low-load NOx performance tests shall consist of three, 20-minute test runs. The peak load NOx performance test shall consist of three, 1-hour test runs. The CO performance tests shall be conducted concurrently with the NOx performance tests at peak load. SO_2 emissions shall be calculated based on fuel flow and vendor analysis of fuel sulfur content. [Rule 62-297.310(7)(a)1, F.A.C.; 40 CFR 60.8 and 60.335]

8. Annual Compliance Tests: During each federal fiscal year (October 1st to September 30th), the gas turbine shall be tested to demonstrate compliance with the emission standards for CO, NOx, and visible emissions. CO and NOx emissions shall be tested concurrently at permitted capacity. SO_2 emissions shall be calculated based on fuel flow and vendor analysis of fuel sulfur content. [Rule and 62-297.310(7)(a)4, F.A.C. and to avoid Rule 62-212.400, F.A.C.]

9. Test Notification: The permittee shall notify the Compliance Authority in writing at least 30 days prior to any initial NSPS performance tests and at least 15 days prior to any other required tests. [Rule 62-297.310(7)(a)9, F.A.C.; 40 CFR 60.7 and, 60.8]

10. Test Methods: Required tests shall be performed in accordance with the following reference methods.

Method	Description of Method and Comments
1-4	Traverse Points, Velocity and Flow Rate, Gas Analysis, and Moisture Content
9	Visual Determination of the Opacity of Emissions from Stationary Sources
10	Determination of Carbon Monoxide Emissions from Stationary Sources {Note: The method shall be based on a continuous sampling train.}
19	Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide, and Nitrogen Oxides Emission Rates (Optional F-factor method may be used to determine flow rate and gas analysis to calculate mass emissions in lieu of Methods 1-4.)
20	Determination of Nitrogen Oxides, Sulfur Dioxide and Diluent Emissions from Gas Turbines

Tests shall also be conducted in accordance with the requirements specified in Section 4, Appendix SC of this permit. The above methods are described in 40 CFR 60, Appendix A, and adopted by reference in Rule 62-204.800, F.A.C. No other methods may be used for compliance testing unless prior written approval is received from the administrator of the Department's Emissions Monitoring Section in accordance with an alternate sampling procedure pursuant to 62-297.620, F.A.C. [Rules 62-204.800 and 62-297.100, F.A.C.; 40 CFR 60, Appendix A]

RECORDS AND REPORTS

11. Test Reports: The permittee shall prepare and submit reports for all required tests in accordance with the requirements specified in Section 4, Appendix SC of this permit. In addition, NOx emissions shall be corrected to ISO ambient atmospheric conditions and compared to the NSPS Subpart GG standard identified in Appendix GG of this permit for each required test. For each run, the test report shall also indicate the natural gas firing rate (cubic feet per hour), heat input rate (mmBTU per hour), the power output (bhp), percent base load, and the inlet compressor temperature. [Rule 62-297.310(8), F.A.C.; 40 CFR 60.332]

12. Custom Fuel Monitoring Schedule: In lieu of the NSPS fuel monitoring requirements of 40 CFR 60.334 of Subpart GG, the Department approves the custom fuel-monitoring schedule specified in Appendix FM of this permit. [Rule 62-4.070(3); 40 CFR 60.334]

13. Operational Data: Using the automated gas turbine control system, the permittee shall monitor and record heat input (mmBTU), power output (bhp), and hours of operation for the gas turbine. 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 contracted 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(3), F.A.C.]

C. EU-010: FGT No. 1408, New Gas Turbine Compressor Engine

This section of the permit addresses the following new emissions unit.

Emissions Unit No. 010 (FGT No. 1408): New Gas Turbine Compressor Engine
Description: The new 15,700 bhp gas turbine is a Pignone Model No. PGT-10B to be used as a compressor engine for the natural gas pipeline. *Fuel*: The gas turbine fires pipeline-quality natural gas (SCC No 2-02-002-01). The maximum natural gas firing rate is approximately 129,600 cubic feet per hour based on a heat content of 1040 BTU per SCF of gas. *Capacity*: At 134.8 mmBTU per hour of heat input, the gas turbine produces approximately 15,700 bhp. After initial startup, the gas turbine is intended to operate between 50% and 100% of base load. *Controls*: The efficient combustion of pipeline-quality natural gas at high temperatures minimizes emissions of carbon monoxide (CO), particulate matter (PM/PM_{10}), sulfur dioxide (SO_2), and volatile organic compounds (VOC). NOx emissions are reduced with dry low-NOx combustion technology. *Stack Parameters*: When operating at capacity, exhaust gases exit a 7.6 feet diameter stack that is 61.5 feet tall with a flow rate of approximately 215,200 acfm at 910° F.

APPLICABLE STANDARDS AND REGULATIONS

{Permitting Note: The existing natural gas compressor station is a major source with respect to the PSD preconstruction review program. The project includes adding a new gas turbine (FGT No. 1408) to increase the compressor station capacity. As such, it is part of the netting analysis that shows the project to be minor with respect to PSD. Therefore, the control systems, fuel specifications, operational restrictions, emissions standards, monitoring provisions, and reporting requirements of this section are established in accordance with Rule 62-212.400, F.A.C.}

1. NSPS Requirements: The new gas turbine shall comply with the New Source Performance Standards (NSPS) of Subpart GG in 40 CFR 60. The applicable NSPS requirements are provided in Appendix GG of this permit. The Department determines that the conditions in this section are at least as stringent, or more stringent than, the NSPS requirements of Subpart GG. [Rule 62-4.070(3), F.A.C.; 40 CFR 60, Subpart GG]

EQUIPMENT

2. New Gas Turbine (FGT No. 1408): The permittee is authorized to install, tune, operate, and maintain a new Pignone Model No. PGT-10B gas turbine to be used as a compressor engine for the natural gas pipeline. The gas turbine design shall incorporate dry low-NOx combustion technology to reduce emissions of nitrogen oxides below the permitted limits. Ancillary equipment includes an automated gas turbine control system, an inlet air filtration system, and a 7.6 feet diameter stack that is 61.5 feet tall. The permittee identifies the new gas turbine compressor engine as FGT No. 1408. [Applicant Request; Design]

PERFORMANCE RESTRICTIONS

3. Permitted Capacity: The maximum heat input rate to the gas turbine shall not exceed 134.8 mmBTU per hour while producing approximately 15,700 bhp based on a compressor inlet air temperature of 59° F, 100% load, and a higher heating value (HHV) of 1040 BTU per SCF for natural gas. Heat input rates will vary depending upon gas turbine characteristics, load, and ambient conditions. The permittee shall provide manufacturer's performance curves (or equations) that correct for site conditions to the Permitting and Compliance Authorities within 45 days of completing the initial compliance testing. Performance data shall be adjusted for the appropriate site conditions in accordance with the performance curves and/or equations on file with the Department. [Rule 62-210.200(PTE), F.A.C.]

4. Authorized Fuel: The gas turbine shall fire only pipeline-quality natural gas with a maximum of 10 grains of sulfur per 100 standard cubic feet of natural gas. [Applicant Request; Rule 62-210.200(PTE), F.A.C.]

5. Restricted 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 60% of base load shall not exceed 876 hours during any consecutive 12 months. [Rules 62-4.070(3) and 62-210.200(PTE), F.A.C.]

EMISSIONS STANDARDS

6. Emissions Standards: Emissions from the gas turbine shall not exceed the following limits for carbon monoxide (CO), nitrogen oxides (NOx), opacity, particulate matter (PM), sulfur dioxide (SO_2), and volatile organic compounds (VOC).

Pollutant	Standards		Equivalent Maximum Emissions [f]		Rule Basis [g]
	Load	Standards	lb/hour	TPY	
CO [a]	90-100%	15.0 ppmvd @ 15% O_2	5.1	37.97	Avoid Rule 62-212.400, F.A.C.
	60-90%	55.0 ppmvd @ 15% O_2	17.3		
	50-60%	75.0 ppmvd @ 15% O_2	22.5		
NOx [b]	50-100%	25.0 ppmvd @ 15% O_2	14.1	61.76	Avoid Rule 62-212.400, F.A.C. 40 CFR 60.332
SO_2 [c]	50-100%	10.0 grains of sulfur per 100 SCF of natural gas	3.7	16.21	Avoid Rule 62-212.400, F.A.C. 40 CFR 60.332
Opacity [d]	50-100%	10% opacity, 6-minute average	Not Applicable		Avoid Rule 62-212.400, F.A.C.
PM [e]	50-100%	Good combustion practices	0.9	3.94	Avoid Rule 62-212.400, F.A.C.
VOC [e]	90-100%	Good combustion practices	0.3	2.43	Avoid Rule 62-212.400, F.A.C.
	60-90%	Good combustion practices	1.2		
	50-60%	Good combustion practices	1.5		

a. The CO standards are based on 3-hour test average as determined by EPA Method 10. Annual CO emissions were based on emissions standards and restricted hours of operation.

b. The NOx standards are based 3-hour test average as determined EPA Method 20.

c. The fuel sulfur specification is based on the maximum limit specified by Federal Energy Regulatory Commission (FERC) and effectively limits the potential SO_2 emissions. Expected fuel sulfur levels are less than 1 grain per 100 SCF of natural gas from the pipeline.

d. The opacity standard is based on a 6-minute average, as determined by EPA Method 9.

e. For both PM and VOC, the efficient combustion of clean fuels is indicated by compliance with opacity and CO standards. Equivalent maximum PM emissions are based on data in Table 3.1-2a in AP-42. Equivalent maximum VOC emissions are based on vendor data. Annual VOC emissions were based on the vendor data and restricted hours of operation. No testing required.

f. Equivalent maximum hourly emissions are the maximum expected emissions based on permitted capacity and a compressor inlet air temperature of 59° F. For comparison purposes, the permittee shall provide a reference table with the initial compliance test report of mass emission rates versus the compressor inlet temperatures. Each test report shall include measured mass emission rates for CO, NOx and SO_2. Mass emission rates for SO_2 shall be calculated based on actual fuel sulfur content and fuel flow rate. For tests conducted at 59° F or greater, measured mass emission rates shall be compared to the equivalent maximum emissions above. For tests conducted below 59° F, measured mass emission rates shall be compared to the tabled mass emission rates provided by the manufacturer based on compressor inlet temperatures.

g. Equivalent maximum annual emissions are based on 8760 hours of operation per year.

h. The emissions standards of this permit ensure that the project does not trigger the PSD preconstruction review requirements of Rule 62-212.400, F.A.C.

EMISSIONS PERFORMANCE TESTING

7. Initial Compliance Tests: The gas turbine shall be tested to demonstrate initial compliance with the emission standards for CO, NOx, and visible emissions. The initial tests shall be conducted within 60 days after achieving at least 90% of the maximum permitted capacity, but not later than 180 days after initial operation of the gas turbine. The initial CO and NOx performance tests shall be conducted at approximately four evenly spaced points between the minimum normal operating load and 100% of peak load. Each of the three low-load CO and NOx performance tests shall consist of three, 20-minute test runs. The peak load CO and NOx performance test shall consist of three, 1-hour test runs. The CO performance tests shall be conducted concurrently with the NOx performance tests. SO_2 emissions shall be calculated based on fuel flow and vendor analysis of fuel sulfur content. [Rule 62-297.310(7)(a)1, F.A.C.; 40 CFR 60.8 and 60.335]

8. Annual Compliance Tests: During each federal fiscal year (October 1st to September 30th), the gas turbine shall be tested to demonstrate compliance with the emission standards for CO, NOx, and visible emissions. CO and NOx emissions shall be tested concurrently at permitted capacity. SO_2 emissions shall be calculated based on fuel flow and vendor analysis of fuel sulfur content. [Rule and 62-297.310(7)(a)4, F.A.C. and to avoid Rule 62-212.400, F.A.C.]

9. Test Methods: Required tests shall be performed in accordance with the following reference methods.

Method	Description of Method and Comments
1-4	Traverse Points, Velocity and Flow Rate, Gas Analysis, and Moisture Content
9	Visual Determination of the Opacity of Emissions from Stationary Sources
10	Determination of Carbon Monoxide Emissions from Stationary Sources {Note: The method shall be based on a continuous sampling train.}
19	Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide, and Nitrogen Oxides Emission Rates (Optional F-factor method may be used to determine flow rate and gas analysis to calculate mass emissions in lieu of Methods 1-4.)
20	Determination of Nitrogen Oxides, Sulfur Dioxide and Diluent Emissions from Gas Turbines

Tests shall also be conducted in accordance with the requirements specified in Section 4, Appendix SC of this permit. The above methods are described in 40 CFR 60, Appendix A, and adopted by reference in Rule 62-204.800, F.A.C. No other methods may be used for compliance testing unless prior written approval is received from the administrator of the Department's Emissions Monitoring Section in accordance with an alternate sampling procedure pursuant to 62-297.620, F.A.C. [Rules 62-204.800 and 62-297.100, F.A.C.; 40 CFR 60, Appendix A]

10. Test Notification: The permittee shall notify the Compliance Authority in writing at least 30 days prior to any initial NSPS performance tests and at least 15 days prior to any other required tests. [Rule 62-297.310(7)(a)9, F.A.C.; 40 CFR 60.7 and, 60.8]

RECORDS AND REPORTS

11. Test Reports: The permittee shall prepare and submit reports for all required tests in accordance with the requirements specified in Section 4, Appendix SC of this permit. In addition, NOx emissions shall be corrected to ISO ambient atmospheric conditions and compared to the NSPS Subpart GG standard identified in Appendix GG of this permit for each required test. For each run, the test report shall also indicate the natural gas firing rate (cubic feet per hour), heat input rate (mmBTU per hour), the power output (bhp), percent base load, and the inlet compressor temperature. [Rule 62-297.310(8), F.A.C.; 40 CFR 60.332]

12. Custom Fuel Monitoring Schedule: In lieu of the NSPS fuel monitoring requirements of 40 CFR 60.334 of Subpart GG, the Department approves the custom fuel-monitoring schedule specified in Appendix FM of this permit. [Rule 62-4.070(3); 40 CFR 60.334]

13. Operational Data: Using the automated gas turbine control system, the permittee shall monitor and record heat input (mmBTU), power output (bhp), and hours of gas turbine operation within each of the following load ranges: 50% to 60% load, 60% 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 60% load; hours of gas turbine operation between 60% 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 contracted 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(3), F.A.C.]

D. EU-009: Miscellaneous Unregulated Emissions Units

This permit recognizes the following unregulated emissions units.

Emissions Unit No. 009: Miscellaneous Unregulated Emissions Units	
004	Support equipment includes: • One Caterpillar Model 3412 emergency generator (637 bhp) fired exclusively with natural gas and identified by the permittee as "GEN03"; • Lube oil storage tanks; • Used oil storage tanks; • Blowdown stacks; and • Miscellaneous fugitive emission leaks from valves, flanges, etc.

The emergency generator is exempt from air construction permitting requirements in accordance with the following rule.

Rule 62-210.300, F.A.C. Permits Required.

(3) Exemptions.

(c) Categorical Exemptions

20. One or more emergency generators located within a single facility provided:

a. None of the emergency generators is subject to the Federal Acid Rain Program; and

b. Total fuel consumption by all such emergency generators within the facility is limited to 32,000 gallons per year of diesel fuel, 4,000 gallons per year of gasoline, 4.4 million standard cubic feet per year of natural gas or propane, or an equivalent prorated amount if multiple fuels are used.

SECTION 4. APPENDICES

CONTENTS

Appendix CF. Citation Format
Appendix FM. Custom Fuel Monitoring Plan for NSPS Gas Turbines
Appendix GC. General Conditions
Appendix GG. NSPS Subpart GG Requirements for Gas Turbines
Appendix SC. Standard Conditions

CITATION FORMAT

The following examples illustrate the format used in the permit to identify applicable permitting actions and regulations.

REFERENCES TO PREVIOUS PERMITTING ACTIONS

Old Permit Numbers

Example: Permit No. AC50-123456 or Air Permit No. AO50-123456

Where: "AC" identifies the permit as an Air Construction Permit
"AO" identifies the permit as an Air Operation Permit
"123456" identifies the specific permit project number

New Permit Numbers

Example: Permit Nos. 099-2222-001-AC, 099-2222-001-AF, 099-2222-001-AO, or 099-2222-001-AV

Where: "099" represents the specific county ID number in which the project is located

"2222" represents the specific facility ID number

"001"identifies the specific permit project

"AC" identifies the permit as an air construction permit

"AF" identifies the permit as a minor federally enforceable state operation permit

"AO" identifies the permit as a minor source air operation permit

"AV" identifies the permit as a Title V Major Source Air Operation Permit

PSD Permit Numbers

Example: Permit No. PSD-FL-317

Where: "PSD" means issued pursuant to the Prevention of Significant Deterioration of Air Quality

"FL" means that the permit was issued by the State of Florida

"317" identifies the specific permit project

RULE CITATION FORMATS

Florida Administrative Code (F.A.C.)

Example: [Rule 62-213.205, F.A.C.]

Means: Title 62, Chapter 213, Rule 205 of the Florida Administrative Code

Code of Federal Regulations (CFR)

Example: [40 CRF 60.7]

Means: Title 40, Part 60, Section 7

CUSTOM FUEL MONITORING PLAN FOR NSPS GAS TURBINES

Custom Fuel Monitoring Schedule: The Department approves the following custom fuel-monitoring schedule in lieu of the NSPS fuel monitoring requirements in 40 CFR 60.334 of Subpart GG for the gas turbines affected by this project.

1. Because natural gas is the exclusive fuel for the gas turbine and contains negligible amounts of nitrogen, no monitoring of the fuel nitrogen content is required.
2. Fuel sulfur monitoring shall be performed in accordance with the following requirements:
   a. The natural gas shall be sampled and analyzed for the sulfur content as determined by ASTM methods D4084-82, D3246-81 or more recent versions.
   b. After first fire in the gas turbine, fuel sulfur monitoring shall be conducted at least twice each month. If this monitoring indicates little variability and compliance with the fuel sulfur limit of this permit for a period of six months, monitoring shall be reduced to once each calendar quarter. If this monitoring indicates little variability and compliance with the fuel sulfur limit of this permit for six calendar quarters, monitoring shall be reduced to twice each year (once each during the first and third calendar quarters).
   c. The permittee shall provide written notification to the Compliance Authority prior to reducing the frequency of monitoring in accordance with the above custom schedule. The notification shall include the results of the previous fuel sulfur analyses, the current frequency of monitoring, and the future frequency of monitoring.
3. This custom fuel-monitoring plan shall be reevaluated if there is a change in the fuel supply, a substantial change in the fuel quality, or any required monitoring indicates failure to comply with the fuel sulfur limit of this permit. For such cases, fuel sulfur monitoring shall resume on a weekly basis while the Department reevaluates the monitoring schedule.

[Rule 62-4.070(3); 40 CFR 60.334]

GENERAL CONDITIONS

The permittee shall comply with the following general conditions from Rule 62-4.160, F.A.C.

1. The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey and vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.

6. The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

   a. Have access to and copy and records that must be kept under the conditions of the permit;
   b. Inspect the facility, equipment, practices, or operations regulated or required under this permit, and,
   c. Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

   Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

   a. A description of and cause of non-compliance; and

   b. The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

   The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida

Statutes. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

10. The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 62-4.120 and 62-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

12. This permit or a copy thereof shall be kept at the work site of the permitted activity.

13. This permit also constitutes:

    a. Determination of Best Available Control Technology (NA);
    b. Determination of Prevention of Significant Deterioration (NA); and
    c. Compliance with New Source Performance Standards (X).

14. The permittee shall comply with the following:

    a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.

    b. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application or this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.

    c. Records of monitoring information shall include:

        1) The date, exact place, and time of sampling or measurements;
        2) The person responsible for performing the sampling or measurements;
        3) The dates analyses were performed;
        4) The person responsible for performing the analyses;
        5) The analytical techniques or methods used; and
        6) The results of such analyses.

15. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

NSPS SUBPART GG REQUIREMENTS FOR GAS TURBINES

The following emissions unit is subject to the applicable requirements of Subpart A (General Provisions) and Subpart GG (Stationary Gas Turbines) established as New Source Performance Standards in 40 CFR 60 and adopted by reference in Rule 62-204.800(7)(b), F.A.C.

Emissions Unit 003: FGT Unit No. 1607, Gas Turbine Compressor
Gas turbine is a Cooper-Rolls Model 501-KC7 DLE that will be used as a compressor engine for the natural gas pipeline.

NSPS General Provisions

The emissions units are subject to the applicable General Provisions of the New Source Performance Standards including 40 CFR 60.7 (Notification and Record Keeping), 40 CFR 60.8 (Performance Tests), 40 CFR 60.11 (Compliance with Standards and Maintenance Requirements), 40 CFR 60.12 (Circumvention), 40 CFR 60.13 (Monitoring Requirements), and 40 CFR 60.19 (General Notification and Reporting Requirements). The General Provisions are not included in this permit, but can be obtained from the Department upon request.

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

{Note: Each gas turbine shall comply with all applicable requirements of 40 CFR 60, Subpart GG adopted by reference in Rule 62-204.800(7)(b), F.A.C. Inapplicable provisions have been deleted in the following conditions, but the numbering of the original rules has been preserved for ease of reference. The term "Administrator" when used in 40 CFR 60 shall mean the Department's Secretary or the Secretary's designee. Department notes and requirements related to the Subpart GG requirements are shown in bold immediately following the section to which they refer. The rule basis for the Department requirements specified below is Rule 62-4.070(3), F.A.C.}

Section 60.330 Applicability and Designation of Affected Facility.

(a) The provisions of this subpart are applicable to the following affected facilities: All stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules per hour (10 million Btu/hour), based on the lower heating value of the fuel fired.

Section 60.331 Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given them in the Act and in subpart A of this part.

(g) ISO standard day conditions means 288 degrees Kelvin, 60 percent relative humidity and 101.3 kilopascals pressure.

(i) Peak load means 100 percent of the manufacturer's design capacity of the gas turbine at ISO standard day conditions.

(j) Base load means the load level at which a gas turbine is normally operated.

Section 60.332 Standard for Nitrogen Oxides.

(a) On and after the date of the performance test required by Section 60.8 is completed, every owner or operator subject to the provisions of this subpart as specified in paragraphs (c) of this section shall comply with:

(2) No owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any stationary gas turbine, any gases which contain nitrogen oxides in excess of:

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

where:

STD = allowable NOx emissions (percent by volume at 15 percent oxygen and on a dry basis).

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

F = NOx emission allowance for fuel-bound nitrogen as defined in paragraph (a)(3) of this section.

(3) F shall be defined according to the nitrogen content of the fuel as follows:

Fuel-bound nitrogen (percent by weight)	F (NOx percent by volume)
$N \leq 0.015$	0
$0.015 < N \leq 0.1$	0.04(N)
$0.1 < N \leq 0.25$	0.004+0.0067(N–0.1)
$N > 0.25$	0.005

where: N=the nitrogen content of the fuel (percent by weight).

Department requirement: **When firing natural gas, the "F" value shall be assumed to be 0.**

{Note: The "Y" value provided by the manufacturer is approximately 11.4 for natural gas. The equivalent emission standard is 190 ppmvd at 15% oxygen. The emissions standards in Section III of this permit are more stringent than this requirement.}

(c) Stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules per hour (10 million Btu/hour) but less than or equal to 107.2 gigajoules per hour (100 million Btu/hour) based on the lower heating value of the fuel fired, shall comply with the provisions of paragraph (a)(2) of this section.

Section 60.333 Standard for Sulfur Dioxide.

On and after the date on which the performance test required to be conducted by Section 60.8 is completed, every owner or operator subject to the provision of this subpart shall comply with:

(b) No owner or operator subject to the provisions of this subpart shall burn in any stationary gas turbine any fuel which contains sulfur in excess of 0.8 percent by weight.

Section 60.334 Monitoring of Operations.

(b) The owner or operator of any stationary gas turbine subject to the provisions of this subpart shall monitor sulfur content and nitrogen content of the fuel being fired in the turbine. The frequency of determination of these values shall be as follows:

(2) If the turbine is supplied its fuel without intermediate bulk storage the values shall be determined and recorded daily. Owners, operators or fuel vendors may develop custom schedules for determination of the values based on the design and operation of the affected facility and the characteristics of the fuel supply. These custom schedules shall be substantiated with data and must be approved by the Administrator before they can be used to comply with paragraph (b) of this section.

Department requirement: **The requirement to monitor the nitrogen content of pipeline quality natural gas fired is waived because natural gas is the exclusive fuel and contains negligible amounts of nitrogen. For purposes of complying with the sulfur content monitoring requirements of this rule, the permittee shall comply with the custom fuel-monitoring schedule specified in the Section 3 of the permit.**

{Note: This is consistent with guidance from EPA Region 4 on custom fuel monitoring.}

(c) For the purpose of reports required under Section 60.7(c), periods of excess emissions that shall be reported are defined as follows:

(1) Nitrogen oxides. Any one-hour period during which the average water-to-fuel ratio, as measured by the continuous monitoring system, falls below the water-to-fuel ratio determined to demonstrate compliance with Section 60.332 by the performance test required in Section 60.8 or any period during which the fuel-bound nitrogen of the fuel is greater than the maximum nitrogen content allowed by the fuel-bound nitrogen allowance used during the performance test required in Section 60.8. Each report shall include the average water-to-fuel

ratio, average fuel consumption, ambient conditions, gas turbine load, and nitrogen content of the fuel during the period of excess emissions, and the graphs or figures developed under Section 60.335(a).

{Note: The excess NOx emissions reporting requirements do not apply. The gas turbine uses dry low-NOx combustion technology and not wet injection to control NOx emissions. Also, NOx emissions due to fuel bound nitrogen are considered negligible because natural gas is the exclusive fuel and contains little nitrogen.}

(2) Sulfur dioxide. Any daily period during which the sulfur content of the fuel being fired in the gas turbine exceeds 0.8 percent.

Department requirement: In accordance with the custom fuel-monitoring schedule, any period between two consecutive fuel sulfur analyses shall be reported as excess emissions if the result of the second analysis indicates failure to comply with the fuel sulfur limit of the permit.

Section 60.335 Test Methods and Procedures.

(a) To compute the nitrogen oxides emissions, the owner or operator shall use analytical methods and procedures that are accurate to within 5 percent and are approved by the Administrator to determine the nitrogen content of the fuel being fired.

(b) In conducting the performance tests required in Section 60.8, the owner or operator shall use as reference methods and procedures the test methods in appendix A of this part or other methods and procedures as specified in this section, except as provided for in Section 60.8(b). Acceptable alternative methods and procedures are given in paragraph (f) of this section.

(c) The owner or operator shall determine compliance with the nitrogen oxides and sulfur dioxide standards in Sections 60.332 and 60.333(a) as follows:

(1) The nitrogen oxides emission rate (NOx) shall be computed for each run using the following equation:

$$NOx = (NOxo)\,(Pr/Po)^{0.5}\, e^{19(Ho - 0.00633)}\,(288°K/Ta)^{1.53}$$

where:

NOx = emission rate of NOx at 15 percent O2 and ISO standard ambient conditions, volume percent.

NOxo = observed NOx concentration, ppm by volume.

Pr = reference combustor inlet absolute pressure at 101.3 kilopascals ambient pressure, mm Hg.

Po = observed combustor inlet absolute pressure at test, mm Hg.

Ho = observed humidity of ambient air, g H2O/g air.

e = transcendental constant, 2.718.

Ta = ambient temperature, °K.

Department requirement: The permittee is required to correct NOx emissions to ISO ambient atmospheric conditions for each required emissions performance test and compare to the NOx standard specified in 40 CFR 60.332.

(2) The monitoring device of Section 60.334(a) shall be used to determine the fuel consumption and the water-to-fuel ratio necessary to comply with Section 60.332 at 30, 50, 75, and 100 percent of peak load or at four points in the normal operating range of the gas turbine, including the minimum point in the range and peak load. All loads shall be corrected to ISO conditions using the appropriate equations supplied by the manufacturer.

Department requirement: The initial NOx performance tests shall be conducted at approximately four evenly spaced points between the minimum normal operating load and 100% of peak load.

{Note: The dry low-NOx controls are only effective above a minimum load, which will be identified during initial testing.}

(3) Method 20 shall be used to determine the nitrogen oxides, sulfur dioxide, and oxygen concentrations. The span values shall be 300 ppm of nitrogen oxide and 21 percent oxygen. The NOx emissions shall be determined at each of the load conditions specified in paragraph (c)(2) of this section.

Department requirement: The span value shall be no greater than 75 ppm of nitrogen oxides due to the low NOx emission levels of the gas turbine.

(d) The owner or operator shall determine compliance with the sulfur content standard in Section 60.333(b) as follows: ASTM D 2880-71 shall be used to determine the sulfur content of liquid fuels and ASTM D 1072-80, D 3031-81, D 4084-82, or D 3246-81 shall be used for the sulfur content of gaseous fuels (incorporated by reference--see Section 60.17). The applicable ranges of some ASTM methods mentioned above are not adequate to measure the levels of sulfur in some fuel gases. Dilution of samples before analysis (with verification of the dilution ratio) may be used, subject to the approval of the Administrator.

Department requirement: The natural gas shall be sampled and analyzed for the sulfur content as determined by ASTM methods D4084-82, D3246-81 or more recent versions.

(e) To meet the requirements of Section 60.334(b), the owner or operator shall use the methods specified in paragraphs (a) and (d) of this section to determine the nitrogen and sulfur contents of the fuel being burned. The analysis may be performed by the owner or operator, a service contractor retained by the owner or operator, the fuel vendor, or any other qualified agency.

{Note: The fuel analysis requirements of the permit meet or exceed the requirements of this rule and will ensure compliance with this rule.}

{Permitting Note: The following conditions apply to all emissions units and activities at this facility.}

EMISSIONS AND CONTROLS

1. Plant Operation - Problems: If temporarily unable to comply with any of the conditions of the permit due to breakdown of equipment or destruction by fire, wind or other cause, the permittee shall notify each Compliance Authority as soon as possible, but at least within one working day, excluding weekends and holidays. The notification shall include: pertinent information as to the cause of the problem; steps being taken to correct the problem and prevent future recurrence; and, where applicable, the owner's intent toward reconstruction of destroyed facilities. Such notification does not release the permittee from any liability for failure to comply with the conditions of this permit or the regulations. [Rule 62-4.130, F.A.C.]

2. Circumvention: The permittee shall not circumvent the air pollution control equipment or allow the emission of air pollutants without this equipment operating properly. [Rule 62-210.650, F.A.C.]

3. Excess Emissions Allowed: Excess emissions resulting from startup, shutdown or malfunction of any emissions unit shall be permitted providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized but in no case exceed two hours in any 24 hour period unless specifically authorized by the Department for longer duration. [Rule 62-210.700(1), F.A.C.]

4. Excess Emissions Prohibited: Excess emissions caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure that may reasonably be prevented during startup, shutdown or malfunction shall be prohibited. [Rule 62-210.700(4), F.A.C.]

5. Excess Emissions - Notification: In case of excess emissions resulting from malfunctions, the permitee shall notify the Department or the appropriate Local Program in accordance with Rule 62-4.130, F.A.C. A full written report on the malfunctions shall be submitted in a quarterly report, if requested by the Department. [Rule 62-210.700(6), F.A.C.]

6. VOC or OS Emissions: No person shall store, pump, handle, process, load, unload or use in any process or installation, volatile organic compounds or organic solvents without applying known and existing vapor emission control devices or systems deemed necessary and ordered by the Department. [Rule 62-296.320(1), F.A.C.]

7. Objectionable Odor Prohibited: No person shall cause, suffer, allow or permit the discharge of air pollutants, which cause or contribute to an objectionable odor. An "objectionable odor" means any odor present in the outdoor atmosphere which by itself or in combination with other odors, is or may be harmful or injurious to human health or welfare, which unreasonably interferes with the comfortable use and enjoyment of life or property, or which creates a nuisance. [Rules 62-296.320(2) and62-210.200(203), F.A.C.]

8. General Visible Emissions: No person shall cause, let, permit, suffer or allow to be discharged into the atmosphere the emissions of air pollutants from any activity equal to or greater than 20 percent opacity. [Rule 62-296.320(4)(b)1, F.A.C.]

9. Unconfined Particulate Emissions: During the construction period, unconfined particulate matter emissions shall be minimized by dust suppressing techniques such as covering and/or application of water or chemicals to the affected areas, as necessary. [Rule 62-296.320(4)(c), F.A.C.]

TESTING REQUIREMENTS

10. Required Number of Test Runs: For mass emission limitations, a compliance test shall consist of three complete and separate determinations of the total air pollutant emission rate through the test section of the stack or duct and three complete and separate determinations of any applicable process variables corresponding to the three distinct time periods during which the stack emission rate was measured; provided, however, that three complete and separate determinations shall not be required if the process variables are not subject to variation during a compliance test, or if three determinations are not necessary in order to calculate the unit's emission rate. The three required test runs shall be completed within one consecutive five-day period. In the event that a sample is lost or one of the three runs must be discontinued because of circumstances beyond the control of the owner or operator, and a valid third run cannot be obtained within the five-day period allowed for the test, the Secretary or his or her designee may accept the results of two complete runs as proof of compliance, provided that the arithmetic mean of the two complete runs is at least 20% below the allowable emission limiting standard. [Rule 62-297.310(1), F.A.C.]

11. Operating Rate During Testing: Testing of emissions shall be conducted with the emissions unit operating at permitted capacity. Permitted capacity is defined as 90 to 100 percent of the maximum operation rate allowed by the permit. If it is impractical to test at permitted capacity, an emissions unit may be tested at less than the maximum permitted capacity; in this case, subsequent emissions unit operation is limited to 110 percent of the test rate until a new test is conducted. Once the unit is so limited, operation at higher capacities is allowed for no more than 15 consecutive days for the purpose of additional compliance testing to regain the authority to operate at the permitted capacity. [Rule 62-297.310(2), F.A.C.]

12. Calculation of Emission Rate: For each emissions performance test, the indicated emission rate or concentration shall be the arithmetic average of the emission rate or concentration determined by each of the three separate test runs unless otherwise specified in a particular test method or applicable rule. [Rule 62-297.310(3), F.A.C.]

13. Test Procedures: Tests shall be conducted in accordance with all applicable requirements of Chapter 62-297, F.A.C.

    a. *Required Sampling Time.* Unless otherwise specified in the applicable rule, the required sampling time for each test run shall be no less than one hour and no greater than four hours, and the sampling time at each sampling point shall be of equal intervals of at least two minutes. The minimum observation period for a visible emissions compliance test shall be thirty (30) minutes. The observation period shall include the period during which the highest opacity can reasonably be expected to occur.

    b. *Minimum Sample Volume.* Unless otherwise specified in the applicable rule or test method, the minimum sample volume per run shall be 25 dry standard cubic feet.

    c. *Calibration of Sampling Equipment.* Calibration of the sampling train equipment shall be conducted in accordance with the schedule shown in Table 297.310-1, F.A.C.

    [Rule 62-297.310(4), F.A.C.]

14. Determination of Process Variables

    a. *Required Equipment.* The owner or operator of an emissions unit for which compliance tests are required shall install, operate, and maintain equipment or instruments necessary to determine process variables, such as process weight input or heat input, when such data are needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.

    b. *Accuracy of Equipment.* Equipment or instruments used to directly or indirectly determine process variables, including devices such as belt scales, weight hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value.

    [Rule 62-297.310(5), F.A.C.]

15. Sampling Facilities: The permittee shall install permanent stack sampling ports and provide sampling facilities that meet the requirements of Rule 62-297.310(6), F.A.C.

16. Test Notification: The owner or operator shall notify the Department, at least 15 days prior to the date on which each formal compliance test is to begin, of the date, time, and place of each such test, and the test contact person who will be responsible for coordinating and having such test conducted for the owner or operator. [Rule 62-297.310(7)(a)9, F.A.C.]

17. Special Compliance Tests: When the Department, after investigation, has good reason (such as complaints, increased visible emissions or questionable maintenance of control equipment) to believe that any applicable emission standard contained in a Department rule or in a permit issued pursuant to those rules is being violated, it shall require the owner or operator of the emissions unit to conduct compliance tests which identify the nature and quantity of pollutant emissions from the emissions unit and to provide a report on the results of said tests to the Department. [Rule 62-297.310(7)(b), F.A.C.]

18. Test Reports: The owner or operator of an emissions unit for which a compliance test is required shall file a report with the Department on the results of each such test. The required test report shall be filed with the Department as

soon as practical but no later than 45 days after the last sampling run of each test is completed. The test report shall provide sufficient detail on the emissions unit tested and the test procedures used to allow the Department to determine if the test was properly conducted and the test results properly computed. As a minimum, the test report, other than for an EPA or DEP Method 9 test, shall provide the following information:

1. The type, location, and designation of the emissions unit tested.
2. The facility at which the emissions unit is located.
3. The owner or operator of the emissions unit.
4. The normal type and amount of fuels used and materials processed, and the types and amounts of fuels used and material processed during each test run.
5. The means, raw data and computations used to determine the amount of fuels used and materials processed, if necessary to determine compliance with an applicable emission limiting standard.
6. The type of air pollution control devices installed on the emissions unit, their general condition, their normal operating parameters (pressure drops, total operating current and GPM scrubber water), and their operating parameters during each test run.
7. A sketch of the duct within 8 stack diameters upstream and 2 stack diameters downstream of the sampling ports, including the distance to any upstream and downstream bends or other flow disturbances.
8. The date, starting time and duration of each sampling run.
9. The test procedures used, including any alternative procedures authorized pursuant to Rule 62-297.620, F.A.C. Where optional procedures are authorized in this chapter, indicate which option was used.
10. The number of points sampled and configuration and location of the sampling plane.
11. For each sampling point for each run, the dry gas meter reading, velocity head, pressure drop across the stack, temperatures, average meter temperatures and sample time per point.
12. The type, manufacturer and configuration of the sampling equipment used.
13. Data related to the required calibration of the test equipment.
14. Data on the identification, processing and weights of all filters used.
15. Data on the types and amounts of any chemical solutions used.
16. Data on the amount of pollutant collected from each sampling probe, the filters, and the impingers, are reported separately for the compliance test.
17. The names of individuals who furnished the process variable data, conducted the test, analyzed the samples and prepared the report.
18. All measured and calculated data required to be determined by each applicable test procedure for each run.
19. The detailed calculations for one run that relate the collected data to the calculated emission rate.
20. The applicable emission standard, and the resulting maximum allowable emission rate for the emissions unit, plus the test result in the same form and unit of measure.
21. A certification that, to the knowledge of the owner or his authorized agent, all data submitted are true and correct. When a compliance test is conducted for the Department or its agent, the person who conducts the test shall provide the certification with respect to the test procedures used. The owner or his authorized agent shall certify that all data required and provided to the person conducting the test are true and correct to his knowledge.

RECORDS AND REPORTS

19. Records Retention: All measurements, records, and other data required by this permit shall be documented in a permanent, legible format and retained for at least five (5) years following the date on which such measurements, records, or data are recorded. Records shall be made available to the Department upon request. [Rules 62-4.160(14) and 62-213.440(1)(b)2, F.A.C.]

20. Annual Operating Report: The permittee shall submit an annual report that summarizes the actual operating rates and emissions from this facility. Annual operating reports shall be submitted to the Compliance Authority by March 1st of each year. [Rule 62-210.370(2), F.A.C.]

Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

July 18, 2001

CERTIFIED MAIL – Return Receipt Requested

Mr. James A. Pasternak
Central Florida Pipeline/Orlando
(GATX Terminals)
2101 GATX Drive
Tampa, FL 33605-6863

Dear Mr. Pasternak:

Re: Facility 0950069 (Orlando Facility, 9919 South Orange Avenue)
Facility 0570085 (Tampa Facility, 2101 GATX Drive)

Letters were recently sent to you regarding the shortfall in the two above referenced Title V facilities for their Annual Title V Emission Fees. The shortfalls were due to the way the fee calculations were figured. Since we had accepted the calculations on one of the facilities (the Orlando facility) last year, we do not feel that we should impose the 50 % penalty without a chance for you to reconcile the original fee submittals. Therefore, we are going to waive the penalty for a 30-day grace period (COB August 17th for postmarking) to allow you time to submit the appropriate annual emissions fee shortfalls with interest. The following figures provide the fee shortfalls plus interest for July and August:

Facility ID:	July	August
0950069	$1630.45	$1644.75
0570085	$2898.85	$2923.46

If the fee shortfalls plus interest has been received (postmarked) by July 31st, then the July figure is acceptable. If the fee shortfalls plus interest has not been received (postmarked) by August 17th, then the penalty assessment will be reinstated and pursued for collection. If there are any questions, please give me a call at 850/413-9198.

Sincerely,

R. Bruce Mitchell
Environmental Administrator
Title V Section

cc: Clair Fancy, BAR
Scott Sheplak, BAR - Title V Section
Kevin Golden, P.E., USI
Ed Svec, BAR - Title V Section
Tom Cascio, BAR - Title V Section

Memorandum

Florida Department of Environmental Protection

TO: Howard Rhodes

THRU: ~~Clair Fancey~~ Al Linero aal 8/13

FROM: Jeff Koerner JK

DATE: August 13, 2001

SUBJECT: Final Air Construction Permit No. 0390029-003-AC
Florida Gas Transmission Company
Gadsden Compressor Station No. 14
Phase V Modifications

The Final Permit for this project is attached for your approval and signature, which authorizes the construction of a new 15,700 bhp gas turbine compressor engine (No. 1408), the up-rating of an existing gas turbine compressor engine (No. 1407) to 13,000 bhp, and modification of one existing reciprocating internal combustion compressor engine (No. 1404). The new equipment will be installed at existing Compressor Station No. 14, which is at Route 3, Box 3390, on Highway 65 South near Quincy in Gadsden County, Florida. Although the project is minor with respect to PSD, the Florida Gas Transmission Company requested that the Tallahassee office process the Phase V modifications due to PSD implications and for purposes of consistency.

The Department distributed an "Intent to Issue Permit" package on July 20, 2001. The applicant published the "Public Notice of Intent to Issue" in the Tallahassee Democrat on July 26, 2001. No requests for administrative hearings were filed.

Day #90 is September 6, 2001. I recommend your approval of the attached Final Permit for this project.

Attachments

CHF/AAL/jfk

7000 0600 0026 4129 9266

U.S. Postal Service

CERTIFIED MAIL RECEIPT

(Domestic Mail Only; No Insurance Coverage Provided)

Postage	$
Certified Fee	
Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	

Postmark Here

Mr. Danny Pribble
Vice President of Operations
Florida Gas Transmission Company
P.O. Box 1188
Houston, TX 77251

se for Instructions

Department of
Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

July 19, 2001

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Danny Pribble, V.P. of Operations
Florida Gas Transmission Company
1400 Smith Street
Houston, TX 77002

Re: Draft Air Permit No. 0390029-003-AC
Gadsden Compressor Station No. 14
Phase V Modifications

Dear Mr. Pribble:

Enclosed is one copy of the draft permit to construct a new 15,700 bhp gas turbine compressor engine, up-rate an existing gas turbine compressor engine to 13,000 bhp, and modify one existing reciprocating internal combustion compressor engine. The new equipment will be installed at existing Compressor Station No. 14, which is located at Route 3, Box 3390, on Highway 65 South near Quincy in Gadsden County, Florida. The engine modifications result in emissions decreases for carbon monoxide and nitrogen oxides, which allow this project to net out of PSD. The Department's "Technical Evaluation and Preliminary Determination", "Intent to Issue Permit", and the "Public Notice of Intent to Issue Permit" are also included.

The "Public Notice of Intent to Issue Permit" must be published one time only, as soon as possible, in the legal advertisement section of a newspaper of general circulation in the area affected, pursuant to the requirements Chapter 50, Florida Statutes. Proof of publication, i.e., newspaper affidavit, must be provided to the Department's Bureau of Air Regulation office within seven days of publication. Failure to publish the notice and provide proof of publication may result in the denial of the permit.

Please submit any written comments you wish to have considered concerning the Department's proposed action to A. A. Linero, Administrator of the New Source Review Section, at the above letterhead address. If you have any other questions, please contact Jeff Koerner at 850/921-9536.

Sincerely,

A. A. Linero P.E.

for C. H. Fancy, P.E., Chief
Bureau of Air Regulation

CHF/AAL/jfk

Enclosures

In the Matter of an
Application for Air Permit by:

Florida Gas Transmission Company
1400 Smith Street
Houston, TX 77002

Authorized Representative:
Mr. Danny Pribble, V.P. of Operations

Compressor Station No. 14
Draft Air Permit No. 0390029-003-AC
Phase V Modifications
Gadsden County

INTENT TO ISSUE AIR CONSTRUCTION PERMIT

The Department of Environmental Protection (Department) gives notice of its intent to issue an air construction permit (copy of Draft Permit attached) for the proposed project as detailed in the application and the enclosed Technical Evaluation and Preliminary Determination, for the reasons stated below. The applicant, Florida Gas Transmission Company, applied on March 26, 2001 to the Department for a permit to construct a new 15,700 bhp gas turbine compressor engine, up-rate an existing gas turbine compressor engine, and modify one existing reciprocating internal combustion compressor engine. The new equipment will be installed at the existing Compressor Station No. 14, which is located at Route 3, Box 3390, on Highway 65 South near Quincy in Gadsden County, Florida.

The Department has permitting jurisdiction under the provisions of Chapter 403 of the Florida Statutes (F.S.), and Chapters 62-4, 62-210, and 62-212 of the Florida Administrative Code (F.A.C.). The above actions are not exempt from permitting procedures. The Department has determined that an air construction permit is required to perform proposed work. The Department intends to issue this air construction permit based on the belief that the applicant has provided reasonable assurances to indicate that operation of these emission units will not adversely impact air quality, and the emission units will comply with all appropriate provisions of Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297, F.A.C.

Pursuant to Section 403.815, F.S., and Rule 62-110.106(7)(a)1, F.A.C., you (the applicant) are required to publish at your own expense the enclosed Public Notice of Intent to Issue Air Construction Permit. The notice shall be published one time only in the legal advertisement section of a newspaper of general circulation in the area affected. Rule 62-110.106(7)(b), F.A.C., requires that the applicant cause the notice to be published as soon as possible after notification by the Department of its intended action. For the purpose of these rules, "publication in a newspaper of general circulation in the area affected" means publication in a newspaper meeting the requirements of Sections 50.011 and 50.031, F.S., in the county where the activity is to take place. If you are uncertain that a newspaper meets these requirements, please contact the Department at the address or telephone number listed below. The applicant shall provide proof of publication to the Department's Bureau of Air Regulation, at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, Florida 32399-2400 (Telephone: 850/488-0114, Fax: 850/ 922-6979). You must provide proof of publication within seven days of publication, pursuant to Rule 62-110.106(5), F.A.C. No permitting action for which published notice is required shall be granted until proof of publication of notice is made by furnishing a uniform affidavit in substantially the form prescribed in Section 50.051, F.S. to the office of the Department issuing the permit. Failure to publish the notice and provide proof of publication may result in the denial of the permit pursuant to Rules 62-110.106(9) and (11), F.A.C.

The Department will issue the final permit with the attached conditions unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions.

The Department will accept written comments concerning the proposed permit issuance action for a period of fourteen (14) days from the date of publication of Public Notice of Intent to Issue Air Permit. Written comments should be provided to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit and require, if applicable, another Public Notice.

The Department will issue the permit with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to Sections 120.569 and 120.57 F.S., before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57, F.S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900

Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen (14) days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to written notice under Section 120.60(3), F.S. must be filed within fourteen (14) days of publication of the public notice or within fourteen (14) days of receipt of this notice of intent, whichever occurs first. Under Section 120.60(3), F.S. however, any person who asked the Department for notice of agency action may file a petition within fourteen (14) days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action; (f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action; and (g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the agency to take with respect to the agency's proposed action.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301, F.A.C.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

In addition to the above, a person subject to regulation has a right to apply for a variance from or waiver of the requirements of particular rules, on certain conditions, under Section 120.542, F.S. The relief provided by this state statute applies only to state rules, not statutes, and not to any federal regulatory requirements. Mediation is not available in this proceeding. Applying for a variance or waiver does not substitute or extend the time for filing a petition for an administrative hearing or exercising any other right that a person may have in relation to the action proposed in this notice of intent.

The application for a variance or waiver is made by filing a petition with the Office of General Counsel of the Department, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000. The petition must specify the following information: (a) The name, address, and telephone number of the petitioner; (b) The name, address, and telephone number of the attorney or qualified representative of the petitioner, if any; (c) Each rule or portion of a rule from which a variance or waiver is requested; (d) The citation to the statute underlying (implemented by) the rule identified in (c) above; (e) The type of action requested; (f) The specific facts that would justify a variance or waiver for the petitioner; (g) The reason why the variance or waiver would serve the purposes of the underlying statute (implemented by the rule); and (h) A statement whether the variance or waiver is permanent or temporary and, if temporary, a statement of the dates showing the duration of the variance or waiver requested.

The Department will grant a variance or waiver when the petition demonstrates both that the application of the rule would create a substantial hardship or violate principles of fairness, as each of those terms is defined in Section

120.542(2), F.S., and that the purpose of the underlying statute will be or has been achieved by other means by the petitioner.

Persons subject to regulation pursuant to any federally delegated or approved air program should be aware that Florida is specifically not authorized to issue variances or waivers from any requirements of any such federally delegated or approved program. The requirements of the program remain fully enforceable by the Administrator of the EPA and by any person under the Clean Air Act unless and until the Administrator separately approves any variance or waiver in accordance with the procedures of the federal program.

Executed in Tallahassee, Florida.

, P.E.

for C. H. Fancy, P.E., Chief
Bureau of Air Regulation

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this Intent to Issue Air Construction Permit package (including the Public Notice of Intent to Issue Air Construction Permit, Technical Evaluation and Preliminary Determination, and the Draft Permit) was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 7/20/01 to the person(s) listed:

Mr. Danny Pribble, FGT*
Mr. Jim Thompson, FGT
Mr. Kevin McGlynn, McGlynn Consulting Co.
Mr. V. Duane Pierce, AQMcs
Ms. Sandra Veazey, NWD
Greg Worley, EPA Region 4

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to §120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Charlotte J. Hayes 7/20/01
(Clerk) (Date)

PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Draft Air Permit No. 0390029-003-AC

Florida Gas Transmission Company
Gadsden Compressor Station No. 14
Phase V Modifications

The Department of Environmental Protection (Department) gives notice of its intent to issue an air construction permit to the Florida Gas Transmission Company to construct a new 15,700 bhp gas turbine compressor engine, up-rate an existing gas turbine compressor engine to 13,000 bhp, and modify one existing reciprocating internal combustion compressor engine. The new equipment will be installed at the existing Compressor Station No. 14, which is located at Route 3, Box 3390, on Highway 65 South near Quincy in Gadsden County, Florida. The proposed project is part of the Florida Gas Transmission Company's overall Phase V Expansion Project intended to increase the supply of natural gas to Florida. The applicant's authorized representative is Mr. Danny Pribble, Vice President of Operations. The applicant's mailing address is Florida Gas Transmission Company, 1400 Smith Street, Houston, TX 77002.

The addition of a new 15,700 bhp gas turbine compressor engine and the up-rating of an existing gas turbine compressor engine will result in potential emission increases. However, modifications to an existing reciprocating internal combustion compressor engine will result in emissions decreases of carbon monoxide and nitrogen oxides. Each engine turbocharger will be physically modified to increase the air manifold pressure and airflow to each cylinder. This will increase in the air-to-fuel mixture with a corresponding decrease in the cylinder temperatures. The decreased temperatures result in lower NOx emissions. Each control system will then be readjusted to include the new engine performance parameters and operating set points. In addition, a new silencer/oxidation catalyst will be installed on the modified engine to reduce emissions of carbon monoxide and volatile organic compounds.

Because potential emissions of at least one regulated pollutant exceed 250 tons per year, the existing facility is classified as a major source of air pollution with respect to Rule 62-212.400, F.A.C, the Prevention of Significant Deterioration (PSD) of Air Quality. The existing station is in an area that is in attainment (or designated as unclassifiable) for all air pollutants subject to a National Ambient Air Quality Standard (NAAQS). Therefore, the new project is subject to a PSD applicability review. The proposed project will result in the following net emissions increases: 94 tons of carbon monoxide per year; 34 tons of nitrogen oxides per year; 7 tons of particulate matter per year; 31 tons of sulfur dioxide per year; and 5 tons of volatile organic compounds per year. Therefore, this project is not subject to PSD preconstruction review because the net emissions increases from the project are less than each of the corresponding PSD significant emissions rates.

The Department will issue the Final Permit with the attached conditions unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions. The Department will accept written comments concerning the proposed permit issuance action for a period of fourteen (14) days from the date of publication of this Public Notice of Intent to Issue Air Construction Permit. Written comments should be provided to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit and require, if applicable, another Public Notice.

The Department will issue the permit with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to Sections 120.569 and 120.57, F.S., before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below. Mediation is not available in this proceeding.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57, F.S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen (14) days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to written notice under Section 120.60(3), F.S. must be filed within fourteen (14) days of publication of the public notice or within fourteen (14) days of receipt of this notice of intent, whichever occurs first. Under Section 120.60(3), F.S., however, any person who asked the Department for notice of agency action may file a petition within fourteen (14) days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action; (f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action; and (g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the agency to take with respect to the agency's proposed action.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301, F.A.C.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

A complete project file is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Department of Environmental Protection
Bureau of Air Regulation
(111 S. Magnolia Drive, Suite 4)
2600 Blair Stone Road, MS #5505
Tallahassee, Florida, 32399-2400
Telephone: 850/488-0114
Fax: 850/922-6979

Department of Environmental Protection
Northwest District Office
Air Resources Section
160 Governmental Center
Pensacola, FL 32501-5794
Telephone: 850/595-8300
Fax: 850/595-4417

The complete project file includes the application, Technical Evaluation and Preliminary Determination, Draft Permit, and the information submitted by the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the Department's reviewing engineer for this project for additional information at the address and phone numbers listed above.

NOTICE TO BE PUBLISHED IN THE NEWSPAPER

TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

PROJECT

Draft Air Construction Permit No. 0390029-003-AC
Phase V Compressor Station Modifications

COUNTY

Gadsden County

APPLICANT

Florida Gas Transmission Company
ARMS Facility ID No. 0390029
Existing Gadsden Compressor Station No. 14

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation
New Source Review Section

July 19, 2001

{Filename: FTG 14V TEPD.DOC}

1. GENERAL PROJECT INFORMATION

1.1 Applicant Name and Address

Florida Gas Transmission Company
P.O. Box 1188
Houston, TX 77251

Authorized Representative:
Danny Pribble, V.P. of Operations

1.2 Processing Schedule

03-26-01 Received the application for a minor source air pollution construction permit.

04-18-01 Department requested additional information.

05-14-01 Department received additional information; application complete.

1.3 Facility Description and Location

Florida Gas Transmission Company operates the existing facility as a compressor station for the natural gas pipeline serving Florida. Compressor Station No. 14 is located at Route 3, Box 3390, on Highway 65 South near Quincy in Gadsden County, Florida. Upon completion of the proposed project, the compressor station will consist of five 2000 bhp reciprocating compressor engines, one 2700 bhp reciprocating compressor engine, one 13,000 bhp gas turbine compressor engine, one 15,700 bhp gas turbine compressor engine, and miscellaneous support equipment. The UTM coordinates are Zone 16, 719.97 km East, and 3377.39 km North. This site is in an area that is in attainment (or designated as unclassifiable) for all air pollutants subject to a National Ambient Air Quality Standard (NAAQS).

1.4 Standard Industrial Classification Code (SIC)

SIC No. 4922 – Natural Gas Transmission

1.5 Regulatory Categories

Title III: The existing facility is identified as a potential major source of hazardous air pollutants (HAP).

Title IV: The facility has no units subject to the acid rain provisions of the Clean Air Act.

Title V: The facility is a Title V major source of air pollution because potential emissions of at least one regulated pollutant exceed 100 tons per year. Regulated pollutants include pollutants such as carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter (PM/PM_{10}), sulfur dioxide (SO_2), and volatile organic compounds (VOC).

PSD: Because potential emissions are greater than 250 tons per year for at least one regulated air pollutant, the facility is a major source of air pollution in accordance with the requirements of the Prevention of Significant Deterioration (PSD) of Air Quality Program (Rule 62-212.400, F.A.C.). Projects resulting in net emissions increases greater than the Significant Emissions Rates specified in Table 62-212.400-2, F.A.C. are subject to the PSD new source preconstruction review requirements.

NSPS: The new gas turbine and up-rated gas turbine are subject to the New Source Performance Standards in 40 CFR 60, Subpart GG.

1.6 Project Description

The existing facility serves as a compressor station for the natural gas pipeline serving Florida. It consists of three 2000 bhp reciprocating compressor engines installed in 1958, one 2000 bhp reciprocating compressor engine installed in 1966, one 2000 bhp reciprocating compressor engine installed in 1968, one 2700 bhp reciprocating compressor engine installed in 1991 (subject to PSD), one 10,350 bhp gas turbine compressor engine installed in February of 2001, and miscellaneous support equipment. The applicant proposes the following project:

- Modify one existing reciprocating internal combustion compressor engine (FGT No. 1404). The engine turbocharger will be physically modified to increase the air manifold pressure and airflow to each cylinder. This will increase in the air-to-fuel mixture with a corresponding decrease in the cylinder temperatures. The decreased temperatures result in lower NOx emissions. Also, the control system will be readjusted to include the new engine performance parameters and operating set points. To control CO and VOC emissions, a new silencer/oxidation catalyst will be installed on the modified engine.
- Up-rate the 10,350 bhp gas turbine compressor engine (FGT No. 1407) installed in February of 2001 to 13,000 bhp (Phase IV). This unit employs dry low-NOx combustion technology to minimize NOx emissions.
- Install a new 15,700 bhp gas turbine compressor engine (FGT No. 1408) with dry low-NOx combustion technology. The applicant requests the following restricted operating schedule for this unit: 876 hours per year for operation between 50% and 60% of base load; 1314 hours per year for operation between 60% and 90% of base load; and 6570 hours per year for operation between 90% and 100% of base load.

All units fire natural gas exclusively. A new compressor building will be constructed to house the new gas turbine compressor engine.

2. APPLICABLE REGULATIONS

2.1 State Regulations

This project is subject to the applicable environmental laws specified in Section 403 of the Florida Statutes (F.S.). The Florida Statutes authorize the Department of Environmental Protection to establish rules and regulations regarding air quality as part of the Florida Administrative Code (F.A.C.). This project is subject to the applicable rules and regulations defined in the following Chapters of the Florida Administrative Code.

Chapter	Description
62-4	Permitting Requirements
62-204	Ambient Air Quality Requirements, PSD Increments, and Federal Regulations Adopted by Reference
62-210	Required Permits, Public Notice and Comments, Reports, Stack Height Policy, Circumvention, Excess Emissions, Forms and Instructions,
62-212	Preconstruction Review, PSD Requirements, and BACT Determinations
62-213	Operation Permits for Major Sources of Air Pollution
62-296	Emission Limiting Standards
62-297	Test Methods and Procedures, Continuous Monitoring Specifications, and Alternate Sampling Procedures

2.2 Federal Regulations

This project is also subject to the applicable federal provisions regarding air quality as established by the EPA in the following sections of the Code of Federal Regulations (CFR).

Title 40, CFR	Description
Part 60	Subpart A - General Provisions for NSPS Sources
	NSPS Subpart GG - Stationary Gas Turbines
	Applicable Appendices

2.3 General PSD Applicability

The Department regulates major air pollution sources in accordance with Florida's Prevention of Significant Deterioration (PSD) program, as approved by the EPA in Florida's State Implementation Plan and defined in Rule 62-212.400, F.A.C. A PSD review is required only in areas currently in attainment with the National Ambient Air Quality Standard (AAQS) or areas designated as "unclassifiable" for a given pollutant. A new facility is considered "major" with respect to PSD if it emits or has the potential to emit:

- 250 tons per year or more of any regulated air pollutant, or
- 100 tons per year or more of any regulated air pollutant and the facility belongs to one of the 28 PSD Major Facility Categories (Table 62-212.400-1, F.A.C.), or
- 5 tons per year of lead.

For new projects at PSD-major sources, each regulated pollutant is reviewed for PSD applicability based on emissions thresholds known as the Significant Emission Rates listed in Table 62-212.400-2, F.A.C. Pollutant emissions from the project exceeding these rates are considered "significant" and the applicant must employ the Best Available Control Technology (BACT) to minimize emissions of each such pollutant and evaluate the air quality impacts. Although a facility may be "major" with respect to PSD for only one regulated pollutant, it may be required to install BACT controls for several "significant" regulated pollutants

2.4 PSD Applicability for Project

The proposed project is located in Gadsden County, an area that is in attainment (or designated as unclassifiable) for all air pollutants subject to a National Ambient Air Quality Standard (NAAQS). As previously discussed, the facility is an existing PSD-major source and is subject to the new source preconstruction review requirements. Potential NOx emissions from the addition of the new gas turbine (FGT No. 1408) and the up-rated gas turbine (FGT No. 1407) exceed the PSD significant emissions rate of 40 tons per year. Therefore, the applicant proposed modifications to an existing compressor engine (FGT No. 1404) to secure a NOx emission decrease that would allow the project to remain minor with respect to PSD. Because the engine modifications would result in increased CO emissions, the applicant also proposes to install a new silencer/oxidation catalyst on the engine. The following table summarizes PSD applicability for this project based on the applicant's requested restrictions and the conditions of the draft permit.

Table 1A. Potential Emissions (Tons Per Year) and PSD Applicability

Pollutant	Future Potential Emissions (TPY) [a]	Past Actual Emissions (TPY) [b]	Net Emissions Increase (TPY)	Significant Emissions Rate (TPY)	Subject To PSD?
CO	108	14	94	100	No
NOx	284	250	34	40	No
PM/PM_{10}	8	1	7	25/15	No
SO_2	32	1	31	40	No
VOC	6	1	5	40	No

[a] Potential emissions include the modified reciprocating compressor engine (FGT No. 1404), the up-rated gas turbine (FGT No. 1407), and the new gas turbine (FGT No. 1408). Annual emissions are based on the permitted capacity of each unit, the proposed emissions standards, and the operational restrictions requested by the applicant. The Department's analysis did not consider emissions from the 637 bhp emergency generator (FGT GEN03) that were permitted during the Phase IV modifications to replace two 200 bhp emergency generators. Pursuant to Rule 62-210.300(3)(a)20, F.A.C., all such units are considered categorically exempt from air permitting requirements if fuel consumption is less than 4.4 million standard cubic feet per year of natural gas. {Note: Actual emissions are not useful for such an analysis because these generators are used only in

emergencies to provide backup electrical power. Potential emissions would be based on the rule limit of "4.4 million standard cubic feet per year of natural gas".}

[b] The past actual emissions of the modified reciprocating compressor engine (FGT No. 1404) are based on the average hours of operation for 1999 and 2000. Pre-modification emission rates are based on actual engine tests performed on each unit on April 27, 2000. Although installed in February of 2001, the past actual emissions for the up-rated gas turbine (FGT No. 1407) are assumed to be "zero". The applicant estimated VOC emissions from fugitive leaks from new natural gas fuel and pipeline components to be less than 0.5 ton per year.

The Department's full netting analysis and calculations are provided in Attachment A. The analysis included all emissions increases and decreases at the compressor station for the contemporaneous period defined as July 14, 1996 through October 14, 2001. It focused on the actual emissions increases related to the new gas turbine, the up-rated gas turbine, and the modified reciprocating compressor engine. The operating history indicates that operation of the compressor engines at this station have generally increased over the last 5 years. Compressor station operation is directly a function of demand for natural gas placed on the pipeline. FGT Unit No. 1404 and 1405 are typically brought on line before FGT Unit Nos. 1401, 1402, and 1403 because they have larger compressor cylinders and will build compressor spread faster. Also, the older reciprocating units require more attention and maintenance. For these reasons, the Department determines that the project is not likely to increase operation of the other units at the compressor station. In fact, operation of FGT Unit Nos. 1401, 1402, and 1403 are more likely to be substantially reduced after completion of the project.

As shown in Table 1A, potential emissions from the proposed project do not exceed the PSD significant emissions rates. Therefore, the project is not subject to PSD preconstruction review. In addition, the applicant estimates total emissions of hazardous air pollutants (HAP) from the new gas turbines will be about 6 tons per year. This is much less than the HAP thresholds that would trigger a case-by case MACT determination.

3. EMISSIONS STANDARDS

3.1 Brief Discussion of Emissions

Stationary Gas Turbines - The following text is an excerpt from Section 3.1 of EPA's AP-42 emission factor document.

"The primary pollutants from gas turbine engines are nitrogen oxides (NOx), carbon monoxide (CO), and to a lesser extent, volatile organic compounds (VOC). Particulate matter (PM) is also a primary pollutant for gas turbines using liquid fuels. Nitrogen oxide formation is strongly dependent on the high temperatures developed in the combustor. Carbon monoxide, VOC, hazardous air pollutants (HAP), and PM are primarily the result of incomplete combustion. Trace to low amounts of HAP and sulfur dioxide (SO_2) are emitted from gas turbines. Ash and metallic additives in the fuel may also contribute to PM in the exhaust. Oxides of sulfur (SOx) will only appear in a significant quantity if heavy oils are fired in the turbine. Emissions of sulfur compounds, mainly SO_2, are directly related to the sulfur content of the fuel.

Available emissions data indicate that the turbine's operating load has a considerable effect on the resulting emission levels. Gas turbines are typically operated at high loads (greater than or equal to 80 percent of rated capacity) to achieve maximum thermal efficiency and peak combustor zone flame temperatures. With reduced loads (lower than 80 percent), or during periods of frequent load changes, the combustor zone flame temperatures are expected to be lower than the high load temperatures, yielding lower thermal efficiencies and more incomplete combustion ... "

Natural Gas-Fired Reciprocating Engines - The following text is an excerpt is from Section 3.2 of EPA's AP-42 emission factor document.

"The primary criteria pollutants from natural gas-fired reciprocating engines are oxides of nitrogen (NOx), carbon monoxide (CO), and volatile organic compounds (VOC). The formation of nitrogen oxides is exponentially related to combustion temperature in the engine cylinder. The other pollutants, CO and VOC species, are primarily the result of incomplete combustion. Particulate matter (PM) emissions include trace amounts of metals, non-combustible inorganic material, and condensible, semi-volatile organics which result from volatized lubricating oil, engine wear, or from products of incomplete combustion. Sulfur oxides are very low since sulfur compounds are removed from natural gas at processing plants. However, trace amounts of sulfur containing odorant are added to natural gas at city gates prior to distribution for the purpose of leak detection."

3.2 NSPS Subpart GG Requirements

The up-rated and new gas turbines (FGT Nos. 1407 and 1408) are subject to the New Source Performance Standards of Subpart GG in 40 CFR 60, adopted by reference in Rule 62-204.800, F.A.C. This regulation establishes standards for emissions of NOx and SO_2 as well as testing and monitoring requirements. In general, the emissions standards are:

- NOx emissions for FGT No. 1407 ≤ 195 ppmvd corrected to 15% oxygen
- NOx emissions for FGT No. 1408 ≤ 196 ppmvd corrected to 15% oxygen
- SO_2 emissions from both units are limited by only authorizing the firing of fuels that contain 0.8 percent sulfur by weight or less.

Based on the manufacturer's estimated performance, the gas turbine will readily comply with the NSPS requirements. The applicant has requested lower emissions standards for several pollutants that will ensure that the project remains minor with respect to PSD applicability.

3.3 Draft Permit Requirements

The draft permit, issued simultaneously with this report, contains emissions standards and monitoring requirements to ensure that the project remains minor with respect to PSD. In addition, the gas turbines are subject to the applicable New Source Performance Standards of Subpart GG. The following provides a general summary of these requirements.

Modified Reciprocating Internal Combustion Compressor Engine (FGT No. 1404)

The draft permit authorizes physical modification of the engine's turbocharger to increase the air manifold pressure and airflow to each cylinder. This will increase in the air-to-fuel mixture and decrease in the cylinder temperatures. The decreased temperatures result in lower NOx emissions. Also, the control system will be readjusted to include the new engine performance parameters and operating set points. The draft permit establishes a NOx emissions standard for the engine based on the modifications and to ensure that the project remains minor with respect to PSD.

The draft permit requires installation of a new silencer/oxidation catalyst on the modified engine to reduce CO emissions. A CO emission standard is established to ensure that the project remains minor with respect to PSD. According to the vendor, the catalyst has an expected life of 5 to 7 years. Actual in-field use suggests a life expectancy of perhaps 10 years. Potential controlled CO emissions from the engine are very low, approximately 16 tons per year.

Emissions of particulate matter, sulfur dioxide, and volatile organic compounds are all minimized by the efficient combustion of natural gas. Fuel is limited to only pipeline-quality natural gas meeting the FERC limit of 10 grains per 100 SCF of natural gas. As an indicator of overall efficient combustion, the draft permit establishes a visible emissions limit of 10% opacity. The engine shall be tested initially for emissions of CO, NOx, and visible emissions. At least quarterly, a trained engine analyst shall inspect the modified engine, estimate the NOx emissions concentration with a portable analyzer, and adjust engine performance as necessary. The engine shall be tested annually for emissions of NOx and visible emissions.

The engine shall be tested initially for CO emissions and then during the year prior to renewal of the operation permit. No tests are required for particulate matter, sulfur dioxide, or volatile organic compounds.

Up-Rated Gas Turbine Compressor Engine (FGT No. 1407)

The draft permit authorizes the recently installed Solar Model No. Mars 90-T-13000S gas turbine to be up-rated from 10,350 bhp to 13,000 bhp. The unit may operate continuously (8760 hours per year). Except for startup and shutdown, operation below 50% base load is prohibited. Emissions standards are established for CO and NOx to ensure that the project remains minor with respect to PSD. Emissions of particulate matter, sulfur dioxide, and volatile organic compounds are all minimized by the efficient combustion of natural gas. Fuel is limited to only pipeline-quality natural gas meeting the FERC limit of 10 grains per 100 SCF of natural gas. As an indicator of overall efficient combustion, the draft permit establishes a visible emissions limit of 10% opacity. Emissions standards for NOx and SO_2 are much more stringent than the NSPS Subpart GG requirements. Initial and annual tests are required for CO, NOx, and visible emissions. Due to the low emission rates, no tests are required for particulate matter, sulfur dioxide, or volatile organic compounds.

New Gas Turbine Compressor Engine (FGT No. 1408)

The draft permit authorizes installation of the new Pignone Model No. PGT-10B gas turbine as a compressor engine with a capacity of 15,700 bhp. Although the unit may operate continuously (8760 hours per year), low-load operation is restricted to the following levels:

- 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 60% of base load shall not exceed 876 hours during any consecutive 12 months.
- Except for startup and shutdown, operation below 50% base load is prohibited.

Emissions standards are established for CO and NOx to ensure that the project remains minor with respect to PSD. Emissions of particulate matter, sulfur dioxide, and volatile organic compounds are all minimized by the efficient combustion of natural gas. Fuel is limited to only pipeline-quality natural gas meeting the FERC limit of 10 grains per 100 SCF of natural gas. As an indicator of overall efficient combustion, the draft permit establishes a visible emissions limit of 10% opacity. Emissions standards for NOx and SO_2 are much more stringent than the NSPS Subpart GG requirements. Initial and annual tests are required for CO, NOx, and visible emissions. Due to the low emission rates, no tests are required for particulate matter, sulfur dioxide, or volatile organic compounds.

5. PRELIMINARY DETERMINATION

The Department makes a preliminary determination that the proposed project will comply with all applicable state and federal air pollution regulations as conditioned by the draft permit. This determination is based on a technical review of the complete application, reasonable assurances provided by the applicant, and the conditions specified in the draft permit. No air quality modeling analysis is required because the project does not result in a PSD significant increase in emissions. Jeff Koerner is the project engineer responsible for reviewing the application and drafting the permit. Additional details of this analysis may be obtained by contacting the project engineer at the Department's Bureau of Air Regulation at Mail Station #5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.

ATTACHMENT A
FGT Compressor Station No. 14
Phase V Modifications

Future Potential Emissions, Tons Per Year

Pollutant	1404	1407	1408	Leaks	Total
CO	15.50	54.20	38.20	0.00	107.90
NOx	177.70	44.50	61.80	0.00	284.00
PM	0.70	3.20	3.90	0.00	7.80
SO_2	2.00	13.60	16.20	0.00	31.80
VOC	1.90	1.60	2.40	0.37	6.27

Past Actual Emissions, Tons Per Year

Pollutant	1404	1407	1408	Leaks	Total
CO	13.70	0.00	0.00	0.00	13.70
NOx	250.10	0.00	0.00	0.00	250.10
PM	0.50	0.00	0.00	0.00	0.50
SO_2	1.40	0.00	0.00	0.00	1.40
VOC	1.40	0.00	0.00	0.00	1.40

Net Emissions Change for Project, Tons Per Year

Pollutant	Project	SER	PSD?
CO	94.20	100	No
NOx	33.90	40	No
PM	7.30	15	No
SO_2	30.40	40	No
VOC	4.87	40	No

FGT Station No. 14
Phase V Modifications
Modified Engine

Past Actual Emissions

Unit	Pollutant	Emissions Factor	Reference	lb/hour	hour/year	TPY
1404	CO	0.91 g/bhp-hr	Test Data	4.01	6835.5	13.70
	NOx	16.6 g/bhp-hr	Test Data	73.19	6835.5	250.10
	PM	0.00999 lb/mmSCF	AP-42, Table 3.2-2	0.15	6835.5	0.50
	SO_2	10 grains/100 scf	FERC Limit	0.41	6835.5	1.40
	VOC	0.09 g/bhp-hr	Test Data	0.40	6835.5	1.40

Future Potential Emissions

Unit	Pollutant	Emissions Factor	Reference	lb/hour	hour/year	TPY
1404	CO	0.8 g/bhp-hr	Test Data	3.53	8760.0	15.50
	NOx	9.2 g/bhp-hr	Test Data	40.56	8760.0	177.70
	PM	0.00999 lb/mmSCF	AP-42, Table 3.2-2	0.16	8760.0	0.70
	SO_2	10 grains/100 scf	FERC Limit	0.45	8760.0	2.00
	VOC	0.1 g/bhp-hr	Test Data	0.44	8760.0	1.90

FGT Station No. 14
Phase V Modifications
Uprated Gas Turbine

Past Actual Emissions

Unit	Pollutant	Emissions Factor	Reference	lb/hour	hour/year	TPY
1407	CO	NA	NA	0.00	0.00	0.00
	NOx	NA	NA	0.00	0.00	0.00
	PM	NA	NA	0.00	0.00	0.00
	SO_2	NA	NA	0.00	0.00	0.00
	VOC	NA	NA	0.00	0.00	0.00

Note: Although installed in January of 2001, the applicant properly identified past actual emissions as "zero".

Future Potential Emissions

Unit	Pollutant	Emissions Factor	Reference	lb/hour	hour/year	TPY
1407	CO	50 ppmvd @ 15% O2	Vendor Data	12.38	8760.0	54.20
	NOx	25 ppmvd @ 15% O2	Vendor Data	10.17	8760.0	44.50
	PM	0.00999 lb/mmSCF	AP-42, Table 3.1-2a	0.74	8760.0	3.20
	SO_2	10 grains/100 scf	FERC Limit	3.10	8760.0	13.60
	VOC	2.5 ppmvd @ 15% O2	Vendor Data	0.36	8760.0	1.60

Future Potential Emissions

Unit	Pollutant	Emissions Factor	Reference	lb/hour	hour/year	TPY
1408	CO	Total	NA	NA	NA	38.20
	50-60% load	75 ppmvd @ 15% O2	Vendor Data	22.50	876.0	9.90
	60-90% load	55 ppmvd @ 15% O2	Vendor Data	17.34	1314.0	11.40
	90-100% load	15 ppmvd @ 15% O2	Vendor Data	5.14	6570.0	16.90
	NOx	25 ppmvd @ 15% O2	Vendor Data	14.10	8760.0	61.80
	PM	0.0066 lb/mmSCF	AP-42, Table 3.1-2a	0.89	8760.0	3.90
	SO_2	10 grains/100 scf	FERC Limit	3.70	8760.0	16.20
	VOC	Total	NA	NA	NA	2.40
	50-60% load	1.46 lb/hr	Vendor Data	1.46	876.0	0.60
	60-90% load	1.15 lb/hr	Vendor Data	1.15	1314.0	0.80
	90-100% load	0.29 lb/hr	Vendor Data	0.29	6570.0	1.00

FGT Station No. 14
Phase V Modifications
Fugitive Leaks

Future Potential Emissions

	VOC, TPY
Fugitive Equipment Leaks	0.37

Note: The applicant estimated increased VOC emissions due to leaks from new components that will be added as part of the Phase V expansion project. New components include valaves, flanges, pumps, connectors etc. Emissions estimates were based on the EPA publication, "Protocol for Equipment Leak Emission Estimates" (EPA-453/R-95-017, November 1995).

FGT Compressor Station No. 14
Annual Hours of Operation

Unit	1996	1997	1998	1999	2000
1401	3356	5124	4053	5811	5494
1402	3604	4717	3658	5377	5578
1403	4278	5715	4180	5889	6586
1404	4258	5295	3906	6879	6792
1405	4305	5194	5184	6412	6882
1406	5437	6301	5710	7544	7349

DRAFT PERMIT

PERMITTEE:

Florida Gas Transmission Company
1400 Smith Street
Houston, TX 77002

Authorized Representative:
Danny Pribble, V.P. of Operations

Gadsden Compressor Station No. 14
Air Permit No. 0390029-003-AC
Facility ID No. 0390029
SIC No. 4922
Permit Expires: June 1, 2002

PROJECT AND LOCATION

This permit authorizes the construction of a new 15,700 bhp gas turbine compressor engine (No. 1408), the uprating of an existing gas turbine compressor engine (No. 1407) to 13,000 bhp, and modification of one existing reciprocating internal combustion compressor engine (No. 1404). The new equipment will be installed at Compressor Station No. 14, which is at Route 3, Box 3390, on Highway 65 South near Quincy in Gadsden County, Florida. The UTM coordinates are Zone 16, 719.97 km East, and 3377.39 km North.

STATEMENT OF BASIS

This air pollution construction permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.) and Title 40, Part 60 of the Code of Federal Regulations. The permittee is authorized to install the proposed equipment in accordance with the conditions of this permit and as described in the application, approved drawings, plans, and other documents on file with the Department.

CONTENTS

Section 1. General Information
Section 2. Administrative Requirements
Section 3. Emissions Units Specific Conditions
Section 4. Appendices

(DRAFT)

Howard L. Rhodes, Director — (Date)
Division of Air Resources Management

FACILITY AND PROJECT DESCRIPTION

The existing facility operates as a compressor station in Gadsden County for the Florida Gas Transmission Company's natural gas pipeline. The project will add a new 15,700 bhp gas turbine compressor engine (No. 1408), up-rate existing gas turbine compressor engine (No. 1407) to 13,000 bhp, and modify one existing reciprocating internal combustion compressor engine (No. 1404). After the project is complete, the facility will consist of the following emissions units.

ID	Emission Unit Description
004	**FGT No. 1404**: One modified 2000 bhp natural gas-fired reciprocating internal combustion engine (Worthington Model No. SEHG-8) was installed as a compressor engine in 1966.
006	**FGT No. 1406**: One 2700 bhp natural gas-fired reciprocating internal combustion engine (Cooper-Bessemer Model No. GMVR-12C) was installed as a compressor engine in 1991.
007	**FGT Nos. 1401, 1402, 1403, and 1405**: Four 2000 bhp natural gas-fired reciprocating internal combustion engines (Worthington Model No. SEHG-8) installed as compressor engines. FGT Nos. 1401, 1402, and 1403 were installed in 1958 and FGT No. 1405 was installed in 1968.
008	**FGT No. 1407**: One 13,000 bhp gas turbine (Solar Model No. Mars 90-T-13000S) was originally installed as a compressor engine in February 2001 and up-rated later in 2001.
009	**Miscellaneous Unregulated Emissions Units**
010	**FGT No. 1408**: A new 15,700 bhp gas turbine (Nuovo Pignone Model No. PGT-10B) to be installed as a compressor engine in 2001.

{Note: Emissions units 001, 002, 003 and 005 are "inactive".}

REGULATORY CLASSIFICATION

Title III: The existing facility is identified as a potential major source of hazardous air pollutants (HAP).

Title IV: The facility has no units subject to the acid rain provisions of the Clean Air Act.

Title V: Because potential emissions of at least one regulated pollutant exceed 100 tons per year, the facility is a Title V major source of air pollution in accordance with Chapter 213, F.A.C. Regulated pollutants include pollutants such as carbon monoxide (CO), nitrogen oxides (NOx), particulate matter (PM/PM_{10}), sulfur dioxide (SO_2), and volatile organic compounds (VOC).

PSD: The project is located in an area designated as "attainment" or "unclassifiable" for each pollutant subject to a National Ambient Air Quality Standard. Potential emissions of at least one regulated pollutant exceed 250 tons per year. Therefore, the facility is classified as a major source of air pollution with respect to Rule 62-212.400, F.A.C, the Prevention of Significant Deterioration (PSD) of Air Quality. Because the net actual emissions increase from this project do not exceed the PSD Significant Emissions Rates (Table 62-212.400-2), the project is not subject to the PSD preconstruction review requirements.

NSPS: The new gas turbine and the existing gas turbine are subject to the New Source Performance Standards of 40 CFR 60, Subpart GG.

RELEVANT DOCUMENTS

The permit application and additional information received to make it complete are not a part of this permit; however, the information is specifically related to this permitting action and is on file with the Department.

1. Permitting Authority: All documents related to applications for permits to construct or modify emissions units regulated by this permit shall be submitted to the Bureau of Air Regulation of the Florida Department of Environmental Protection (DEP) at 2600 Blair Stone Road (MS #5505), Tallahassee, Florida 32399-2400. All documents related to applications for permits to operate an emissions unit shall be submitted to the Department's Northwest District Office at 160 Governmental Center, Pensacola, Florida 32501-5794 and phone number 850/595-8364.

2. Compliance Authority: All documents related to compliance activities such as reports, tests, and notifications shall be submitted to the Department's Northwest District Office at 160 Governmental Center, Pensacola, Florida 32501-5794 and phone number 850/595-8364.

3. Appendices: The following Appendices are attached as part of this permit.
   - Appendix CF: Citation Format
   - Appendix FM: Custom Fuel Monitoring Plan for Gas Turbines Subject to NSPS Subpart GG
   - Appendix GC: General Conditions [Rule 62-4.160, F.A.C.]
   - Appendix GG: NSPS Subpart GG Requirements for Gas Turbines
   - Appendix SC: Standard Conditions [applicable requirements from Chapters 62-4, 62-210, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.).]

4. Applicable Regulations, Forms and Application Procedures: Unless otherwise indicated in this permit, the construction and operation of the subject emissions unit shall be in accordance with the capacities and specifications stated in the application. The facility is subject to all applicable provisions of: Chapter 403 of the Florida Statutes (F.S.); Chapters 62-4, 62-204, 62-210, 62-212, 62-213, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.); and Title 40, Part 60 of the Code of Federal Regulations (CFR), adopted by reference in Rule 62-204.800, F.A.C. The terms used in this permit have specific meanings as defined in the applicable chapters of the Florida Administrative Code. The permittee shall use the applicable forms listed in Rule 62-210.900, F.A.C. and follow the application procedures in Chapter 62-4, F.A.C. Issuance of this permit does not relieve the permittee from compliance with any applicable federal, state, or local permitting or regulations. [Rules 62-204.800, 62-210.300 and 62-210.900, F.A.C.]

5. New or Additional Conditions: For good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions, and on application of the permittee, the Department may grant additional time. [Rule 62-4.080, F.A.C.]

6. Modifications: The permittee shall notify the Compliance Authority upon commencement of construction. No emissions unit or facility subject to this permit shall be constructed or modified without obtaining an air construction permit from the Department. Such permit shall be obtained prior to beginning construction or modification. [Rules 62-210.300(1) and 62-212.300(1)(a), F.A.C.]

7. Title V Permit: This permit authorizes construction of the permitted emissions units and initial operation to determine compliance with Department rules. A Title V operation permit is required for regular operation of the permitted emissions unit. The permittee shall apply for a Title V operation permit at least 90 days prior to expiration of this permit, but no later than 180 days after commencing operation. To apply for a Title V operation permit, the applicant shall submit the appropriate application form, compliance test results, and such additional information as the Department may by law require. The application shall be submitted to the Department's Bureau of Air Regulation, and copies to each Compliance Authority. [Rules 62-4.030, 62-4.050, 62-4.220, and Chapter 62-213, F.A.C.]

A. EU-004: FGT No. 1404, Modified Reciprocating Compressor Engine

This section of the permit addresses the following modified emissions units.

Emissions Unit No. 004 (FGT No. 1404) **Modified Reciprocating Compressor Engine**
Description: The modified reciprocating internal combustion engine is a Worthington Model No. SEHG-8 that is used as a compressor engine for the natural gas pipeline. Engine No. 1404 was installed in 1966. *Fuel*: The engine fires pipeline-quality natural gas (SCC No 2-02-002-54). The maximum natural gas firing rate is approximately 15,900 cubic feet per hour based on a heat content of 1040 BTU per SCF of gas. *Capacity*: At 16.5 mmBTU per hour of heat input, each engine produces approximately 2000 bhp. After initial startup, the engine is intended to operate at or near capacity. *Controls*: The efficient combustion of pipeline-quality natural gas at high temperatures minimizes emissions of PM/PM_{10}, SO_2, and VOC. A catalytic converter reduces emissions of CO and VOC. Modifications to the engine turbocharger increase the air manifold pressure and airflow to each cylinder, which reduces NOx emissions. *Stack Parameters*: When operating at capacity, exhaust gases exit a 28 feet tall stack that is 1.44 feet in diameter with a flow rate of approximately 11,600 acfm at 700° F.

{Permitting Note: The existing natural gas compressor station is a major source with respect to the PSD preconstruction review program. The compressor engine was installed prior to implementation of the PSD program. However, specific modifications are being made in this project to obtain actual emissions decreases for use in a netting analysis that shows the total project to be minor with respect PSD. Therefore, the control systems, fuel specifications, operational restrictions, emissions standards, monitoring provisions, and reporting requirements of this section are established in accordance with Rule 62-212.400, F.A.C.}

EQUIPMENT

1. Engine Turbocharger Modifications: The permittee is authorized to physically modify the turbocharger of the reciprocating compressor engine in order to increase the air manifold pressure and airflow to each cylinder. The purpose of this modification is to increase the air-to-fuel mixture and decrease the cylinder temperatures, which will result in lower NOx emissions. Each control system shall be readjusted to include the new engine performance parameters and operating set points. The permittee shall tune, maintain, and operate the modified engine and control system to preserve the reduced NOx emissions. [Applicant Request]

PERFORMANCE RESTRICTIONS

2. Permitted Capacity: The maximum heat input rate to the modified reciprocating compressor engine shall not exceed 16.5 mmBTU per hour while producing approximately 2000 bhp based on a higher heating value (HHV) of 1040 BTU per SCF for natural gas. [Rule 62-210.200(PTE), F.A.C.]

3. Authorized Fuel: The modified reciprocating compressor engine shall fire only pipeline-quality natural gas with a maximum of 10 grains of sulfur per 100 standard cubic feet of natural gas. The custom fuel monitoring plan for the gas turbines (FGT Unit Nos. 1407 and 1408) shall serve as the compliance demonstration for the fuel sulfur limit. [Applicant Request; Rule 62-210.200(PTE), F.A.C.]

4. Restricted Operation: The hours of operation of the modified reciprocating compressor engine are not limited (8760 hours per year). [Rules 62-4.070(3) and 62-210.200(PTE), F.A.C.]

EMISSIONS STANDARDS

5. Emissions Standards: Emissions from the modified reciprocating compressor engine shall not exceed the following limits for carbon monoxide (CO), nitrogen oxides (NOx), opacity, particulate matter (PM), sulfur dioxide (SO_2), and volatile organic compounds (VOC).

Pollutant	Standards	Equivalent Maximum Emissions [f]		Rule Basis [g]
		lb/hour	TPY	
CO [a]	0.8 gram/bhp-hour	3.5	15.33	Avoid Rule 62-212.400, F.A.C.
NOx [b]	9.2 gram/bhp-hour	40.6	177.83	Avoid Rule 62-212.400, F.A.C.
SO_2 [c]	10 grains of sulfur per 100 SCF of gas	0.5	2.19	Avoid Rule 62-212.400, F.A.C.
Opacity [d]	10% opacity, 6-minute average	Not Applicable		Avoid Rule 62-212.400, F.A.C.
PM [e]	Good combustion practices (Factor: 0.00999 lb/mmBTU)	0.2	0.88	Avoid Rule 62-212.400, F.A.C.
VOC [e]	Good combustion practices (Factor: 0.1 gram/bhp-hour)	0.4	1.75	Avoid Rule 62-212.400, F.A.C.

a. The CO standards are based on a 3-hour test average as determined by EPA Method 10.

b. The NOx standards are based on a 3-hour test averages as determined EPA Method 7E.

c. The fuel sulfur specification is based on the maximum limit specified by Federal Energy Regulatory Commission (FERC) and effectively limits the potential SO_2 emissions. Expected fuel sulfur levels are less than 1 grain per 100 SCF of natural gas from the pipeline. Compliance by record keeping.

d. The opacity standard is based on a 6-minute average, as determined by EPA Method 9.

e. For both PM and VOC, the efficient combustion of clean fuels is indicated by compliance with opacity and CO standards. Equivalent maximum PM emissions are based on data in Table 3.2-2 of AP-42. Equivalent maximum VOC emissions are based on test data. No testing required.

f. Equivalent maximum emissions are based on the maximum expected emissions (or the emissions standard) at permitted capacity and 8760 hours of operation per year.

g. The emissions standards of this permit ensure that the project does not trigger the PSD preconstruction review requirements of Rule 62-212.400, F.A.C.

EMISSIONS PERFORMANCE TESTING

6. Initial Compliance Tests: The modified reciprocating compressor engine shall be tested to demonstrate initial compliance with the emissions standards for CO, NOx, and visible emissions. The initial tests shall be conducted within 60 days after achieving at least 90% of the maximum permitted capacity, but not later than 180 days after initial operation of the modified engine. CO and NOx performance tests shall be conducted concurrently at permitted capacity. SO_2 emissions shall be calculated based on fuel flow and vendor analysis of fuel sulfur content. [Rule 62-297.310(7)(a)1, F.A.C.]

7. Annual Compliance Tests: During each federal fiscal year (October 1st to September 30th), the modified reciprocating compressor engine shall be tested to demonstrate compliance with the emissions standards for

NOx and visible emissions. SO_2 emissions shall be calculated based on fuel flow and vendor analysis of fuel sulfur content. [Rule and 62-297.310(7)(a)4, F.A.C. and to avoid Rule 62-212.400, F.A.C.]

8. Tests Prior to Renewal: Within the 12-month period prior to expiration of the operation permit, the modified reciprocating compressor engine shall be tested to demonstrate compliance with the emission standards for CO, NOx, and visible emissions. CO and NOx performance tests shall be conducted concurrently at permitted capacity. SO_2 emissions shall be calculated based on fuel flow and vendor analysis of fuel sulfur content. [Rule 62-297.310(7)(a)3, F.A.C.]

9. Test Notification: The permittee shall notify the Compliance Authority in writing at least 15 days prior to any required tests. [Rule 62-297.310(7)(a)9, F.A.C.]

10. Test Methods: Required tests shall be performed in accordance with the following reference methods.

Method	Description of Method and Comments
1-4	Traverse Points, Velocity and Flow Rate, Gas Analysis, and Moisture Content
7E	Determination of Nitrogen Oxide Emissions from Stationary Sources
9	Visual Determination of the Opacity of Emissions from Stationary Sources
10	Determination of Carbon Monoxide Emissions from Stationary Sources {Note: The method shall be based on a continuous sampling train.}
19	Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide, and Nitrogen Oxides Emission Rates (Optional F-factor method may be used to determine flow rate and gas analysis to calculate mass emissions in lieu of Methods 1-4.)

Tests shall also be conducted in accordance with the requirements specified in Section 4, Appendix SC of this permit. The above methods are described in 40 CFR 60, Appendix A, and adopted by reference in Rule 62-204.800, F.A.C. No other methods may be used for compliance testing unless prior written approval is received from the administrator of the Department's Emissions Monitoring Section in accordance with an alternate sampling procedure pursuant to 62-297.620, F.A.C. [Rules 62-204.800 and 62-297.100, F.A.C.; 40 CFR 60, Appendix A]

RECORDS AND REPORTS

11. Test Reports: The permittee shall prepare and submit reports for all required tests in accordance with the requirements specified in Section 4, Appendix SC of this permit. For each test run, the report shall also indicate the natural gas firing rate (cubic feet per hour), heat input rate (mmBTU per hour), and the power output (bhp). [Rule 62-297.310(8), F.A.C.]

12. Operational Data: The permittee shall adequately monitor the fuel consumption rate and hours of operation for use in submittal of the required Annual Operating Report. At least once per calendar quarter, a trained engine analyst shall inspect each modified engine, estimate the exhaust NOx concentration with a portable analyzer, and adjust engine performance as necessary. These inspections shall be recorded in a permanent log and made available for inspection upon request of the Department. [Rule 62-4.070(3), F.A.C.]

B. EU-008: FGT No. 1407, Up-Rated Gas Turbine Compressor Engine

This section of the permit addresses the following modified emissions unit.

Emissions Unit No. 008 (FGT No. 1407): Up-Rated Gas Turbine Compressor Engine
Description: The up-rated 13,000 bhp gas turbine is a Solar Model No. Mars 90-T-13000S that is used as a compressor engine for the natural gas pipeline. Engine No. 1407 was originally installed in early 2001.
Fuel: The gas turbine fires pipeline-quality natural gas (SCC No 2-02-002-01). The maximum natural gas firing rate is approximately 108,470 cubic feet per hour based on a heat content of 1040 BTU per SCF of gas.
Capacity: At 112.8 mmBTU per hour of heat input, the gas turbine produces approximately 13,000 bhp. After initial startup, the gas turbine is intended to operate at or near capacity.
Controls: The efficient combustion of pipeline-quality natural gas at high temperatures minimizes emissions of CO, PM/PM_{10}, SO_2, and VOC. NOx emissions are reduced with dry low-NOx combustion technology.
Stack Parameters: When operating at capacity, exhaust gases exit a rectangular stack (7.5 feet by 8 feet) that is 58 feet tall with a flow rate of approximately 179,500 acfm at 870° F.

{<u>Permitting Note</u>: The existing natural gas compressor station is a major source with respect to the PSD preconstruction review program. The project includes up-rating the existing gas turbine (FGT No. 1407) installed in early 2001. As such, it is part of the netting analysis that shows the project to be minor with respect to PSD. Therefore, the control systems, fuel specifications, operational restrictions, emissions standards, monitoring provisions, and reporting requirements of this section are established in accordance with Rule 62-212.400, F.A.C.}

APPLICABLE STANDARDS AND REGULATIONS

1. <u>NSPS Requirements</u>: The gas turbine shall comply with the New Source Performance Standards (NSPS) of Subpart GG in 40 CFR 60. The applicable NSPS requirements are provided in Appendix GG of this permit. The Department determines that the conditions in this section are at least as stringent, or more stringent than, the NSPS requirements of Subpart GG. [Rule 62-4.070(3), F.A.C.; 40 CFR 60, Subpart GG]

EQUIPMENT

2. <u>Up-Rated Gas Turbine (FGT No. 1407)</u>: The permittee is authorized to up-rate the recently installed Solar Model No. Mars 90-T-13000S gas turbine from 10,350 bhp to 13,000 bhp. The permittee shall tune, operate and maintain the gas turbine's dry low-NOx combustion system to reduce emissions of nitrogen oxides below the permitted limits. Ancillary equipment includes the automated Solar Turbotronic gas turbine control system, an inlet air filtration system, and a rectangular stack (7.5 feet by 8.0 feet) that is 58 feet tall. [Applicant Request]

PERFORMANCE RESTRICTIONS

3. <u>Permitted Capacities</u>: The maximum heat input rate to the gas turbine shall not exceed 112.8 mmBTU per hour while producing approximately 13,078 bhp based on a compressor inlet air temperature of 59° F, 100% load, and a higher heating value (HHV) of 1040 BTU per SCF for natural gas. Heat input rates will vary depending upon gas turbine characteristics, load, and ambient conditions. For each gas turbine, the permittee shall provide manufacturer's performance curves (or equations) that correct for site conditions to the Permitting and Compliance Authorities within 45 days of completing the initial testing. Performance data shall be adjusted for the appropriate site conditions in accordance with the performance curves and/or equations on file with the Department. [Rule 62-210.200(PTE), F.A.C.]

4. Authorized Fuel: The gas turbine shall fire only pipeline-quality natural gas with a maximum of 10 grains of sulfur per 100 standard cubic feet of natural gas. [Applicant Request; Rule 62-210.200(PTE), F.A.C.]

5. 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 62-4.070(3) and 62-210.200(PTE), F.A.C.]

EMISSIONS STANDARDS

6. Emissions Standards: Emissions from each gas turbine shall not exceed the following limits for carbon monoxide (CO), nitrogen oxides (NOx), opacity, particulate matter (PM), sulfur dioxide (SO_2), and volatile organic compounds (VOC).

Pollutant	Standards	Equivalent Maximum Emissions [f]		Rule Basis [g]
		lb/hour	TPY	
CO [a]	50.0 ppmvd @ 15% O_2	12.4	54.31	Avoid Rule 62-212.400, F.A.C.
NOx [b]	25.0 ppmvd @ 15% O_2	10.2	44.68	Avoid Rule 62-212.400, F.A.C. 40 CFR 60.332
SO_2 [c]	10.0 grains of sulfur per 100 SCF of gas	3.1	13.58	Avoid Rule 62-212.400, F.A.C. 40 CFR 60.332
Opacity [d]	10% opacity, 6-minute average	Not Applicable		Avoid Rule 62-212.400, F.A.C.
PM [e]	Good combustion practices (Factor: 0.00999 lb/mmBTU)	0.7	3.3	Avoid Rule 62-212.400, F.A.C.
VOC [e]	Good combustion practices (Factor: 2.5 ppmvd @ 15% O_2)	0.4	1.75	Avoid Rule 62-212.400, F.A.C.

a. The CO standards are based on a 3-hour test average as determined by EPA Method 10.

b. The NOx standard are based a 3-hour test average as determined EPA Method 20.

c. The fuel sulfur specification is based on the maximum limit specified by Federal Energy Regulatory Commission (FERC) and effectively limits the potential SO_2 emissions. Expected fuel sulfur levels are less than 1 grain per 100 SCF of natural gas from the pipeline.

d. The opacity standard is based on a 6-minute average, as determined by EPA Method 9.

e. For both PM and VOC, the efficient combustion of clean fuels is indicated by compliance with opacity and CO standards. Equivalent maximum PM emissions are based on vendor data. Equivalent maximum VOC emissions were conservatively assumed to be 10% of the vendor's data for total unburned hydrocarbon. No testing required.

f. Equivalent maximum emissions are based on the maximum expected emissions, permitted capacity, a compressor inlet air temperature of 59° F, and 8760 hours of operation per year. For comparison purposes, the permittee shall provide a reference table with the initial compliance test report of mass emission rates versus the compressor inlet temperatures. Each test report shall include measured mass emission rates for CO, NOx and SO_2. Mass emission rates for SO_2 shall be calculated based on actual fuel sulfur content and fuel flow rate. For tests conducted at 59° F or greater, measured mass emission rates shall be compared to the equivalent maximum emissions above. For tests conducted below 59° F, measured mass emission rates shall be compared to the tabled mass emission rates provided by the manufacturer based on compressor inlet temperatures.

g. The emissions standards of this permit ensure that the project does not trigger the PSD preconstruction review requirements of Rule 62-212.400, F.A.C.

EMISSIONS PERFORMANCE TESTING

7. Initial Compliance Tests: The gas turbine shall be tested to demonstrate initial compliance with the emission standards for CO, NOx, and visible emissions. The initial tests shall be conducted within 60 days after achieving at least 90% of the maximum permitted capacity, but not later than 180 days after initial operation of the gas turbine. The initial NOx performance tests shall be conducted at approximately four evenly spaced points between the minimum normal operating load and 100% of peak load. Each of the three low-load NOx performance tests shall consist of three, 20-minute test runs. The peak load NOx performance test shall consist of three, 1-hour test runs. The CO performance tests shall be conducted concurrently with the NOx performance tests at peak load. SO_2 emissions shall be calculated based on fuel flow and vendor analysis of fuel sulfur content. [Rule 62-297.310(7)(a)1, F.A.C.; 40 CFR 60.8 and 60.335]

8. Annual Compliance Tests: During each federal fiscal year (October 1st to September 30th), the gas turbine shall be tested to demonstrate compliance with the emission standards for CO, NOx, and visible emissions. CO and NOx emissions shall be tested concurrently at permitted capacity. SO_2 emissions shall be calculated based on fuel flow and vendor analysis of fuel sulfur content. [Rule and 62-297.310(7)(a)4, F.A.C. and to avoid Rule 62-212.400, F.A.C.]

9. Test Notification: The permittee shall notify the Compliance Authority in writing at least 30 days prior to any initial NSPS performance tests and at least 15 days prior to any other required tests. [Rule 62-297.310(7)(a)9, F.A.C.; 40 CFR 60.7 and, 60.8]

10. Test Methods: Required tests shall be performed in accordance with the following reference methods.

Method	Description of Method and Comments
1-4	Traverse Points, Velocity and Flow Rate, Gas Analysis, and Moisture Content
9	Visual Determination of the Opacity of Emissions from Stationary Sources
10	Determination of Carbon Monoxide Emissions from Stationary Sources {Note: The method shall be based on a continuous sampling train.}
19	Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide, and Nitrogen Oxides Emission Rates (Optional F-factor method may be used to determine flow rate and gas analysis to calculate mass emissions in lieu of Methods 1-4.)
20	Determination of Nitrogen Oxides, Sulfur Dioxide and Diluent Emissions from Gas Turbines

Tests shall also be conducted in accordance with the requirements specified in Section 4, Appendix SC of this permit. The above methods are described in 40 CFR 60, Appendix A, and adopted by reference in Rule 62-204.800, F.A.C. No other methods may be used for compliance testing unless prior written approval is received from the administrator of the Department's Emissions Monitoring Section in accordance with an alternate sampling procedure pursuant to 62-297.620, F.A.C. [Rules 62-204.800 and 62-297.100, F.A.C.; 40 CFR 60, Appendix A]

RECORDS AND REPORTS

11. Test Reports: The permittee shall prepare and submit reports for all required tests in accordance with the requirements specified in Section 4, Appendix SC of this permit. In addition, NOx emissions shall be corrected to ISO ambient atmospheric conditions and compared to the NSPS Subpart GG standard identified in Appendix GG of this permit for each required test. For each run, the test report shall also indicate the natural gas firing rate (cubic feet per hour), heat input rate (mmBTU per hour), the power output (bhp), percent base load, and the inlet compressor temperature. [Rule 62-297.310(8), F.A.C.; 40 CFR 60.332]

12. Custom Fuel Monitoring Schedule: In lieu of the NSPS fuel monitoring requirements of 40 CFR 60.334 of Subpart GG, the Department approves the custom fuel-monitoring schedule specified in Appendix FM of this permit. [Rule 62-4.070(3); 40 CFR 60.334]

13. Operational Data: Using the automated gas turbine control system, the permittee shall monitor and record heat input (mmBTU), power output (bhp), and hours of operation for the gas turbine. 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 contracted 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(3), F.A.C.]

C. EU-010: FGT No. 1408, New Gas Turbine Compressor Engine

This section of the permit addresses the following new emissions unit.

Emissions Unit No. 010 (FGT No. 1408): New Gas Turbine Compressor Engine
Description: The new 15,700 bhp gas turbine is a Pignone Model No. PGT-10B to be used as a compressor engine for the natural gas pipeline. *Fuel*: The gas turbine fires pipeline-quality natural gas (SCC No 2-02-002-01). The maximum natural gas firing rate is approximately 129,600 cubic feet per hour based on a heat content of 1040 BTU per SCF of gas. *Capacity*: At 134.8 mmBTU per hour of heat input, the gas turbine produces approximately 15,700 bhp. After initial startup, the gas turbine is intended to operate between 50% and 100% of base load. *Controls*: The efficient combustion of pipeline-quality natural gas at high temperatures minimizes emissions of carbon monoxide (CO), particulate matter (PM/PM_{10}), sulfur dioxide (SO_2), and volatile organic compounds (VOC). NOx emissions are reduced with dry low-NOx combustion technology. *Stack Parameters*: When operating at capacity, exhaust gases exit a 7.6 feet diameter stack that is 61.5 feet tall with a flow rate of approximately 215,200 acfm at 910° F.

APPLICABLE STANDARDS AND REGULATIONS

{Permitting Note: The existing natural gas compressor station is a major source with respect to the PSD preconstruction review program. The project includes adding a new gas turbine (FGT No. 1408) to increase the compressor station capacity. As such, it is part of the netting analysis that shows the project to be minor with respect to PSD. Therefore, the control systems, fuel specifications, operational restrictions, emissions standards, monitoring provisions, and reporting requirements of this section are established in accordance with Rule 62-212.400, F.A.C.}

1. NSPS Requirements: The new gas turbine shall comply with the New Source Performance Standards (NSPS) of Subpart GG in 40 CFR 60. The applicable NSPS requirements are provided in Appendix GG of this permit. The Department determines that the conditions in this section are at least as stringent, or more stringent than, the NSPS requirements of Subpart GG. [Rule 62-4.070(3), F.A.C.; 40 CFR 60, Subpart GG]

EQUIPMENT

2. New Gas Turbine (FGT No. 1408): The permittee is authorized to install, tune, operate, and maintain a new Pignone Model No. PGT-10B gas turbine to be used as a compressor engine for the natural gas pipeline. The gas turbine design shall incorporate dry low-NOx combustion technology to reduce emissions of nitrogen oxides below the permitted limits. Ancillary equipment includes an automated gas turbine control system, an inlet air filtration system, and a 7.6 feet diameter stack that is 61.5 feet tall. The permittee identifies the new gas turbine compressor engine as FGT No. 1408. [Applicant Request; Design]

PERFORMANCE RESTRICTIONS

3. Permitted Capacity: The maximum heat input rate to the gas turbine shall not exceed 134.8 mmBTU per hour while producing approximately 15,700 bhp based on a compressor inlet air temperature of 59° F, 100% load, and a higher heating value (HHV) of 1040 BTU per SCF for natural gas. Heat input rates will vary depending upon gas turbine characteristics, load, and ambient conditions. The permittee shall provide manufacturer's performance curves (or equations) that correct for site conditions to the Permitting and Compliance Authorities within 45 days of completing the initial compliance testing. Performance data shall be adjusted for the appropriate site conditions in accordance with the performance curves and/or equations on file with the Department. [Rule 62-210.200(PTE), F.A.C.]

4. Authorized Fuel: The gas turbine shall fire only pipeline-quality natural gas with a maximum of 10 grains of sulfur per 100 standard cubic feet of natural gas. [Applicant Request; Rule 62-210.200(PTE), F.A.C.]

5. Restricted 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 60% of base load shall not exceed 876 hours during any consecutive 12 months. [Rules 62-4.070(3) and 62-210.200(PTE), F.A.C.]

EMISSIONS STANDARDS

6. Emissions Standards: Emissions from the gas turbine shall not exceed the following limits for carbon monoxide (CO), nitrogen oxides (NOx), opacity, particulate matter (PM), sulfur dioxide (SO_2), and volatile organic compounds (VOC).

Pollutant	Standards		Equivalent Maximum Emissions[f]		Rule Basis[g]
	Load	Standards	lb/hour	TPY	
CO[a]	90-100%	15.0 ppmvd @ 15% O_2	5.1	37.97	Avoid Rule 62-212.400, F.A.C.
	60-90%	55.0 ppmvd @ 15% O_2	17.3		
	50-60%	75.0 ppmvd @ 15% O_2	22.5		
NOx[b]	50-100%	25.0 ppmvd @ 15% O_2	14.1	61.76	Avoid Rule 62-212.400, F.A.C. 40 CFR 60.332
SO_2[c]	50-100%	10.0 grains of sulfur per 100 SCF of natural gas	3.7	16.21	Avoid Rule 62-212.400, F.A.C. 40 CFR 60.332
Opacity[d]	50-100%	10% opacity, 6-minute average	Not Applicable		Avoid Rule 62-212.400, F.A.C.
PM[e]	50-100%	Good combustion practices	0.9	3.94	Avoid Rule 62-212.400, F.A.C.
VOC[e]	90-100%	Good combustion practices	0.3	2.43	Avoid Rule 62-212.400, F.A.C.
	60-90%	Good combustion practices	1.2		
	50-60%	Good combustion practices	1.5		

a. The CO standards are based on 3-hour test average as determined by EPA Method 10. Annual CO emissions were based on emissions standards and restricted hours of operation.

b. The NOx standards are based 3-hour test average as determined EPA Method 20.

c. The fuel sulfur specification is based on the maximum limit specified by Federal Energy Regulatory Commission (FERC) and effectively limits the potential SO_2 emissions. Expected fuel sulfur levels are less than 1 grain per 100 SCF of natural gas from the pipeline.

d. The opacity standard is based on a 6-minute average, as determined by EPA Method 9.

e. For both PM and VOC, the efficient combustion of clean fuels is indicated by compliance with opacity and CO standards. Equivalent maximum PM emissions are based on data in Table 3.1-2a in AP-42. Equivalent maximum VOC emissions are based on vendor data. Annual VOC emissions were based on the vendor data and restricted hours of operation. No testing required.

f. Equivalent maximum hourly emissions are the maximum expected emissions based on permitted capacity and a compressor inlet air temperature of 59° F. For comparison purposes, the permittee shall provide a reference table with the initial compliance test report of mass emission rates versus the compressor inlet temperatures. Each test report shall include measured mass emission rates for CO, NOx and SO_2. Mass emission rates for SO_2 shall be calculated based on actual fuel sulfur content and fuel flow rate. For tests conducted at 59° F or greater, measured mass emission rates shall be compared to the equivalent maximum emissions above. For tests conducted below 59° F, measured mass emission rates shall be compared to the tabled mass emission rates provided by the manufacturer based on compressor inlet temperatures.

g. Equivalent maximum annual emissions are based on 8760 hours of operation per year.

h. The emissions standards of this permit ensure that the project does not trigger the PSD preconstruction review requirements of Rule 62-212.400, F.A.C.

EMISSIONS PERFORMANCE TESTING

7. Initial Compliance Tests: The gas turbine shall be tested to demonstrate initial compliance with the emission standards for CO, NOx, and visible emissions. The initial tests shall be conducted within 60 days after achieving at least 90% of the maximum permitted capacity, but not later than 180 days after initial operation of the gas turbine. The initial CO and NOx performance tests shall be conducted at approximately four evenly spaced points between the minimum normal operating load and 100% of peak load. Each of the three low-load CO and NOx performance tests shall consist of three, 20-minute test runs. The peak load CO and NOx performance test shall consist of three, 1-hour test runs. The CO performance tests shall be conducted concurrently with the NOx performance tests. SO_2 emissions shall be calculated based on fuel flow and vendor analysis of fuel sulfur content. [Rule 62-297.310(7)(a)1, F.A.C.; 40 CFR 60.8 and 60.335]

8. Annual Compliance Tests: During each federal fiscal year (October 1st to September 30th), the gas turbine shall be tested to demonstrate compliance with the emission standards for CO, NOx, and visible emissions. CO and NOx emissions shall be tested concurrently at permitted capacity. SO_2 emissions shall be calculated based on fuel flow and vendor analysis of fuel sulfur content. [Rule and 62-297.310(7)(a)4, F.A.C. and to avoid Rule 62-212.400, F.A.C.]

9. Test Methods: Required tests shall be performed in accordance with the following reference methods.

Method	Description of Method and Comments
1-4	Traverse Points, Velocity and Flow Rate, Gas Analysis, and Moisture Content
9	Visual Determination of the Opacity of Emissions from Stationary Sources
10	Determination of Carbon Monoxide Emissions from Stationary Sources {Note: The method shall be based on a continuous sampling train.}
19	Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide, and Nitrogen Oxides Emission Rates (Optional F-factor method may be used to determine flow rate and gas analysis to calculate mass emissions in lieu of Methods 1-4.)
20	Determination of Nitrogen Oxides, Sulfur Dioxide and Diluent Emissions from Gas Turbines

Tests shall also be conducted in accordance with the requirements specified in Section 4, Appendix SC of this permit. The above methods are described in 40 CFR 60, Appendix A, and adopted by reference in Rule 62-204.800, F.A.C. No other methods may be used for compliance testing unless prior written approval is received from the administrator of the Department's Emissions Monitoring Section in accordance with an alternate sampling procedure pursuant to 62-297.620, F.A.C. [Rules 62-204.800 and 62-297.100, F.A.C.; 40 CFR 60, Appendix A]

10. Test Notification: The permittee shall notify the Compliance Authority in writing at least 30 days prior to any initial NSPS performance tests and at least 15 days prior to any other required tests. [Rule 62-297.310(7)(a)9, F.A.C.; 40 CFR 60.7 and, 60.8]

RECORDS AND REPORTS

11. Test Reports: The permittee shall prepare and submit reports for all required tests in accordance with the requirements specified in Section 4, Appendix SC of this permit. In addition, NOx emissions shall be corrected to ISO ambient atmospheric conditions and compared to the NSPS Subpart GG standard identified in Appendix GG of this permit for each required test. For each run, the test report shall also indicate the natural gas firing rate (cubic feet per hour), heat input rate (mmBTU per hour), the power output (bhp), percent base load, and the inlet compressor temperature. [Rule 62-297.310(8), F.A.C.; 40 CFR 60.332]

12. Custom Fuel Monitoring Schedule: In lieu of the NSPS fuel monitoring requirements of 40 CFR 60.334 of Subpart GG, the Department approves the custom fuel-monitoring schedule specified in Appendix FM of this permit. [Rule 62-4.070(3); 40 CFR 60.334]

13. Operational Data: Using the automated gas turbine control system, the permittee shall monitor and record heat input (mmBTU), power output (bhp), and hours of gas turbine operation within each of the following load ranges: 50% to 60% load, 60% 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 60% load; hours of gas turbine operation between 60% 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 contracted 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(3), F.A.C.]

D. EU-009: Miscellaneous Unregulated Emissions Units

This permit recognizes the following unregulated emissions units.

Emissions Unit No. 009: Miscellaneous Unregulated Emissions Units	
004	Support equipment includes: • One Caterpillar Model 3412 emergency generator (637 bhp) fired exclusively with natural gas and identified by the permittee as "GEN03"; • Lube oil storage tanks; • Used oil storage tanks; • Blowdown stacks; and • Miscellaneous fugitive emission leaks from valves, flanges, etc.

The emergency generator is exempt from air construction permitting requirements in accordance with the following rule.

Rule 62-210.300, F.A.C. Permits Required.

(3) Exemptions.

(c) Categorical Exemptions

20. One or more emergency generators located within a single facility provided:

a. None of the emergency generators is subject to the Federal Acid Rain Program; and

b. Total fuel consumption by all such emergency generators within the facility is limited to 32,000 gallons per year of diesel fuel, 4,000 gallons per year of gasoline, 4.4 million standard cubic feet per year of natural gas or propane, or an equivalent prorated amount if multiple fuels are used.

SECTION 4. APPENDICES

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Appendix CF. Citation Format

Appendix FM. Custom Fuel Monitoring Plan for NSPS Gas Turbines

Appendix GC. General Conditions

Appendix GG. NSPS Subpart GG Requirements for Gas Turbines

Appendix SC. Standard Conditions

CITATION FORMAT

The following examples illustrate the format used in the permit to identify applicable permitting actions and regulations.

REFERENCES TO PREVIOUS PERMITTING ACTIONS

Old Permit Numbers

Example: Permit No. AC50-123456 or Air Permit No. AO50-123456

Where: "AC" identifies the permit as an Air Construction Permit
"AO" identifies the permit as an Air Operation Permit
"123456" identifies the specific permit project number

New Permit Numbers

Example: Permit Nos. 099-2222-001-AC, 099-2222-001-AF, 099-2222-001-AO, or 099-2222-001-AV

Where: "099" represents the specific county ID number in which the project is located
"2222" represents the specific facility ID number
"001"identifies the specific permit project
"AC" identifies the permit as an air construction permit
"AF" identifies the permit as a minor federally enforceable state operation permit
"AO" identifies the permit as a minor source air operation permit
"AV" identifies the permit as a Title V Major Source Air Operation Permit

PSD Permit Numbers

Example: Permit No. PSD-FL-317

Where: "PSD" means issued pursuant to the Prevention of Significant Deterioration of Air Quality
"FL" means that the permit was issued by the State of Florida
"317" identifies the specific permit project

RULE CITATION FORMATS

Florida Administrative Code (F.A.C.)

Example: [Rule 62-213.205, F.A.C.]

Means: Title 62, Chapter 213, Rule 205 of the Florida Administrative Code

Code of Federal Regulations (CFR)

Example: [40 CRF 60.7]

Means: Title 40, Part 60, Section 7

CUSTOM FUEL MONITORING PLAN FOR NSPS GAS TURBINES

Custom Fuel Monitoring Schedule: The Department approves the following custom fuel-monitoring schedule in lieu of the NSPS fuel monitoring requirements in 40 CFR 60.334 of Subpart GG for the gas turbines affected by this project.

1. Because natural gas is the exclusive fuel for the gas turbine and contains negligible amounts of nitrogen, no monitoring of the fuel nitrogen content is required.
2. Fuel sulfur monitoring shall be performed in accordance with the following requirements:
    a. The natural gas shall be sampled and analyzed for the sulfur content as determined by ASTM methods D4084-82, D3246-81 or more recent versions.
    b. After first fire in the gas turbine, fuel sulfur monitoring shall be conducted at least twice each month. If this monitoring indicates little variability and compliance with the fuel sulfur limit of this permit for a period of six months, monitoring shall be reduced to once each calendar quarter. If this monitoring indicates little variability and compliance with the fuel sulfur limit of this permit for six calendar quarters, monitoring shall be reduced to twice each year (once each during the first and third calendar quarters).
    c. The permittee shall provide written notification to the Compliance Authority prior to reducing the frequency of monitoring in accordance with the above custom schedule. The notification shall include the results of the previous fuel sulfur analyses, the current frequency of monitoring, and the future frequency of monitoring.
3. This custom fuel-monitoring plan shall be reevaluated if there is a change in the fuel supply, a substantial change in the fuel quality, or any required monitoring indicates failure to comply with the fuel sulfur limit of this permit. For such cases, fuel sulfur monitoring shall resume on a weekly basis while the Department reevaluates the monitoring schedule.

[Rule 62-4.070(3); 40 CFR 60.334]

SECTION 4. APPENDIX GC
GENERAL CONDITIONS

The permittee shall comply with the following general conditions from Rule 62-4.160, F.A.C.

1. The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey and vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.

6. The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

   a. Have access to and copy and records that must be kept under the conditions of the permit;
   b. Inspect the facility, equipment, practices, or operations regulated or required under this permit, and,
   c. Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

   Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

   a. A description of and cause of non-compliance; and

   b. The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

   The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida

Statutes. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

10. The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.
11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 62-4.120 and 62-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.
12. This permit or a copy thereof shall be kept at the work site of the permitted activity.
13. This permit also constitutes:
    a. Determination of Best Available Control Technology (NA);
    b. Determination of Prevention of Significant Deterioration (NA); and
    c. Compliance with New Source Performance Standards (X).
14. The permittee shall comply with the following:
    a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.
    b. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application or this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.
    c. Records of monitoring information shall include:
        1) The date, exact place, and time of sampling or measurements;
        2) The person responsible for performing the sampling or measurements;
        3) The dates analyses were performed;
        4) The person responsible for performing the analyses;
        5) The analytical techniques or methods used; and
        6) The results of such analyses.
15. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

NSPS SUBPART GG REQUIREMENTS FOR GAS TURBINES

The following emissions unit is subject to the applicable requirements of Subpart A (General Provisions) and Subpart GG (Stationary Gas Turbines) established as New Source Performance Standards in 40 CFR 60 and adopted by reference in Rule 62-204.800(7)(b), F.A.C.

Emissions Unit 003: FGT Unit No. 1607, Gas Turbine Compressor
Gas turbine is a Cooper-Rolls Model 501-KC7 DLE that will be used as a compressor engine for the natural gas pipeline.

NSPS GENERAL PROVISIONS

The emissions units are subject to the applicable General Provisions of the New Source Performance Standards including 40 CFR 60.7 (Notification and Record Keeping), 40 CFR 60.8 (Performance Tests), 40 CFR 60.11 (Compliance with Standards and Maintenance Requirements), 40 CFR 60.12 (Circumvention), 40 CFR 60.13 (Monitoring Requirements), and 40 CFR 60.19 (General Notification and Reporting Requirements). The General Provisions are not included in this permit, but can be obtained from the Department upon request.

40 CFR 60, SUBPART GG
STANDARDS OF PERFORMANCE FOR STATIONARY GAS TURBINES

{Note: Each gas turbine shall comply with all applicable requirements of 40 CFR 60, Subpart GG adopted by reference in Rule 62-204.800(7)(b), F.A.C. Inapplicable provisions have been deleted in the following conditions, but the numbering of the original rules has been preserved for ease of reference. The term "Administrator" when used in 40 CFR 60 shall mean the Department's Secretary or the Secretary's designee. Department notes and requirements related to the Subpart GG requirements are shown in bold immediately following the section to which they refer. The rule basis for the Department requirements specified below is Rule 62-4.070(3), F.A.C.}

<u>Section 60.330 Applicability and designation of affected facility.</u>

(a) The provisions of this subpart are applicable to the following affected facilities: All stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules per hour (10 million Btu/hour), based on the lower heating value of the fuel fired.

<u>Section 60.331 Definitions.</u>

As used in this subpart, all terms not defined herein shall have the meaning given them in the Act and in subpart A of this part.

(g) ISO standard day conditions means 288 degrees Kelvin, 60 percent relative humidity and 101.3 kilopascals pressure.

(i) Peak load means 100 percent of the manufacturer's design capacity of the gas turbine at ISO standard day conditions.

(j) Base load means the load level at which a gas turbine is normally operated.

<u>Section 60.332 Standard for nitrogen oxides.</u>

(a) On and after the date of the performance test required by Section 60.8 is completed, every owner or operator subject to the provisions of this subpart as specified in paragraphs (c) of this section shall comply with:

(2) No owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any stationary gas turbine, any gases which contain nitrogen oxides in excess of:

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

where:

STD = allowable NOx emissions (percent by volume at 15 percent oxygen and on a dry basis).

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

F = NOx emission allowance for fuel-bound nitrogen as defined in paragraph (a)(3) of this section.

(3) F shall be defined according to the nitrogen content of the fuel as follows:

Fuel-bound nitrogen (percent by weight)	F (NOx percent by volume)
$N \leq 0.015$	0
$0.015 < N \leq 0.1$	0.04(N)
$0.1 < N \leq 0.25$	0.004+0.0067(N–0.1)
$N > 0.25$	0.005

where: N=the nitrogen content of the fuel (percent by weight).

Department requirement: **When firing natural gas, the "F" value shall be assumed to be 0.**

{Note: The "Y" value provided by the manufacturer is approximately 11.4 for natural gas. The equivalent emission standard is 190 ppmvd at 15% oxygen. The emissions standards in Section III of this permit are more stringent than this requirement.}

(c) Stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules per hour (10 million Btu/hour) but less than or equal to 107.2 gigajoules per hour (100 million Btu/hour) based on the lower heating value of the fuel fired, shall comply with the provisions of paragraph (a)(2) of this section.

Section 60.333 Standard for sulfur dioxide.

On and after the date on which the performance test required to be conducted by Section 60.8 is completed, every owner or operator subject to the provision of this subpart shall comply with:

(b) No owner or operator subject to the provisions of this subpart shall burn in any stationary gas turbine any fuel which contains sulfur in excess of 0.8 percent by weight.

Section 60.334 Monitoring of operations.

(b) The owner or operator of any stationary gas turbine subject to the provisions of this subpart shall monitor sulfur content and nitrogen content of the fuel being fired in the turbine. The frequency of determination of these values shall be as follows:

(2) If the turbine is supplied its fuel without intermediate bulk storage the values shall be determined and recorded daily. Owners, operators or fuel vendors may develop custom schedules for determination of the values based on the design and operation of the affected facility and the characteristics of the fuel supply. These custom schedules shall be substantiated with data and must be approved by the Administrator before they can be used to comply with paragraph (b) of this section.

Department requirement: **The requirement to monitor the nitrogen content of pipeline quality natural gas fired is waived because natural gas is the exclusive fuel and contains negligible amounts of nitrogen. For purposes of complying with the sulfur content monitoring requirements of this rule, the permittee shall comply with the custom fuel monitoring schedule specified in the Section 3 of the permit.**

{Note: This is consistent with guidance from EPA Region 4 on custom fuel monitoring.}

(c) For the purpose of reports required under Section 60.7(c), periods of excess emissions that shall be reported are defined as follows:

(1) Nitrogen oxides. Any one-hour period during which the average water-to-fuel ratio, as measured by the continuous monitoring system, falls below the water-to-fuel ratio determined to demonstrate compliance with Section 60.332 by the performance test required in Section 60.8 or any period during which the fuel-bound nitrogen of the fuel is greater than the maximum nitrogen content allowed by the fuel-bound nitrogen allowance used during the performance test required in Section 60.8. Each report shall include the average water-to-fuel

ratio, average fuel consumption, ambient conditions, gas turbine load, and nitrogen content of the fuel during the period of excess emissions, and the graphs or figures developed under Section 60.335(a).

{Note: The excess NOx emissions reporting requirements do not apply. The gas turbine uses dry low-NOx combustion technology and not wet injection to control NOx emissions. Also, NOx emissions due to fuel bound nitrogen are considered negligible because natural gas is the exclusive fuel and contains little nitrogen.}

(2) Sulfur dioxide. Any daily period during which the sulfur content of the fuel being fired in the gas turbine exceeds 0.8 percent.

Department requirement: **In accordance with the custom fuel monitoring schedule, any period between two consecutive fuel sulfur analyses shall be reported as excess emissions if the results of the second analysis indicates failure to comply with the fuel sulfur limit of the permit.**

Section 60.335 Test methods and procedures.

(a) To compute the nitrogen oxides emissions, the owner or operator shall use analytical methods and procedures that are accurate to within 5 percent and are approved by the Administrator to determine the nitrogen content of the fuel being fired.

(b) In conducting the performance tests required in Section 60.8, the owner or operator shall use as reference methods and procedures the test methods in appendix A of this part or other methods and procedures as specified in this section, except as provided for in Section 60.8(b). Acceptable alternative methods and procedures are given in paragraph (f) of this section.

(c) The owner or operator shall determine compliance with the nitrogen oxides and sulfur dioxide standards in Sections 60.332 and 60.333(a) as follows:

(1) The nitrogen oxides emission rate (NOx) shall be computed for each run using the following equation:

$$NOx = (NOxo)\,(Pr/Po)^{0.5}\, e^{19(Ho - 0.00633)}\,(288°K/Ta)^{1.53}$$

where:

NOx^{l}	=	emission rate of NOx at 15 percent O2 and ISO standard ambient conditions, volume percent.
NOxo	=	observed NOx concentration, ppm by volume.
Pr	=	reference combustor inlet absolute pressure at 101.3 kilopascals ambient pressure, mm Hg.
Po	=	observed combustor inlet absolute pressure at test, mm Hg.
Ho	=	observed humidity of ambient air, g H2O/g air.
e	=	transcendental constant, 2.718.
Ta	=	ambient temperature, °K.

Department requirement: **The permittee is required to correct NOx emissions to ISO ambient atmospheric conditions for each required emissions performance test and compare to the NOx standard specified in 40 CFR 60.332.**

(2) The monitoring device of Section 60.334(a) shall be used to determine the fuel consumption and the water-to-fuel ratio necessary to comply with Section 60.332 at 30, 50, 75, and 100 percent of peak load or at four points in the normal operating range of the gas turbine, including the minimum point in the range and peak load. All loads shall be corrected to ISO conditions using the appropriate equations supplied by the manufacturer.

Department requirement: **The initial NOx performance tests shall be conducted at approximately four evenly spaced points between the minimum normal operating load and 100% of peak load.**

{Note: The dry low-NOx controls are only effective above a minimum load, which will be identified during initial testing.}

(3) Method 20 shall be used to determine the nitrogen oxides, sulfur dioxide, and oxygen concentrations. The span values shall be 300 ppm of nitrogen oxide and 21 percent oxygen. The NOx emissions shall be determined at each of the load conditions specified in paragraph (c)(2) of this section.

Department requirement: The span value shall be no greater than 75 ppm of nitrogen oxides due to the low NOx emission levels of the gas turbine.

(d) The owner or operator shall determine compliance with the sulfur content standard in Section 60.333(b) as follows: ASTM D 2880-71 shall be used to determine the sulfur content of liquid fuels and ASTM D 1072-80, D 3031-81, D 4084-82, or D 3246-81 shall be used for the sulfur content of gaseous fuels (incorporated by reference--see Section 60.17). The applicable ranges of some ASTM methods mentioned above are not adequate to measure the levels of sulfur in some fuel gases. Dilution of samples before analysis (with verification of the dilution ratio) may be used, subject to the approval of the Administrator.

Department requirement: The natural gas shall be sampled and analyzed for the sulfur content as determined by ASTM methods D4084-82, D3246-81 or more recent versions.

(e) To meet the requirements of Section 60.334(b), the owner or operator shall use the methods specified in paragraphs (a) and (d) of this section to determine the nitrogen and sulfur contents of the fuel being burned. The analysis may be performed by the owner or operator, a service contractor retained by the owner or operator, the fuel vendor, or any other qualified agency.

{Note: The fuel analysis requirements of the permit meet or exceed the requirements of this rule and will ensure compliance with this rule.}

STANDARD CONDITIONS

{Permitting Note: The following conditions apply to all emissions units and activities at this facility.}

EMISSIONS AND CONTROLS

1. Plant Operation - Problems: If temporarily unable to comply with any of the conditions of the permit due to breakdown of equipment or destruction by fire, wind or other cause, the permittee shall notify each Compliance Authority as soon as possible, but at least within one working day, excluding weekends and holidays. The notification shall include: pertinent information as to the cause of the problem; steps being taken to correct the problem and prevent future recurrence; and, where applicable, the owner's intent toward reconstruction of destroyed facilities. Such notification does not release the permittee from any liability for failure to comply with the conditions of this permit or the regulations. [Rule 62-4.130, F.A.C.]

2. Circumvention: The permittee shall not circumvent the air pollution control equipment or allow the emission of air pollutants without this equipment operating properly. [Rule 62-210.650, F.A.C.]

3. Excess Emissions Allowed: Excess emissions resulting from startup, shutdown or malfunction of any emissions unit shall be permitted providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized but in no case exceed two hours in any 24 hour period unless specifically authorized by the Department for longer duration. [Rule 62-210.700(1), F.A.C.]

4. Excess Emissions Prohibited: Excess emissions caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure that may reasonably be prevented during startup, shutdown or malfunction shall be prohibited. [Rule 62-210.700(4), F.A.C.]

5. Excess Emissions - Notification: In case of excess emissions resulting from malfunctions, the permitee shall notify the Department or the appropriate Local Program in accordance with Rule 62-4.130, F.A.C. A full written report on the malfunctions shall be submitted in a quarterly report, if requested by the Department. [Rule 62-210.700(6), F.A.C.]

6. VOC or OS Emissions: No person shall store, pump, handle, process, load, unload or use in any process or installation, volatile organic compounds or organic solvents without applying known and existing vapor emission control devices or systems deemed necessary and ordered by the Department. [Rule 62-296.320(1), F.A.C.]

7. Objectionable Odor Prohibited: No person shall cause, suffer, allow or permit the discharge of air pollutants, which cause or contribute to an objectionable odor. An "objectionable odor" means any odor present in the outdoor atmosphere which by itself or in combination with other odors, is or may be harmful or injurious to human health or welfare, which unreasonably interferes with the comfortable use and enjoyment of life or property, or which creates a nuisance. [Rules 62-296.320(2) and62-210.200(203), F.A.C.]

8. General Visible Emissions: No person shall cause, let, permit, suffer or allow to be discharged into the atmosphere the emissions of air pollutants from any activity equal to or greater than 20 percent opacity. [Rule 62-296.320(4)(b)1, F.A.C.]

9. Unconfined Particulate Emissions: During the construction period, unconfined particulate matter emissions shall be minimized by dust suppressing techniques such as covering and/or application of water or chemicals to the affected areas, as necessary. [Rule 62-296.320(4)(c), F.A.C.]

TESTING REQUIREMENTS

10. Required Number of Test Runs: For mass emission limitations, a compliance test shall consist of three complete and separate determinations of the total air pollutant emission rate through the test section of the stack or duct and three complete and separate determinations of any applicable process variables corresponding to the three distinct time periods during which the stack emission rate was measured; provided, however, that three complete and separate determinations shall not be required if the process variables are not subject to variation during a compliance test, or if three determinations are not necessary in order to calculate the unit's emission rate. The three required test runs shall be completed within one consecutive five-day period. In the event that a sample is lost or one of the three runs must be discontinued because of circumstances beyond the control of the owner or operator, and a valid third run cannot be obtained within the five-day period allowed for the test, the Secretary or his or her designee may accept the results of two complete runs as proof of compliance, provided that the arithmetic mean of the two complete runs is at least 20% below the allowable emission limiting standard. [Rule 62-297.310(1), F.A.C.]

11. Operating Rate During Testing: Testing of emissions shall be conducted with the emissions unit operating at permitted capacity. Permitted capacity is defined as 90 to 100 percent of the maximum operation rate allowed by the permit. If it is impractical to test at permitted capacity, an emissions unit may be tested at less than the maximum permitted capacity; in this case, subsequent emissions unit operation is limited to 110 percent of the test rate until a new test is conducted. Once the unit is so limited, operation at higher capacities is allowed for no more than 15 consecutive days for the purpose of additional compliance testing to regain the authority to operate at the permitted capacity. [Rule 62-297.310(2), F.A.C.]

12. Calculation of Emission Rate: For each emissions performance test, the indicated emission rate or concentration shall be the arithmetic average of the emission rate or concentration determined by each of the three separate test runs unless otherwise specified in a particular test method or applicable rule. [Rule 62-297.310(3), F.A.C.]

13. Test Procedures: Tests shall be conducted in accordance with all applicable requirements of Chapter 62-297, F.A.C.

    a. *Required Sampling Time.* Unless otherwise specified in the applicable rule, the required sampling time for each test run shall be no less than one hour and no greater than four hours, and the sampling time at each sampling point shall be of equal intervals of at least two minutes. The minimum observation period for a visible emissions compliance test shall be thirty (30) minutes. The observation period shall include the period during which the highest opacity can reasonably be expected to occur.

    b. *Minimum Sample Volume.* Unless otherwise specified in the applicable rule or test method, the minimum sample volume per run shall be 25 dry standard cubic feet.

    c. *Calibration of Sampling Equipment.* Calibration of the sampling train equipment shall be conducted in accordance with the schedule shown in Table 297.310-1, F.A.C.

    [Rule 62-297.310(4), F.A.C.]

14. Determination of Process Variables

    a. *Required Equipment.* The owner or operator of an emissions unit for which compliance tests are required shall install, operate, and maintain equipment or instruments necessary to determine process variables, such as process weight input or heat input, when such data are needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.

    b. *Accuracy of Equipment.* Equipment or instruments used to directly or indirectly determine process variables, including devices such as belt scales, weight hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value.

    [Rule 62-297.310(5), F.A.C.]

15. Sampling Facilities: The permittee shall install permanent stack sampling ports and provide sampling facilities that meet the requirements of Rule 62-297.310(6), F.A.C.

16. Test Notification: The owner or operator shall notify the Department, at least 15 days prior to the date on which each formal compliance test is to begin, of the date, time, and place of each such test, and the test contact person who will be responsible for coordinating and having such test conducted for the owner or operator. [Rule 62-297.310(7)(a)9, F.A.C.]

17. Special Compliance Tests: When the Department, after investigation, has good reason (such as complaints, increased visible emissions or questionable maintenance of control equipment) to believe that any applicable emission standard contained in a Department rule or in a permit issued pursuant to those rules is being violated, it shall require the owner or operator of the emissions unit to conduct compliance tests which identify the nature and quantity of pollutant emissions from the emissions unit and to provide a report on the results of said tests to the Department. [Rule 62-297.310(7)(b), F.A.C.]

18. Test Reports: The owner or operator of an emissions unit for which a compliance test is required shall file a report with the Department on the results of each such test. The required test report shall be filed with the Department as

soon as practical but no later than 45 days after the last sampling run of each test is completed. The test report shall provide sufficient detail on the emissions unit tested and the test procedures used to allow the Department to determine if the test was properly conducted and the test results properly computed. As a minimum, the test report, other than for an EPA or DEP Method 9 test, shall provide the following information:

1. The type, location, and designation of the emissions unit tested.
2. The facility at which the emissions unit is located.
3. The owner or operator of the emissions unit.
4. The normal type and amount of fuels used and materials processed, and the types and amounts of fuels used and material processed during each test run.
5. The means, raw data and computations used to determine the amount of fuels used and materials processed, if necessary to determine compliance with an applicable emission limiting standard.
6. The type of air pollution control devices installed on the emissions unit, their general condition, their normal operating parameters (pressure drops, total operating current and GPM scrubber water), and their operating parameters during each test run.
7. A sketch of the duct within 8 stack diameters upstream and 2 stack diameters downstream of the sampling ports, including the distance to any upstream and downstream bends or other flow disturbances.
8. The date, starting time and duration of each sampling run.
9. The test procedures used, including any alternative procedures authorized pursuant to Rule 62-297.620, F.A.C. Where optional procedures are authorized in this chapter, indicate which option was used.
10. The number of points sampled and configuration and location of the sampling plane.
11. For each sampling point for each run, the dry gas meter reading, velocity head, pressure drop across the stack, temperatures, average meter temperatures and sample time per point.
12. The type, manufacturer and configuration of the sampling equipment used.
13. Data related to the required calibration of the test equipment.
14. Data on the identification, processing and weights of all filters used.
15. Data on the types and amounts of any chemical solutions used.
16. Data on the amount of pollutant collected from each sampling probe, the filters, and the impingers, are reported separately for the compliance test.
17. The names of individuals who furnished the process variable data, conducted the test, analyzed the samples and prepared the report.
18. All measured and calculated data required to be determined by each applicable test procedure for each run.
19. The detailed calculations for one run that relate the collected data to the calculated emission rate.
20. The applicable emission standard, and the resulting maximum allowable emission rate for the emissions unit, plus the test result in the same form and unit of measure.
21. A certification that, to the knowledge of the owner or his authorized agent, all data submitted are true and correct. When a compliance test is conducted for the Department or its agent, the person who conducts the test shall provide the certification with respect to the test procedures used. The owner or his authorized agent shall certify that all data required and provided to the person conducting the test are true and correct to his knowledge.

RECORDS AND REPORTS

19. Records Retention: All measurements, records, and other data required by this permit shall be documented in a permanent, legible format and retained for at least five (5) years following the date on which such measurements, records, or data are recorded. Records shall be made available to the Department upon request. [Rules 62-4.160(14) and 62-213.440(1)(b)2, F.A.C.]

20. Annual Operating Report: The permittee shall submit an annual report that summarizes the actual operating rates and emissions from this facility. Annual operating reports shall be submitted to the Compliance Authority by March 1st of each year. [Rule 62-210.370(2), F.A.C.]

Memorandum

Florida Department of Environmental Protection

TO: Clair Fancy

THROUGH: Al Linero

FROM: Jeff Koerner

DATE: July 19, 2001

SUBJECT: Draft Air Construction Permit No. 0390029-003-AC
Florida Gas Transmission Company
Gadsden Compressor Station No. 14
Phase V Modifications

Attached for your review are the following items:

- Intent to Issue Permit and Public Notice Package;
- Technical Evaluation and Preliminary Determination;
- Draft Permit; and
- PE Certification

The draft permit authorizes the construction of a new 15,700 bhp gas turbine compressor engine, the up-rating of an existing gas turbine compressor engine from 10,350 bhp to 13,000 bhp, and the modification of one existing reciprocating internal combustion compressor engine. The new equipment will be installed at existing Compressor Station No. 14, which is located at Route 3, Box 3390, on Highway 65 South near Quincy in Gadsden County, Florida. The engine modifications result in CO and NOx emissions decreases, which allow this project to net out of PSD.

The Technical Evaluation and Preliminary Determination provides a detailed description of the project, rule applicability, and emissions standards. The PE certification briefly summarizes the proposed project. Day #74 is July 26, 2001. I recommend your approval of the attached Draft Permit for this project.

CHF/AAL/jfk

Attachments

Florida Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation
New Source Review Section
2600 Blair Stone Road, MS #5505
Tallahassee, Florida, 32399-2400

P.E. CERTIFICATION STATEMENT

PERMITTEE

Florida Gas Transmission Company
1400 Smith Street
Houston, TX 77002

Draft Air Permit No. 0390029-003-AC Gadsden Compressor Station No. 14 Phase V Modifications

PROJECT DESCRIPTION

The existing facility operates as a compressor station in Gadsden County for Florida Gas Transmission Company's natural gas pipeline. It consists of five reciprocating internal combustion engines and a small emergency generator. Three 2000 bhp engines were installed in 1958, one 2000 bhp engine was installed in 1966, one 2000 bhp engine was installed in 1968, and one 2700 bhp engine was installed in 1991. All units fire natural gas. The proposed project will add a Nuovo Pignone Model No. PGT-10B gas turbine with a capacity of 15,700 bhp as a new compressor engine. An existing Solar Model No. Mars 90-T-13000S gas turbine will be up-rated from 10,350 bhp to 13,000 bhp. In addition, one existing 2000 bhp reciprocating internal combustion engine will be physically modified to reduce emissions of carbon monoxide and nitrogen oxides. All units fire natural gas exclusively.

Because potential emissions of at least one regulated pollutant exceed 250 tons per year, the existing facility is classified as a major source of air pollution with respect to Rule 62-212.400, F.A.C, the Prevention of Significant Deterioration (PSD) of Air Quality. The existing station is in an area that is in attainment (or designated as unclassifiable) for all air pollutants subject to a National Ambient Air Quality Standard (NAAQS). Therefore, the new project is subject to a PSD applicability review.

The addition of a new 15,700 bhp gas turbine compressor engine and the up-rating of an existing gas turbine compressor engine will result in potential emission increases. However, modifications to an existing reciprocating internal combustion compressor engine will result in emissions decreases of carbon monoxide and nitrogen oxides. Each engine turbocharger will be physically modified to increase the air manifold pressure and airflow to each cylinder. This will increase in the air-to-fuel mixture with a corresponding decrease in the cylinder temperatures. The decreased temperatures result in lower NOx emissions. Each control system will then be readjusted to include the new engine performance parameters and operating set points. In addition, a new silencer/oxidation catalyst will be installed on the modified engine to reduce emissions of carbon monoxide and volatile organic compounds. The proposed project will result in the following net emissions increases: 94 tons of carbon monoxide per year; 34 tons of nitrogen oxides per year; 7 tons of particulate matter per year; 31 tons of sulfur dioxide per year; and 5 tons of volatile organic compounds per year. Therefore, this project is not subject to PSD preconstruction review because the net emissions increases from the project are less than each of the corresponding PSD significant emissions rates.

The gas turbines are also subject to the New Source Performance Standards of Subpart GG in 40 CFR 60, adopted by reference in Rule 62-204.800, F.A.C. This regulation establishes standards for emissions of NOx and SO_2 as well as testing and monitoring requirements. The applicant has requested lower emissions standards for these pollutants to ensure that the project remains minor with respect to PSD applicability. Based on the manufacturer's estimated performance, the gas turbines will readily comply with the NSPS requirements. Emissions of hazardous air pollutants from the new gas turbines are well below the thresholds requiring a case-by-case MACT analysis.

***I HEREBY CERTIFY** that the air pollution control engineering features described in the above referenced application and subject to the proposed permit conditions provide reasonable assurance of compliance with applicable provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 62-4 and 62-204 through 62-297. However, I have not evaluated and I do not certify aspects of the proposal outside of my area of expertise (including but not limited to the electrical, mechanical, structural, hydrological, and geological features).*

Jeffery J. Koerner

Jeffery F. Koerner, P.E.
Registration Number: 49441

7-1-00

(Date)

NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT

Best Available Copy

in the Second Judicial Circuit Court was published in said newspaper in the issues of:

JULY 26, 2001

Affiant further says that the said Tallahassee Democrat is a newspaper published at Tallahassee, in the said Leon County, Florida, and that the said newspaper has heretofore been continuously published in said Leon County, Florida, each day and has been entered as second class mail matter at the post office in Tallahassee, in said Leon County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that he has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this publication in the said newspaper.

Harrison Arencibian

~~HARRISON ARENCIBIAN~~
LEGAL ADVERTISING REPRESENTATIVE

Sworn To And Subscribed Before Me This
26th Day of July A.D. 2001

(SEAL) Notary Public
Jesse H. McKenzie

JESSE H. MCKENZIE
MY COMMISSION # CC 862995
EXPIRES: September 10, 2003
Bonded Thru Notary Public Underwriters

RECEIVED

AUG 03 2001

BUREAU OF AIR REGULATION

PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Draft Air Permit No. 0390029-003-AC

Florida Gas Transmission Company
Gadsden Compressor Station No. 14
Phase V Modifications

The Department of Environmental Protection (Department) gives notice of its intent to issue an air construction permit to the Florida Gas Transmission Company to construct a new 15,700 bhp gas turbine compressor engine, up-rate an existing gas turbine compressor engine to 13,000 bhp, and modify one existing reciprocating internal combustion compressor engine. The new equipment will be installed at the existing Compressor Station No. 14, which is located at Route 3, Box 3390, on Highway 65 South near Quincy in Gadsden County, Florida. The proposed project is part of the Florida Gas Transmission Company's overall Phase V Expansion Project intended to increase the supply of natural gas to Florida. The applicant's authorized representative is Mr. Danny Pribble, Vice President of Operations. The applicant's mailing address is Florida Gas Transmission Company, 1400 Smith Street, Houston, TX 77002.

The addition of a new 15,700 bhp gas turbine compressor engine and the uprating of an existing gas turbine compressor engine will result in potential emission increases. However, modifications to an existing reciprocating internal combustion compressor engine will result in emissions decreases of carbon monoxide and nitrogen oxides. Each engine turbocharger will be physically modified to increase the air manifold pressure and airflow to each cylinder. This will increase the air-to-fuel mixture with a corresponding decrease in the cylinder temperatures. The decreased temperatures result in lower NOx emissions. Each control system will then be readjusted to include the new engine performance parameters and operating set points. In addition, a new silencer/oxidation catalyst will be installed on the modified engine to reduce emissions of carbon monoxide and volatile organic compounds.

Because potential emissions of at least one regulated pollutant exceed 250 tons per year, the existing facility is classified as a major source of air pollution with respect to Rule 62-212.400, F.A.C., the Prevention of Significant Deterioration (PSD) of Air Quality. The existing station is in an area that is in attainment (or designated as unclassifiable) for all air pollutants subject to a National Ambient Air Quality Standard (NAAQS). Therefore, the new project is subject to a PSD applicability review. The proposed project will result in the following net emissions increases: 94 tons of carbon monoxide per year; 38 tons of nitrogen oxides per year; 7 tons of particulate matter per year; 31 tons of sulfur dioxide per year; and 5 tons of volatile organic compounds per year. Therefore, this project is not subject to PSD preconstruction review because the net emissions increases from the project are less than each of the corresponding PSD significant emissions rates.

The Department will issue the Final Permit with the attached conditions unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions. The Department will accept written comments concerning the proposed permit issuance action for a period of fourteen (14) days from the date of publication of this Public Notice of Intent to Issue Air Construction Permit. Written comments should be provided to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit and require, if applicable, another Public Notice.

The Department will issue the permit with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to Sections 120.569 and 120.57, F.S., before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below. Mediation is not available in this proceeding.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57, F.S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen (14) days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to written notice under Section 120.60(3), F.S. must be filed within fourteen (14) days of publication of the public notice or within fourteen (14) days of receipt of this notice of intent, whichever occurs first. Under Section 120.60(3), F.S., however, any person who asked the Department for notice of agency action may file a petition within fourteen (14) days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action; (f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action; and (g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the agency to take with respect to the agency's proposed action.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301, F.A.C.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

A complete project file is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Department of Environmental Protection	Department of Environmental Protection
Bureau of Air Regulation	Northwest District Office
(111 S. Magnolia Drive, Suite 4)	Air Resources Section
2600 Blair Stone Road, MS #5505	160 Governmental Center
Tallahassee, Florida, 32399-2400	Pensacola, FL 32501-5794
Telephone: 850/488-0114	Telephone: 850/595-8300
Fax: 850/922-6979	Fax: 850/595-8417

The complete project file includes the application, Technical Evaluation and Preliminary Determination, Draft Permit, and the information submitted by the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the Department's reviewing engineer for this project for additional information at the address and phone numbers listed above.

TALLAHASSEE DEMOCRAT
PUBLISHED DAILY
TALLAHASSEE - LEON - FLORIDA

STATE OF FLORIDA COUNTY OF LEON:
Before the undersigned authority personally appeared Harrison Arencibian who on oath says that he is Legal Advertising Representative of the Tallahassee Democrat, a daily newspaper published at Tallahassee in Leon County, Florida; that the attached copy of advertising being a Legal Ad in the matter of

NOTICE OF INTENT
TO ISSUE AIR CONSTRUCTION PERMIT

in the Second Judicial Circuit Court was published in said newspaper in the issues of:

JULY 26, 2001

Affiant further says that the said Tallahassee Democrat is a newspaper published at Tallahassee, in the said Leon County, Florida, and that the said newspaper has heretofore been continuously published in said Leon County, Florida, each day and has been entered as second class mail matter at the post office in Tallahassee, in said Leon County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that he has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this publication in the said newspaper.

Harrison Arencibian

~~HARRISON ARENCIBIAN~~
LEGAL ADVERTISING REPRESENTATIVE

Sworn To And Subscribed Before Me This
26th Day of July A.D. 2001

(SEAL)

Notary Public
Jesse H. McKenzie

JESSE H. MCKENZIE
MY COMMISSION # CC 862995
EXPIRES: September 10, 2003
Bonded Thru Notary Public Underwriters

Best Available Copy

Tallahassee Dem

1 1 1 1

PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Draft Air Permit No. 0390029-003-AC

Florida Gas Transmission Company
Gadsden Compressor Station No. 14
Phase V Modifications

The Department of Environmental Protection (Department) gives notice of its intent to issue an air construction permit to the *Florida Gas Transmission Company* to construct a new 15,700 bhp gas turbine compressor engine, uprate an existing gas turbine compressor engine to 13,000 bhp, and modify one existing reciprocating internal combustion compressor engine. The new equipment will be installed at the existing Compressor Station No. 14, which is located at Route 3, Box 3390, on Highway 65 South near Quincy in Gadsden County, Florida. The proposed project is part of the Florida Gas Transmission Company's overall Phase V Expansion Project intended to increase the supply of natural gas to Florida. The applicant's authorized representative is Mr. Danny Pribble, Vice President of Operations. The applicant's mailing address is Florida Gas Transmission Company, 1400 Smith Street, Houston, TX 77002.

The addition of a new 15,700 bhp gas turbine compressor engine and the uprating of an existing gas turbine compressor engine will result in potential emission increases. However, modifications to an existing reciprocating internal combustion compressor engine will result in emissions decreases of carbon monoxide and nitrogen oxides. Each engine turbocharger will be physically modified to increase the air manifold pressure and airflow to each cylinder. This will increase in the air-to-fuel mixture with a corresponding decrease in the cylinder temperatures. The decreased temperatures result in lower NOx emissions. Each control system will then be readjusted to include the new engine performance parameters and operating set points. In addition, a new silencer/oxidation catalyst will be installed on the modified engine to reduce emissions of carbon monoxide and volatile organic compounds.

Because potential emissions of at least one regulated pollutant exceed 250 tons per year, the existing facility is classified as a major source of air pollution with respect to Rule 62-212.400, F.A.C., the Prevention of Significant Deterioration (PSD) of Air Quality. The existing station is in an area that is in attainment (or designated as unclassifiable) for all air pollutants subject to a National Ambient Air Quality Standard (NAAQS). Therefore, the new project is subject to a PSD applicability review. The proposed project will result in the following net emissions increases: 94 tons of carbon monoxide per year; 34 tons of nitrogen oxides per year; 7 tons of particulate matter per year; 3 tons of sulfur dioxide per year; and 3 tons of volatile organic compounds per year. Therefore, this project is not subject to PSD preconstruction review because the net emissions increases from the project are less than each of the corresponding PSD significant emissions rates.

The Department will issue the Final Permit with the attached conditions unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions. The Department will accept written comments concerning the proposed permit issuance action for a period of fourteen (14) days from the date of publication of this Public Notice of Intent to Issue Air Construction Permit. Written comments should be provided to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit and require, if applicable, another Public Notice.

The Department will issue the permit with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to Sections 120.569 and 120.57, F.S., before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below. Mediation is not available in this proceeding.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57, F.S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen (14) days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to written notice under Section 120.60(3), F.S. must be filed within fourteen (14) days of publication of the public notice or within fourteen (14) days of receipt of this notice of intent, whichever occurs first. Under Section 120.60(3), F.S., however, any person who asked the Department for notice of agency action may file a petition within fourteen (14) days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C.

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(SEAL) Notary Public
Jesse H. McKenzie

JESSE H. MCKENZIE
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EXPIRES: September 10, 2003
Bonded Thru Notary Public Underwriters

BEST AVAILABLE COPY

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STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Draft Air Permit No. 0390029-003-AC

Florida Gas Transmission Company
Gadsden Compressor Station No. 14
Phase V Modifications

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Department of Environmental Protection	Department of Environmental Protection
Bureau of Air Regulation	Northwest District Office
(111 S. Magnolia Drive, Suite 4)	Air Resources Section
2600 Blair Stone Road, MS #5505	160 Governmental Center
Tallahassee, Florida, 32399-2400	Pensacola, FL 32501-5794
Telephone: 850/488-0114	Telephone: 850/595-8300
Fax: 850-922-6979	Fax: 850/595-[illegible]

The complete project file includes the application, Technical Evaluation and Preliminary Determination, Draft Permit, and the information submitted by the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the Department's reviewing engineer for this project for additional information at the [illegible]

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Mr. Danny Pribble
Vice President of Operations
Florida Gas Transmission Co.
PO Box 1188
Houston, TX 77251

COMPLETE THIS SECTION ON DELIVERY

A. Received by (*Please Print Clearly*) D W Yeatt B. Date of Delivery APR 23 2001

C. Signature
X D W Yeatt ☐ Agent ☐ Addressee

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (*Extra Fee*) ☐ Yes

2. Article Number (*Copy from service label*)
7099 3400 0000 1450 2859

PS Form 3811, July 1999 Domestic Return Receipt 102595-00-M-0952

U.S. Postal Service
CERTIFIED MAIL RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

7099 3400 0000 1450 2859

Article Sent To:
Mr. Danny Pribble

Postage	$	Gadsden County
Certified Fee		Postmark Here
Return Receipt Fee (Endorsement Required)		
Restricted Delivery Fee (Endorsement Required)		
Total Postage & Fees	$	

Name (Please Print Clearly) (to be completed by mailer)
Mr. Danny Pribble
Street, Apt. No.; or PO Box No.
PO Box 1188
City, State, ZIP+4
Houston, TX 77251

PS Form 3800, July 1999 See Reverse for Instructions

Department of
Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

April 18, 2001

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Danny Pribble, Vice President of Operations
Florida Gas Transmission Company (FGTC)
P.O. Box 1188
Houston, TX 77251

Re: **Request for Additional Information**
Project No. 0390029-003-AC
FGTC Compressor Station No. 14 - Gadsden County, Florida
Phase V Modification

Dear Mr. Pribble:

On March 26, 2001, the Department received your application for an air construction permit to increase the capacity of Compressor Station No. 14 located in Gadsden County. The project is part of the overall Phase V Expansion Project aimed at boosting the capacity of FGTC's natural gas pipeline for Florida customers. The application is incomplete. In order to continue processing your application, the Department will need the additional information requested below. Should your response to any of the below items require new calculations, please submit the new calculations, assumptions, reference material and appropriate revised pages of the application form.

1. The netting analysis presented assumes that operation of existing Units 1401, 1402, 1403 and 1405 will not increase as a result of this project. Please discuss the typical operation of these units as related to demands from the natural gas pipeline placed on Compressor Station No. 14. Does FGTC predict that these units will increase operation as a result of this project? How does FGTC determine which units are dispatched first or most frequently? Does FGTC tend to run each engine approximately the same amount of hours for purposes of scheduled maintenance? Does FGTC expect dispatching to change as a result of this project? As supporting information, please provide the individual engine operating hours from 1996 through 2000 for Units 1401, 1401, 1403, 1404, 1405, and 1406.

2. Please identify any other emissions increases or decreases that occurred during the contemporaneous period defined as July 14, 1996 through October 14, 2001. Did FGTC obtain any air construction permits during this period? If so, please describe the projects and the associated emissions. Please identify the make and model of "GEN03". What is the function of this unit? Is it an emergency generator? Was it permitted or exempt from permitting requirements? If, permitted, does the permit contain restrictions on operation? Is it fired with natural gas?

3. Page D-4 states that the maximum hours of operation for Unit 1408 represent 75% operation (6570 hour/year) at full load, 15% operation (1314 hour/year) at 60% load, and 10% operation (876 hour/year) at 50% load. The Phase V application for FGT Station No. 12 requested 75% operation at full load (6570 hour/year), 20% operation at 70% load (1752 hour/year), and 5% operation (438 hour/year) at 50% load. Please explain request for different limits at low load operations and why Station No. 14 needs 2190 hours per year below 60% load?

4. Summarizing, the proposed modifications to Unit 1404 includes:
   - The engine turbocharger will be physically modified to increase the air manifold pressure and airflow to each cylinder. This will increase in the air-to-fuel mixture with a corresponding decrease in the cylinder temperatures. The decreased temperatures result in lower NOx emissions.
   - The control system will be readjusted to include the new engine performance parameters and operating set points.
   - A new silencer/oxidation catalyst will be installed to reduce CO and VOC emissions.

Is this an accurate general description of the proposed modifications? What will be the new "target" air manifold pressure (psig) and cylinder temperature (° F)? Will the ignition timing change from the current 27° to 30° BTDC? If the turbocharger modifications were made without installing the oxidation catalyst, what would the CO emissions be (lb/hour)? What are the total equipment and installation costs of the turbocharger modification and the silencer/oxidation catalyst? How does FGTC propose to monitor the CO and NOx emission performance improvements? How frequently does FGTC currently perform thorough maintenance inspections for this engine? Will the frequency of inspections change as a result of these modifications? What types and frequencies of inspections does FGTC propose to ensure that the engine remains "in tune" for the improved emission performance levels?

5. The potential emissions from new Unit 1408 are based on 6570 hours per year at full load, 1314 hours per year at 60% load, and 876 hours per year at 50% load. To be federally enforceable and creditable, the maximum hours of operation must be included as permit limits. How does FGTC currently monitor the engine operating hours? How does FGTC propose to conservatively monitor the engine operating hours at each given load condition to ensure that operation (and emissions) does not exceed these levels?

6. The pre-modification test report summarized in Table 2 of Attachment E indicates a NOx emission rate of 68.2 lb/hour. Table 2-7 in the Project Description indicates a pre-modification NOx emission rate of 73.2 lb/hour. In fact, Table 3 of Attachment E indicates a NOx emission rate of 66.1 lb/hour for Unit 1405, an identical engine. Please explain the discrepancy or correct the PSD applicability analysis. The application was missing the post-modification test report summary for similar Unit 1504. Please submit.

The Department will resume processing your application after receipt of the requested information. Rule 62-4.050(3), F.A.C. requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature. For any material changes to the application, please include a new certification statement by the authorized representative or responsible official. You are reminded that Rule 62-4.055(1), F.A.C. now requires applicants to respond to requests for information within 90 days or provide a written request for an additional period of time to submit the information.

If you have any questions regarding this matter, please call me at 850/921-9536.

Sincerely,

Jeffrey J. Koerner

Jeff Koerner, P.E.
New Source Review Section

AAL/jfk

cc: Mr. Jim Thompson, FGTC
Mr. Kevin McGlynn, McGlynn Consulting Co.
Mr. Duane Pierce, AQMcs
Ms. Sandra Veazey, NWD Office
Mr. Gregg Worley, EPA Region 4 Office
Mr. John Bunyak, NPS

Florida Gas Transmission Company

Capital Projects Field Office, 111 Kelsey Lane, Ste. A., Tampa, FL 33619
813.655.7441 / 800.381.1477

May 11, 2001

Mr. Jeff Koerner, P.E.
New Source Review Section
Bureau of Air Regulation
Florida Department of Environmental Protection
Twin Towers Office Bldg.
2600 Blairstone
Tallahassee, FL 32399-2400

Re: **Request for Additional Information**
Project No. 0390029-003-AC
FGTC Compressor Station No. 14 - Gadsden County, Florida
Phase V Modification

Dear Mr. Koerner:

The following is being sent in response to the above referenced Request for Additional Information.

1. *The netting analysis presented assumes that operation of existing Units 1401, 1402, 1403 and 1405 will not increase as a result of this project. Please discuss the typical operation of these units as related to demands from the natural gas pipeline placed on Compressor Station No. 14. Does FGTC predict that these units will increase operation as a result of this project? How does FGTC determine which units are dispatched first or most frequently? Does FGTC tend to run each engine approximately the same amount of hours for purposes of scheduled maintenance? Does FGTC expect dispatching to change as a result of this project? As supporting information, please provide the individual engine operating hours from 1996 through 2000 for Units 1401, 1401, 1403, 1404, 1405, and 1406.*

Response:

FGT does not expect the use of units 1401, 1402, 1403, and 1405 to increase as a result of this project. On the contrary, given similar pipeline demand conditions, FGT expects that the use of the reciprocating compressors will diminish with the installation of the new turbines. The reciprocating compressors require more attention and maintenance, so from an operational management perspective, it is in the best interest of FGT to operate them less.

There are two major factors evaluated in choosing which compressors will be dispatched first. These are, the unit's capacity to move gas and the number of operating hours on the unit since the last overhaul.

Generally when a station comes on line, gas control requests that the largest units come on line first. Gas control typically asks for 3-4 units. The first unit asked for is 1406 because it has the largest Hp rating. Then, units 1404 and 1405 are put on line because they have larger compressor cylinders and will build compressor spread faster. The remaining choice is usually left to the station personnel. Station personnel will generally try and balance the number of operating hours on each unit between overhauls.

It should be noted that the operating hours of the whole station and the reciprocating units as a whole are primarily a function of pipeline demand. While the turbines are expected to create less dependency on the reciprocating units, the demands of the pipeline as a whole can increase resulting in increased usage of all the station compressors.

There is no known reason for FGT to change dispatching order as a result of the project

Additionally, there are three separate pipelines, a 20", a 24" and a 36." The proposed new turbine will be operating on the 36" pipeline while Units 1401, 1402, 1403, and 1405 operate on the smaller pipelines.

Crossovers have been added between the lines, but these have been added with the intent to allow the turbines to assist with compression on the smaller pipelines that use Units 1401, 1402, 1403, and 1405.

Annual operating hours for the years 1996 through 2000 for Units 1401, 1401, 1403, 1404, 1405, and 1406 have been attached as Attachment A.

2. *Please identify any other emissions increases or decreases that occurred during the contemporaneous period defined as July 14, 1996 through October 14, 2001. Did FGTC obtain any air construction permits during this period? If so, please describe the projects and the associated emissions. Please identify the make and model of "GEN03". What is the function of this unit? Is it an emergency generator? Was it permitted or exempt from permitting requirements? If, permitted, does the permit contain restrictions on operation? Is it fired with natural gas?*

   Response: All contemporaneous changes have been listed in Table 3-4, page 23 of the application narrative. This includes the Phase IV Expansion Project changes. There are no other emission increases or decreases that have occurred during the contemporaneous period defined as July 14, 1996 through October 14, 2001. Additionally, FGTC has not obtained any other air construction permits during this period other than for the changes listed in Table 3-4.

   "GEN03" is an emergency generator that has been constructed under Permit No. 0390029-002-AC as part of the Phase IV Expansion Project. It is listed in Appendix I-1 of the permit as Item No. 1 and is limited to 500 hours of operation per year. It replaced two existing emergency generators. A gas-fired Caterpillar Model 3412 reciprocating engine rated at 637 bhp powers the emergency generator. Please refer to the Application for Air Construction Permit dated November 1999 for more details.

3. *Page D-4 states that the maximum hours of operation for Unit 1408 represent 75% operation (6570 hour/year) at full load, 15% operation (1314 hour/year) at 60% load, and 10% operation (876 hour/year) at 50% load. The Phase V application for FGT Station No. 12 requested 75% operation at full load (6570 hour/year), 20% operation at <u>70</u>% load (<u>1752</u> hour/year), and <u>5</u>% operation (<u>438</u> hour/year) at 50% load. Please explain request for different limits at low load operations and why Station No. 14 needs 2190 hours per year below 60% load?*

   Response: FGTC desires to both maximize the operational flexibility of the proposed PGT-10B turbines at Stations 12 and 14 and to also avoid triggering the requirement for a PSD permit. Ideally, FGTC would prefer to operate the PGT-10B units without any load restrictions; however, this is not possible without triggering PSD review. FGTC is, therefore, willing to accept restrictions on the load schedule in order to avoid triggering PSD review. In both cases load schedules have been requested for the maximum PGT-10B operating flexibility that can be obtained without triggering PSD requirements for CO. There are differences due to variations in hours of operation for the past actual hours of operation for the modified engines (1204, 1205 and 1404) and also for the past actual emission rates as determined by emissions testing. Load schedules have been adjusted so that netting calculations result in levels below the PSD CO trigger.

   Past actual emissions for Unit 1404 have been higher compared to Units 1204 and 1205 based on hours of operation and past actual emission rates. This resulted in a larger difference in the future potential to emit minus past actual value calculation which in turn allowed more flexibility, i.e. lower loads, in the load schedule for the PGT-10B.

4. *Summarizing, the proposed modifications to Unit 1404 includes:*

   - *The engine turbocharger will be physically modified to increase the air manifold pressure and airflow to each cylinder. This will increase in the air-to-fuel mixture with a corresponding decrease in the cylinder temperatures. The decreased temperatures result in lower NOx emissions.*

- *The control system will be readjusted to include the new engine performance parameters and operating set points.*
- *A new silencer/oxidation catalyst will be installed to reduce CO and VOC emissions.*

Is this an accurate general description of the proposed modifications? What will be the new "target" air manifold pressure (psig) and cylinder temperature (° F)? Will the ignition timing change from the current 27° to 30° BTDC? If the turbocharger modifications were made without installing the oxidation catalyst, what would the CO emissions be (lb/hour)? What are the total equipment and installation costs of the turbocharger modification and the silencer/oxidation catalyst? How does FGTC propose to monitor the CO and NOx emission performance improvements? How frequently does FGTC currently perform thorough maintenance inspections for this engine? Will the frequency of inspections change as a result of these modifications? What types and frequencies of inspections does FGTC propose to ensure that the engine remains "in tune" for the improved emission performance levels?

Response:

AMP and timing parameters have not yet been finalized. Final AMP is expected to increase to a value between 7-9" Hg. Final timing is expected to be from 16-20° BTDC. These parameters will be fine tuned to meet or be less than emission permit levels with a secondary consideration to fuel consumption.

The CO emissions without the oxidation catalyst would be 6.66 lb/hr (1.51 g/bhp-hr) for Unit 1404 based on testing of the modified unit.

The costs for the turbocharger modification, oxidation catalyst, platforms and testing are about $90K per unit.

These new operating parameters (AMP, and timing) will be programmed into the unit controller. FGTC proposes to monitor CO and NOx emission performance semi-annually with a portable analyzer.

On a quarterly basis, an engine analyst will check the performance inspect each engine using an engine analyzer.

5. *The potential emissions from new Unit 1408 are based on 6570 hours per year at full load, 1314 hours per year at 60% load, and 876 hours per year at 50% load. To be federally enforceable and creditable, the maximum hours of operation must be included as permit limits. How does FGTC currently monitor the engine operating hours? How does FGTC propose to conservatively monitor the engine operating hours at each given load condition to ensure that operation (and emissions) does not exceed these levels?*

   Response: For existing engines, FGTC only maintains monthly hours of operation. For the proposed new Unit 1408, the control system will maintain records of hours of operation and loads at which the turbine operated. The following is a description of what the control program will do on the new turbine.

   The unit automation will calculate the thermal load based on actual conditions. This will be done in small intervals (30 seconds or a minute). It will then log the time operated in a load category (e.g. 50-60% load, 70-80%load). It will do this continuously while summing up hours that are operated in each category. A report, and feed information will be made sent to the station control panel that shows the year to date operating hours for each category. The station control panel will control the percent load budget based on the operating hours spent in order to prevent any operation that would exceed the permitted hours for lower loads. For example, it will increase the load on the PGT10B if it has already spent the allocated operating hours for 50-70% load. A report will be printed annually that will summarize the operating hours used for each load category.

6. *The pre-modification test report summarized in Table 2 of Attachment E indicates a NOx emission rate of 68.2 lb/hour. Table 2-7 in the Project Description indicates a pre-modification NOx emission rate of 73.2 lb/hour. In*

fact, Table 3 of Attachment E indicates a NOx emission rate of 66.1 lb/hour for Unit 1405, an identical engine. Please explain the discrepancy or correct the PSD applicability analysis. The application was missing the post-modification test report summary for similar Unit 1504. Please submit.

Response: The values in Tables 2 and 3 of Attachment E for NOx emission rates of 68.2 lb/hour for Unit 1404 and 66.1 lb/hour for Unit 1405, respectively, are based on emission rates of 16.6 g/bhp-hr for Unit 1404 and 15.4 g/bhp-hr for Unit 1405 and the engine loads during the test in bhp. While these engines are identical models, it would be unreasonable to expect two engines installed two years apart and subject to variations in operation that have occurred over more than thirty years and to the error inherent in any test method to have identical emissions. In fact it would be very surprising if they had identical emission rates even when new.

The value provided in Tables 2-7 in the Project Description indicates a pre-modification NOx emission rate of 473.2 lb/hour for Unit 1404 based on a bhp value of 2000 bhp.

Unit 1404:

Test: 16.6 g/bhp-hr x 1865 bhp x 1 lb/453.6 g = 68.2 lb/hr

Project: 16.6 g/bhp-hr x 2000 bhp x 1 lb/453.6 g = 73.2 lb/hr

Loads are not recorded during normal operation for Unit 1404 so that there are no records of the loads at which it was operated; however, it is normally operated at full load. Additionally, emissions for reciprocating engines are usually presented as g/bhp-hr values, e.g. in BACT analyses so that value was used as a basis.

The post-modification test report summary for Unit 1504 was inadvertently omitted from your copy. It has been attached as Attachment B.

FGTC believes that the above responses do not constitute material changes to the application; therefore, a new certification statement by the authorized responsible official has not been included.

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

Sincerely,

Jim Thompson

Jim Thompson
Project Manager, Environmental

ATTACHMENTS

CC: Dan Pribble
Allan Weatherford
Jake Krautsch
Frank Diemont
Marcello Minotti
Kevin McGlynn
Duane Pierce
A. Allen, NWD

Attachment A

Hours of Operation

FGT Compressor Station No. 14					
	Hours of Operation				
Unit	1996	1997	1998	1999	2000
1401	3356	5124	4053	5811	5494
1402	3604	4717	3658	5377	5578
1403	4278	5715	4180	5889	6586
1404	4258	5295	3906	6879	6792
1405	4305	5194	5184	6412	6882
1406	5437	6301	5710	7544	7349

Attachment B

Summary of Modified 1504 Test Report

Table 5: Unit 1504 Post-Modification

Florida Gas Transmission
Compressor Station No. 15
6 miles N of Perry, FL on C-361
Worthington SEHG-8 Compressor Engine — **2030 bhp @ 345 rpm**
Technicians: LJB, RPO

Test Run No.	1504-CM-1	1504-CM-2	1504-CM-3	
Date	4/28/00	4/28/00	4/28/00	
Start Time	13:15	14:34	15:52	
Stop Time	14:15	15:34	16:52	
Engine/Compressor Operation				**Averages**
Engine Load (bhp, measured at the compressor)	2036	2017	2003	2019
Fuel Horsepower (bhp, based upon fuel torque)	2080	2064	2051	2065
Engine Speed (rpm)	344	345	345	345
Torque (%, full load = 2030 bhp at 345 rpm)	102.7	101.7	101.1	101.8
Ignition Timing (°BTDC)	17.0	17.0	17.0	17.0
Air Manifold Pressure ("Hg)	10.6	10.7	10.7	10.7
Air Manifold Temperature (°F)	99	99	99	99
Fuel Manifold Pressure (psig)	32.1	32.1	32.2	32.1
Station Suction Pressure (psig)	701	695	694	697
Station Suction Temperature (°F)	66.0	66.0	66.0	66
Station Discharge Pressure (psig)	947	937	936	940
Station Discharge Temperature (°F)	112.7	112.0	112.0	112.2
Compressor Flow Rate (MMSCFD)	102	102	102	102.3
Loading Step Number	0	0	0	-
Engine Fuel Data (Natural Gas)				
Fuel Heating Value (Btu/SCF, HHV)	1037.0	1037.0	1037.0	1037.0
Fuel Specific Gravity	0.5851	0.5851	0.5851	0.5851
O_2 "F-factor" (DSCFex/MMBtu @ 0% excess air)	8639	8639	8639	8639
CO_2 "F-factor" (DSCFex/MMBtu @ 0% excess air)	1027	1027	1027	1027
Fuel Flow (SCFH)	15,216	15,133	15,061	15,137
Heat Input (MMBtu/hr)	15.78	15.69	15.62	15.70
Brake-specific Fuel Consumption (Btu/bhp-hr)	7,750	7,780	7,797	7776
Ambient Conditions				
Atmospheric Pressure ("Hg)	29.82	29.76	29.75	29.78
Temperature (°F): Dry bulb	73.1	82.3	82.3	79.2
(°F): Wet bulb	67.0	70.0	72.0	69.7
Humidity (lbs moisture/lb air)	0.0125	0.0126	0.0142	0.0131
Measured Emissions				
NO_x (ppmv, dry basis)	481.7	446.9	453.9	460.8
CO (ppmv, dry basis)	282.4	281.3	278.6	280.8
THC (ppmv, wet basis)	1209.5	1146.5	1222.8	1192.9
Fuel VOC Fraction (% non-methane/non-ethane)	2.44	2.44	2.44	2.44
VOC (ppmv, wet basis)	29.5	28.0	29.8	29.1
O_2 (% volume, dry basis)	12.12	12.17	12.19	12.16
CO_2 (% volume, dry basis)	5.03	5.00	4.90	4.98
F_o (fuel factor, range = 1.600-1.836 for NG)	1.75	1.75	1.78	1.76
Stack Volumetric Flow Rates				
via Pitot Tube (SCFH, dry basis)	3.36E+05	3.35E+05	3.36E+05	3.36E+05
via O_2 "F_d-factor" (SCFH, dry basis)	3.24E+05	3.25E+05	3.24E+05	3.24E+05
via CO_2 "F_c-factor" (SCFH, dry basis)	3.22E+05	3.22E+05	3.27E+05	3.24E+05
Calculated Emission Rates (via pitot tube)				
NO_x (lbs/hr)	19.3	17.9	18.2	18.5
CO (lbs/hr)	6.90	6.85	6.80	6.85
VOC (lbs/hr, based on THC emissions and fuel VOC)	0.459	0.435	0.466	0.453
NO_x (tons/yr)	84.7	78.3	79.7	80.9
CO (tons/yr)	30.2	30.0	29.8	30.0
VOC (tons/yr)	2.01	1.91	2.04	1.99
NO_x (g/bhp-hr)	4.22	3.93	4.03	4.06
CO (g/bhp-hr)	1.51	1.51	1.50	1.51
CO (g/bhp-hr)	0.10	0.10	0.10	0.10

Florida Gas Transmission Company

P.O. Box 945100, Maitland, Florida 32751 (407) 875-5800

March 19, 2001

CERTIFIED MAIL – RETURN RECEIPT

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

RECEIVED
MAR 26 2001
BUREAU OF AIR REGULATION

Reference: Facility: 0390029
Compressor Station No. 14, Gadsen County

Dear Mr. Fancy:

Subject: Application for Air Construction Permit

Florida Gas Transmission Company (FGT) is proposing to install a new Pignone PGT-10B 15,700 bhp compressor turbine, to upgrade an existing compressor turbine from 10,350 bhp to 13,000 bhp and to modify an existing 2,000 bhp reciprocating engine at the above referenced facility.

The facility is a major source under New Source Review definitions and the proposed new turbine and turbine modifications have associated NO_x emissions exceeding 40 tpy. The proposed modifications to the existing reciprocating engines will create reductions in NO_x emissions so that the net emissions do not exceed levels that are significant under Prevention of Significant Deterioration requirements. Therefore, a state only construction permit is required.

Enclosed is an Application with supporting documentation 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
Dan Pribble, w/o attachments
Frank Diemont
Clay Roesler
Jake Krautsch
Duane Pierce, AQMcs, LLC
Compressor Station No. 14

Florida Gas Transmission Company

Phase V Expansion Project

Compressor Station No. 14

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 an ENRON/EL PASO affiliate of Houston, Texas, is proposing to expand its existing natural gas pipeline facility near Quincy, in Gadsen County, Florida (Compressor Station No. 14). This proposed modification is part of FGT's Phase V Expansion Project, aimed at increasing the supply capacity of FGT's network servicing domestic suppliers, 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 and pipeline 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. 14 is located in Gadsden County, Florida, approximately 11 miles southwest of Quincy on Highway 65. Figure 1-1 shows the location of the existing compressor station.

The proposed expansion consists of the installation of a new 15,700 brake horsepower (bhp), natural gas-fired, turbine compressor engine and the upgrading of an existing turbine from 10,350 bhp to 13,000 bhp. The proposed new compressor turbine is a Pignone PGT10B equipped with dry low NO_X (oxides of nitrogen) combustion. The compressor turbine to be upgraded is a Solar Mars T-13000S equipped with dry low NO_X (oxides of nitrogen) combustion. The 10, 350 hp Solar Mars T-13000S unit is being constructed as part of FGT's Phase IV project. These compressor engines will be used solely for transporting natural gas by pipeline for distribution to markets in Florida.

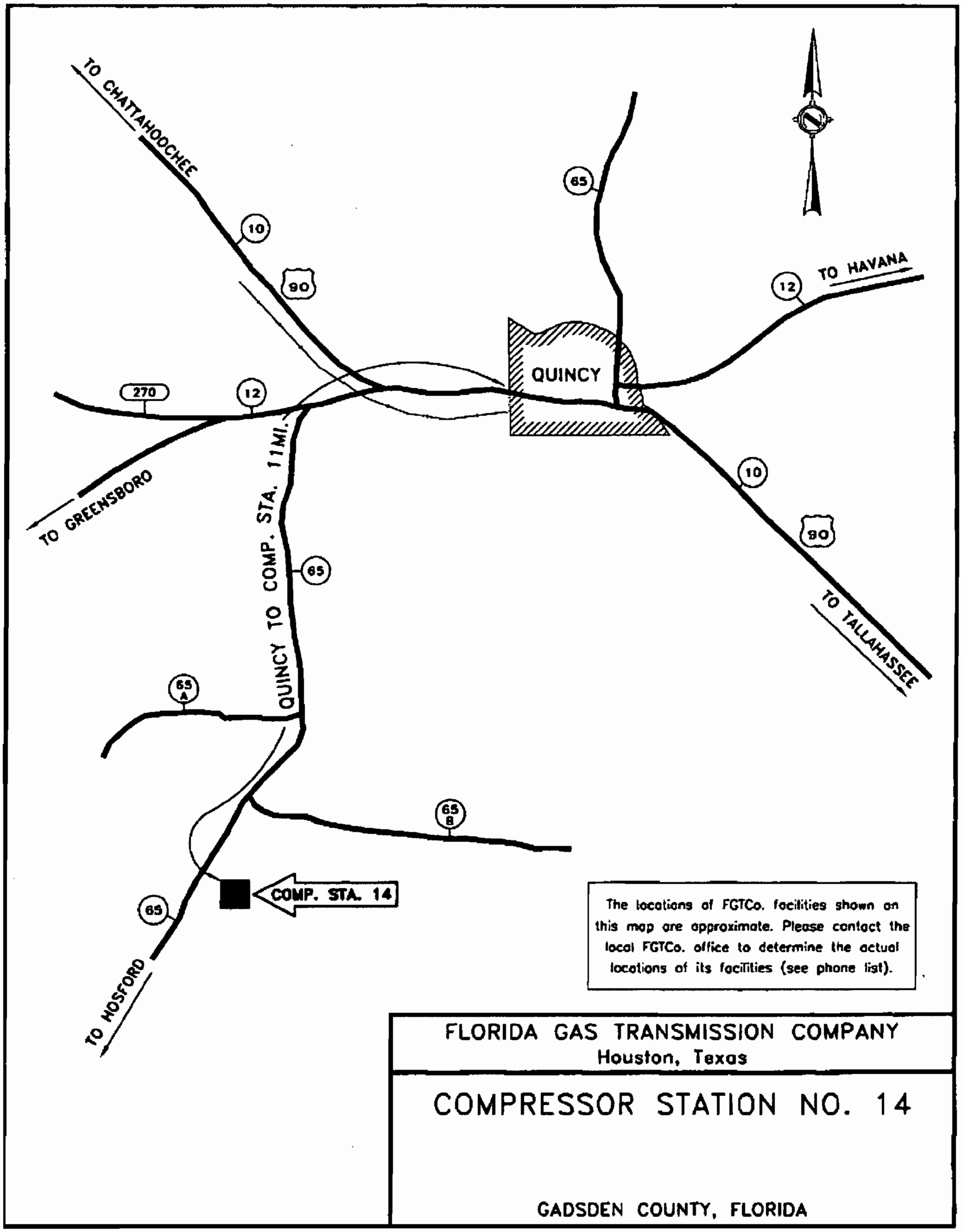
Based on projected new annual emission rates, the proposed new sources would potentially constitute a significant modification at an existing major stationary source under Prevention of Significant Deterioration (PSD) regulations. However, FGT is also proposing to reduce the NO_X emissions from an existing 2,000 bhp reciprocating compressor engine by modifying the engine. Based on the projected net annual emission rate change, there will be no PSD significant increase in the emissions of any contaminant and a state only construction permit is required.

Engineering designs for the proposed expansion project include selection of an engine incorporating dry low NO_X combustion technology with NOx emissions at 25 ppmv. This dry low NO_X technology for control of NO_X emissions would represent Best Available Control Technology (BACT) for the proposed new gas turbine engine under PSD requirements.

This narrative contains four additional sections. Descriptions of the existing operation at FGT's Compressor Station No. 14, the proposed new turbine, the proposed upgraded turbine and the proposed reciprocating engine 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.

FDEP permit application forms are provided in Attachment A. Attachment B contains a plot plan of the facility. Attachment C contains vendor information, Attachment D contains emission calculations, and Attachment E contains a test report for the current emissions of the engine to be modified and a summary test report of a similar unit that was modified.

AQMcs


TO CHATTAHOOCHEE
10
90
65
TO HAVANA
12
270
12
QUINCY
TO GREENSBORO
QUINCY TO COMP. STA. 11MI.
65
10
90
TO TALLAHASSEE
65 A
65 B
COMP. STA. 14
65
TO HOSFORD
The locations of FGTCo. facilities shown on this map are approximate. Please contact the local FGTCo. office to determine the actual locations of its facilities (see phone list).
FLORIDA GAS TRANSMISSION COMPANY
Houston, Texas
COMPRESSOR STATION NO. 14
GADSDEN COUNTY, FLORIDA

2.0 PROJECT DESCRIPTION

A plot plan of FGT's Compressor Station No. 14, 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. 14 consists of five 2,000 bhp, one 2,700 bhp natural-gas-fired reciprocating internal combustion (IC) engines and one 10,350 bhp natural gas-fired turbine. 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 1401 through 1403). Engine 1404 was installed in 1966 and engine 1405 was installed in 1968. An addition referred to as Phase II was constructed in 1991 (Compressor Engine 1406) and was subject to PSD review. Compressor Engine 1407 is being installed in early 2001 as part of the Phase IV Expansion Project.

Of the existing engines, 1404 is being modified to reduce NO_X and CO emissions 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. 14, as part of the Phase V Expansion Project. This will involve adding one new gas-fired turbine (Compressor Engine 1408) and upgrading an existing gas-fired turbine (Compressor Engine 1407). The proposed new engine and upgraded 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 modifications, 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 Turbine Engine Addition

FGT proposes to install one natural gas-fired turbine compressor unit and associated support equipment at Compressor Station No. 14. The turbine will be a Pignone PGT-10B engine compressor unit rated at 15,700 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.

Table 2-1 Summary of Existing Compressor Engines

Engine #	Date of Installation	Type	Manufacturer	Model #	Brake Horse Power (bhp)
1401	1958	Reciprocating	Worthington	SEHG-8	2,000
1402	1958	Reciprocating	Worthington	SEHG-8	2,000
1403	1958	Reciprocating	Worthington	SEHG-8	2,000
1404	1966	Reciprocating	Worthington	SEHG-8	2,000
1405	1968	Reciprocating	Worthington	SEHG-8	2,000
1406	1991	Reciprocating	Cooper-Bessemer	GMVR-12C	2,700
1407	2001	Turbine	Solar	Mars 90 T-13000S	10,350

Table 2-2 Proposed New Compressor Turbine (1408) Specifications and Stack Parameters

Parameter	Design
Compressor Engine	1408
Type	Gas Turbine
Manufacturer	Nuovo Pignone
Model	PGT10B
Unit Size	15,700 bhp
Heat Input [a]	134.77 MMBtu/hr
Maximum Fuel Consumption [b]	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

NOTE:

acfm	=	actual cubic feet per minute.
bhp	=	brake horsepower.
Btu/hp-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 heat rate value plus 10%

[b] Based on heating value for natural gas of 1040 British thermal units per standard cubic foot (Btu/scf).

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 SO_2 are based on FGT's Federal Energy Regulatory Commission (FERC) certificate limit of 10 grains sulfur per 100 cubic feet of natural gas. Hazardous air pollutant (HAP) emissions are based upon the Gas Research Institute's (GRI) HapCalc software which uses USEPA emission factors, emission factors found in research literature and emission factors based on GRI research data.

Table 2-3 Emissions from Proposed New Compressor Turbine Engine (1408)

Pollutant	Emission Factor	Reference	lb/hr	TPY
Nitrogen Oxides	14.1 lb/hr	Manufacturer Data	14.10	61.8
Carbon Monoxide	5.14 lb/hr @ 100% load 17.34 lb/hr @ 60% load 22.50 lb/hr @ 50% load	Manufacturer Data	8.71[a]	38.1[b]
Volatile Organic Compounds	0.29 lb/hr @ 100% load 1.15 lb/hr @ 60% load 1.46 lb/hr @ 50% load	Manufacturer Data	0.58[c]	2.4[b]
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	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, 60% load for 15% of time & 50% load for 10% of time
c) Nominal VOC (annual) rate, maximum 1.46 lb/hr

All contaminants have decreasing lb/hr emission rates with decreasing engine load except CO and VOCs. The new turbine will be operated at less than 100% load at times. The load may commonly drop as low as 60% and occasionally to 50%. The CO and VOC emission rates on the PGT-10B increase with decreasing engine load. Emission rates are based on 100% load (worse case) for all contaminants except CO and VOC. CO and VOC emission rates are based on operation at 100% load for 75% of the time (6570 hr/yr), 60% load for 15% (1314 hr/yr) of the time and 50% load for 10% of the time (876 hr/yr).

2.2.2 Upgraded Compressor Turbine

FGT proposes to upgrade one existing natural gas-fired turbine engine compressor unit at Compressor Station No. 14. This unit is currently being constructed as part of FGT's Phase IV Expansion Project, to be completed in early 2001. The engine is a Solar Mars 90 T-13000S turbine compressor unit flat rated at 10,350 bhp that will be upgraded to 13,026 bhp. Fuel will be exclusively natural gas from FGT's natural gas pipeline. Engine specifications and stack parameters for the proposed engine are presented in Table 2-4.

Table 2-4 Proposed Upgraded Turbine (1407) Specifications and Stack Parameters

Parameter	Design
Compressor Engine	1407
Type	Gas Turbine
Manufacturer	Solar
Model	Mars 90 T-13000S
Unit Size	13,026 bhp
Heat Input [a]	8,626 Btu/hp-hr
Maximum Fuel Consumption [b]	0.10804 MMscf/hr
Speed	8,412 rpm
Stack Parameters	
Stack Height	58 ft
Stack Diameter	7.5 ft x 8 ft (rectangular)
Exhaust Gas Flow	179,531 acfm
Exhaust Temperature	867 °F
Exhaust Gas Velocity	50.3 ft/sec

NOTE:

acfm	=	actual cubic feet per minute.
bhp	=	brake horsepower.
Btu/hp-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 heat rate value plus 10%

[b] Based on heating value for natural gas of 1040 British thermal units per standard cubic foot (Btu/scf).

Hourly and annual emissions of regulated pollutants from the proposed engine under normal operating conditions are presented in Table 2-5. Emissions of NOX, CO and VOCs are based on the engine manufacturer's supplied data (See Attachment C).

Typically, turbine vendors do not provide information on particulate matter or SO_2 emissions; therefore, particulate matter emissions are based upon USEPA publication AP-42 Table 3.1-2 (USEPA, 2000) and emissions of SO_2 are based on FGT's Federal Energy Regulatory Commission (FERC) certificate limit of 10 grains sulfur per 100 cubic feet of natural gas. Hazardous air pollutant (HAP) emissions are based upon the Gas Research Institute's (GRI) HapCalc software, which uses USEPA emission factors, emission factors found in research literature and emission factors based on GRI research data.

Table 2-5 Proposed Upgraded Turbine (1407) Compressor Engine Emissions

Pollutant	Emission Factor	Reference	lb/hr	TPY
Nitrogen Oxides	10.17 lb/hr	Manufacturer Data	10.17	44.5
Carbon Monoxide	12.38 lb/hr	Manufacturer Data	12.38	54.2
Volatile Organic Compounds	0.35 lb/hr	Manufacturer Data	0.35	1.6
Particulate Matter	0.0066 lb/MMBtu	AP-42, Table 3.1-2a	0.74	3.2
Sulfur Dioxide*	10 grains/100 scf	FERC Limit	3.09	13.5
HAPs	Various see Attachment D	GRI HapCalc 3.0	0.62	2.7

* Emissions based on vendor provided fuel use value plus 10 per cent

2.2.3 Proposed Reciprocating Engine Modifications

The following describes and explains the modifications to be made to Emission Unit 1404.

2.2.3.1 Background

For natural gas engines, there is small window of relative proportions of air and fuel for which combustion can occur. Too much air relative to the amount of fuel in a cylinder head will not ignite. Also, if there is not enough air relative to the amount of fuel in the cylinder head, it will not ignite.

"Rich burn" engines power most of the old pipeline compressors. This means that they mix air and fuel in proportions such that the combustible mixture is on the low air to fuel ratio side of the combustion envelope. It has been known for some time now that one of the secrets of producing less NO_X in the internal engine combustion process is to increase the air manifold pressure and operate at higher air to fuel ratios. By increasing the air manifold pressure, more air is let into the cylinder head per each stroke. This means that more air is added to the same or similar parts of fuel for each "explosion" that occurs in the cylinder head. The result is lower cylinder temperatures and lower NO_X levels.

Most of the original engine manufacturers (OEM's) want the users to purchase their kit for accomplishing the modifications. These kits consist of expensive jet cells, modifications to cylinder heads, a cooling system for the jet cells and sometimes a whole new turbocharger. These kits are designed to operate the engine at the high end of the air to fuel mixture window. While these kits reduce the amount of NO_X formation, they are generally expensive to install, increase the maintenance of the ignition and cooling systems and reduce the reliability of the compressor engine. Furthermore, as a side effect, they sometimes reduce fuel consumption slightly.

Most compressor engines have been operated with the same OEM engine parameters since their installation. Not many users will modify the operating parameters given by the OEM. However, with the need for cleaner combustion, OEM's started modifying the parameters by increasing the air to fuel ratio with their kits. Users caught on and later began implementing non-OEM approaches. FGT's approach is to increase the air to fuel ratio incrementally to reduce the amount of NO_X without the use of OEM systems. By doing this, many of the complicated, unreliable systems are not required. Since this approach generally cannot achieve the same air to fuel ratios it does not yield the same levels of NO_X reduction; however, significant reductions are still achieved.

With this approach, FGT has demonstrated significant emission reductions. FGT believes it has accomplished these reductions without the compromised reliability and increased complexity of the OEM packages; however, any unit modified, will have to operate at an increased fuel consumption rate and increased frequency of maintenance of the turbocharger.

Inlet air temperature is also another factor in NO_x production from an engine. Temperature, like pressure, affects density. Just as increased air pressure increases density, lower temperature increases density as well. The more dense the air, the more air that can be put into a cylinder head, and therefore the higher the air to fuel ratio of the engine and in turn, the less NO_x that will be produced. Conversely, as the ambient temperatures rises, less air is put in the engine, and more NO_x is produced. Temperatures fluctuate from season to season. However, the modification that increases air manifold pressure increases the air into the cylinder head for any ambient temperature. Thus the air to fuel ratios are higher for any air manifold temperature the engine has experienced in the past.

2.2.3.2 Engine Modifications

In order to reduce emissions, FGT selected an older slow speed engine (emission Unit 1404) at Compressor Station No. 14. The modifications consist of modifying the turbocharger aerodynamics and the control system for the unit. The result is lower emissions but at a cost of added fuel and harder work from the turbocharger.

The turbocharger modifications consist of removing the turbocharger and sending it to a turbocharger overhaul and manufacturing facility where the internals will be modified to produce more air at higher pressures. By increasing the capability of the turbocharger to produce more air and at a higher pressure, higher air to fuel mixtures can be achieved. This means lower NO_X. The facility modifies the internals of the turbocharger with the correct aerodynamic components to produce the required air. FGT re-installs the turbocharger and re-adjusts the controls to make the compressor unit run with the modified turbocharger. The adjustment will consist of setting the air manifold pressure at a higher level than it was previously operated. In doing so, more air will enter into the cylinder for about the same amount of fuel. This will increase the air to fuel ratio. When the air manifold pressure setpoint is put into the controls, the unit is capable of operating at a higher air manifold pressure than it has in the past and the NO_X rate is reduced.

The controls modification consists of determining new engine operating settings for the modified condition, drawing curves to control the compressor unit to the desired settings, and reconfiguring the main control logic to control the compressor unit.

The basic effect of the modification on the units is increased air pressure to the engine, allowing higher air to fuel ratios. The resulting side effect on the turbocharger is that it must turn faster and will cause more backpressure on the engine. In basic terms, the turbocharger will "work harder" and is expected to require overhaul on a more frequent basis. Furthermore, the increased backpressure requires that the engine burn more fuel to function at the same horsepower levels. Based on FGT testing results, the increased fuel consumption for the compressor unit at Compressor Station No. 14 will be about 10%.

Engine parameters are given in Table 2-6 and pre-modification and post-modification emission rates are given in Tables 2-7 and 2-8. Pre-modification emissions are based on stack testing conducted in April 2000. A copy of the test report is located in Attachment E. Post-modification emission rates are based upon stack testing of a similar unit that was modified (see Attachment E for a test report summary).

Table 2-6 Proposed Modified Engine (1404) Specifications and Stack Parameters

Parameter	Design
Compressor Engine	1404
Type	Reciprocating Engine
Manufacturer	Worthington
Model	SEHG-8
Unit Size	2,000 bhp
Specific Heat Input	8,250 Btu/hp-hr
Maximum Fuel Consumption [a]	0.01587 MMscf/hr
Stack Parameters	
Stack Height	28 ft
Stack Diameter	1.44 ft
Exhaust Gas Flow	11,637 acfm
Exhaust Temperature	700 °F
Exhaust Gas Velocity	36.3 ft/sec

NOTE:
acfm = actual cubic feet per minute.
bhp = brake horsepower.
Btu/hp-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.

[a] Based on heating value for natural gas of 1040 British thermal units per standard cubic foot (Btu/scf).

Table 2-7 Pre-modification (1404) Compressor Engine Potential Emissions

Pollutant	Emission Factor	Reference	lb/hr	TPY
Nitrogen Oxides	16.6 g/hp-hr	Test Data	73.19	320.6
Carbon Monoxide	0.91g/hp-hr	Test Data	4.01	17.6
Volatile Organic Compounds	0.09 g/hp-hr	Test Data	0.40	1.7
Particulate Matter	0.00999 lb/MMBtu	AP-42 Table 3.2-2	0.15	0.7
Sulfur Dioxide*	10 grains/100 scf	FERC Limit	0.41	1.8
HAPs	Various see Attachment D	GRI HapCalc 3.0	0.76	3.32

* Emissions based on vendor provided fuel use value

Table 2-8 Post-modification (1404) Compressor Engine Potential Emissions

Pollutant	Emission Factor	Reference	lb/hr	TPY
Nitrogen Oxides	9.2 g/hp-hr	Similar Unit Test Data	40.56	177.7
Carbon Monoxide*	0.8 g/hp-hr	Similar Unit Test Data	3.53	15.5
Volatile Organic Compounds	0.1 g/hp-hr	Similar Unit Test Data	0.44	1.9
Particulate Matter**	0.00999 lb/MMBtu	AP-42 Table 3.2-2	0.16	0.7
Sulfur Dioxide**	10 grains/100 scf	FERC Limit	0.45	2.0
HAPs	Various see Attachment D	GRI HapCalc 3.0	0.76	3.3

* EMISSION RATES REFLECT 80% control efficiency for CO converter
** Emissions based on vendor provided fuel use value plus expected 10 % fuel use increase

2.2.3.3 Catalytic Converter for CO Emission Reduction.

Since the modifications described above will result in an increase in CO emissions, a catalytic converter will be added to the modified engine to reduce CO emissions. The converter will be a HIS Emission Reduction Systems Model DeCOHx-120/150/20WRL Converter/Silencer. Vendor information is provided in Attachment D. The emission rates provided in Table 2.8 reflect reductions from this converter at approximately 47% control efficiency. The vendor is guaranteeing 90% control efficiency. A lower control level has been used in this application due to potential variations in the results of the modifications on different engines.

2.2.4 Fugitive Emissions

Potential new emissions from Compressor Station No. 14 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 publication EPA-453/R-95-017, November 1995, "Protocol for Equipment Leak Emission Estimates"). Table 2-9 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.

2.2.5 Support Equipment Additions and Changes

In addition to the compressor engines, a new compressor building will be installed at the site. The location of the new building 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 78.5 feet long by 35.3 feet high.

2.2.6 Emissions Summary

The total changes in emissions resulting from the project are listed on Table 2-10. As can be seen from the table, the emissions increases are not significant under PSD. The calculations used to estimate these emissions are presented in Attachment D.

Table 2-9 VOC Fugitive Emission Calculations and Summary

Component	Service	Component Count	Emissions * Factor (ton/yr)	NM/NE Fraction	Emissions (ton/yr)
Valves	Gas	54	0.0434606	0.05	0.12
Connector	Gas	0	0.0019316	0.05	0.00
Flanges	Gas	90	0.0037666	0.05	0.02
Open-Ended Line	Gas	15	0.0193158	0.05	0.01
Pumps	Gas	1	0.023179	0.05	0.00
Other	Gas	0	0.0849895	0.05	0.00
Valves	Light Oil	7	0.0241448	1.00	0.17
Connector	Light Oil	0	0.0020282	1.00	0.00
Flanges	Light Oil	18	0.0010624	1.00	0.02
Open-Ended Line	Light Oil	2	0.0135211	1.00	0.03
Pumps	Light Oil	0	0.1255527	1.00	0.00
Other	Light Oil	0	0.0724343	1.00	0.00
Valves	Heavy Oil	3	0.0000811	1.00	0.00
Connector	Heavy Oil	0	0.0000724	1.00	0.00
Flanges	Heavy Oil	11	0.0000038	1.00	0.00
Open-Ended Line	Heavy Oil	0	0.0013521	1.00	0.00
Other	Heavy Oil	0	0.0002994	1.00	0.00
				TOTAL:	**0.37**

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

Table 2-10 Potential Annual Emissions (tpy) Summary

SOURCE ID	DESCRIPTION	NO_x	CO	VOC[a]	SO_2	PM
	EXISTING FACILITY					
1401	2000 bhp Recip. Engine	212.5	27.0	8.5	1.8	0.7
1402	2000 bhp Recip. Engine	212.5	27.0	8.5	1.8	0.7
1403	2000 bhp Recip. Engine	212.5	27.0	8.5	1.8	0.7
1404	2000 bhp Recip. Engine[b]	320.6	17.6	1.7	1.8	0.7
1405	2000 bhp Recip. Engine	212.5	27.0	1.7	1.8	0.7
1406	2700 bhp Recip. Engine	46.3	48.7	11.6	2.0	0.4
1407	10,350 bhp Turbine Engine	38.6	47.0	1.3	11.7	2.5
GEN03	637 bhp Recip. Engine	0.7	0.6	0.2	0.0	0.0
	OTHER SOURCES: [c]	0.0	0.0	3.5	0.0	0.0
	EXISTING ANNUAL POTENTIALTOTALS:	**1256.2**	**221.9**	**45.5**	**22.7**	**6.4**

	PROPOSED MODIFIED FACILITY					
1401	2000 bhp Recip. Engine	212.5	27.0	8.5	1.8	0.6
1402	2000 bhp Recip. Engine	212.5	27.0	8.5	1.8	0.6
1403	2000 bhp Recip. Engine	212.5	27.0	8.5	1.8	0.6
1404	2,000 bhp recip engine – modified[d]	177.7	15.5	1.9	2.0	0.7
1405	2,000 bhp recip engine	212.5	27.0	8.5	1.8	0.6
1406	2700 bhp Recip. Engine	46.3	48.7	11.6	2.0	0.4
1407	13,000 bhp Turbine Engine –upgraded	44.5	54.2	1.6	13.6	3.0
1408	15,700 bhp Turbine engine – new	61.8	38.1	2.4	15.4	3.5
GEN03	637 bhp Recip. Engine	0.7	0.6	0.2	0.0	0.0
	OTHER SOURCES: [c]	0.0	0.0	3.9	0.0	0.0
	PROPOSED ANNUAL POTENTIAL TOTALS:	**1181**	**265.1**	**55.6**	**40.2**	**10**

NET CHANGES IN POTENTIAL EMISSIONS:	**-75.2**	**43.2**	**10.1**	**17.5**	**3.6**

(a) VOC = Non-methane/non-ethane HC
(b) Based on stack testing
(c) Other Sources Includes ancillary equipment, storage tanks and equipment leaks
(d) 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. 14.

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. 14.

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. Gadsen County in 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.

Table 3-1 National and State Ambient Air Quality Standards (μg/m³)

POLLUTANT	AVERAGING PERIOD	EPA STANDARDS PRIMARY	EPA STANDARDS SECONDARY	FLORIDA STANDARDS
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.

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. Since Gadsen County is considered in attainment for all pollutants, the proposed new emissions are potentially subject to PSD review and not non-attainment review.

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 project's potential to emit must constitute a major stationary source or major modification to an existing major stationary source. A major stationary source is defined as any 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 3-2.

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.

Proposed project increases are determined for each pollutant and are equal to the actual emissions (average of the actual emissions over the two years immediately prior to the proposed project) subtracted from the proposed new allowable emissions. Fugitive emissions are only included in the potential to emit if the source is one of the 28 named source categories in 40 CFR 52.21(b)(1) or belongs to a stationary source category that is subject to an NSPS proposed prior to August 7, 1980 or that is subject to an NESHAPS promulgated prior to August 7, 1980. For this project, proposed new NO_X emissions are significant.

Netting is required for each regulated pollutant for which the proposed project increases (decreases are not considered yet) result in a significant increase in emissions. Netting is performed by identifying both the creditable and contemporaneous increases and the reductions in emissions. The contemporaneous period is defined as the period of time from five years prior to estimated start of construction through estimated start of operation.

a. 7 / 14 / 01 Date of estimated start of construction.

b. 7 / 14 / 96 Five years prior to estimated start of construction date.

c. 10 / 14 / 01 Date of estimated start of operation.

d. 7 / 14 / 96 to 10 / 14 / 01 Contemporaneous period (b. to c.).

The requirements for creditable increases and reductions are listed below.

- The increases/reductions occurred within the contemporaneous period.

- For each unit at the source at which the change occurred, the increases/reductions were calculated as the allowable emissions after the change minus the actual emissions averaged over the two-year period immediately preceding the change.

- The increases/reductions occurred at the applicant's contiguous or adjacent plant site and came from units under the same common ownership or control.

- The reductions have not been relied upon in issuing a previous PSD permit (including use in netting for a PSD permit).

- The reductions have not been relied upon in issuing a non-attainment permit and the reductions have not been used as an offset1 in a non-attainment permit or reserved in an application for use as an offset.

- The reductions will be federally enforceable by the start of construction of the proposed project and actually accomplished by the start of operation.

- The reductions have the same qualitative significance for public health as the increase from the proposed project.

Actual emission changes are provided in Table 3.3 and a summary of contemporaneous emission increases and decreases for Compressor Station No. 14 are listed in Table 3.4.

Table 3-3 Actual Annual Emissions

Emission Unit	Total Hours of Operation 1/1/99 Through 12/31/00	*A.* Average Annual Hours of Operation	*B.* NOx Emission Rate (lbs/hr)	*A x B /2000* NOx Actual Annual Emission Rate (tpy)
1407 (Ph IV)*	0.0	0.0	0.0	0.0
GEN03*	0.0	0.0	0.0	0.0
1404	13,671	6835.5	73.19	250.2
1407 (Ph V)	0.0	0.0	0.0	0.0
1408	0.0	0.0	0.0	0.0

* Installed February 2001

Table 3-4 Contemporaneous Emission Changes

Project Date	Emission Unit At Which Change Occurred	Project Name Or Activity	A. Allowable Emissions After The Activity (Tons/Year)	B. Actual Emissions Prior To The Activity (Tons/Year)	Difference (A-B) (Tons/Year)	Creditable Decrease Or Increase
			NOx			
01/01/01	1407 (Ph IV)	New turbine	38.6	0.0	38.6	38.6
01/01/01	GEN03	New Generator	0.7	0.0	0.7	0.7
12/01/01	1404	Engine modified	177.7	250.2	-72.5	-72.5
12/01/01	1407 (Ph V)*	Uprated turbine	5.9	0.0	5.9	5.9
12/01/01	1408	New turbine	61.8	0.0	61.8	61.8
						34.5

* Phase V portion only

Since Compressor Station No. 14 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. However, the net increase in emissions resulting from the proposed actions will not exceed the PSD significant rates; therefore, the compressor station is not subject to PSD pre-construction review as shown in Table 3.6.

Table 3-5 PSD Applicability

Regulated Pollutant:	**NO_X**
Significance level as defined in 40 CFR 52.21(b)(23)	40
Net contemporaneous change from Table3-4 (tpy)	34.5
Is PSD review applicable?	No

3.1.3 Non-Attainment New Source Review (NNSR) 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. 14 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)

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 new turbine to be installed at Compressor Station No. 14 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 SO_2 and requires performance testing and daily monitoring of fuel nitrogen and sulfur.

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

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

STD = Allowable NO_x emissions % by volume

Y = Heat rate at peak load not to exceed 14.4 *Kj/watt-hour*

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.

For new Engine No. 1408

Y = Btu/bhp-hr x 1.055 *Kj/Btu x hp-hr/745.7 watt-hour*

= 7,807 Btu/bhp-hr x 1.055 *Kj/Btu x hp-hr/745.7 watt-hour*

= *11.0 Kj/watt-hr*

STD = 0.0150 (14.4/11.0) + 0

= *0.0196 %*

= 196 ppm_v

For uprated Engine No. 1407

Y = Btu/bhp-hr x 1.055 *Kj/Btu x hp-hr/745.7 watt-hour*

= 7,842 Btu/bhp-hr x 1.055 *Kj/Btu x hp-hr/745.7 watt-hour*

= *11.1 Kj/watt-hr*

STD = 0.0150 (14.4/11.1) + 0

= *0.0195 %*

= 195 ppm_v

Table 3-6 summarizes the NSPS applicability for the proposed gas engines.

The two turbines at this facility will both meet the NSPS for NO_X of 196 ppmv and 195 ppmv (i.e., manufacturer's estimation of 25 ppmv), and for SO_2 of 150 ppmv (estimated for these turbines 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

  $H_{GEP} = H + 1.5\ L$

Table 3-6 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. 1407 Gas Turbine	Gas	NO_2	>10 MM Btu/hr	102 MM Btu/hr	195 ppm_v	25 ppm_v
GG	60.333(a)	Engine No. 1407 Gas Turbine	Gas	SO_2	>10 MM Btu/hr	102 MM Btu/hr	150 ppm_v	~4 ppm_v
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. 1408 Gas Turbine	Gas	NO_2	>10 MM Btu/hr	122 MM Btu/hr	196 ppm_v	25 ppm_v
GG	60.333(a)	Engine No. 1408 Gas Turbine	Gas	SO_2	>10 MM Btu/hr	122 MM Btu/hr	150 ppm_v	~4 ppm_v
Design maximum based on vendor data.								

Where:

H_{GEP} = 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 for the new turbine (Engine No. 1408) at Compressor Station No. 14 will be 61.5 feet (18.74 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.

3.1.5 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. 14 has no affected sources as defined by 40 CFR 63 Subpart HHH and is, therefore, not subject to this subpart.

There are potential future regulations that may affect sources at this facility, but these regulations have not been promulgated at this time.

3.2 Florida State Air Quality Regulations

Compressor Station No. 14 is currently operating under Permit No. 0390029-002-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. 14 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 NOx 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 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). The new and modified engines will not violate this standard.

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

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. 14	
3. Facility Identification Number: 0390029	[ ] Unknown
4. Facility Location: Street Address or Other Locator: Rt. 3 Box 3390, Highway 65 S City: Quincy County: Gadsen Zip Code: 32351-9803	
5. Relocatable Facility? [ ] Yes [X] No	6. Existing Permitted Facility? [X] Yes [ ] No

Application Contact

1. Name and Title of Application Contact: Jim Thompson, Director of Environmental
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:	3/26/01
2. Permit Number:	0390029-003-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: ______________________

[X] 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: ____ 0390029-001-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)

[X] 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: P.O. Box 1188 City: Houston State: TX Zip Code: 77251
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, 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.* Danny Pribble 3/16/01 Signature Date

* 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 [ ], 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 [X], 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: [signature] Date: March 9, 2001

(seal) PROFESSIONAL ENGINEER, STATE OF FLORIDA, KEVIN J. MCGLYNN

* Attach any exception to certification statement.

Scope of Application

Emissions Unit ID	Description of Emissions Unit	Permit Type	Processing Fee
007	Reciprocating I. C. Compressor Engine No. 1404, 2000 bhp, Natural Gas Fired	NA	$0
007	Turbine Compressor Engine No. 1407, 13,026 bhp,Natural Gas Fired	NA	$0
	Turbine Compressor Engine No. 1408, 15,700 bhp,Natural Gas Fired	NA	$0

Application Processing Fee

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

Construction/Modification Information

1. Description of Proposed Project or Alterations: Florida Gas Transmission Company (FGT) is proposing to install a new Pignone PGT-10B 15,700 bhp compressor turbine, to upgrade an existing Solar Mars 90 T-13000S to 13,026 bhp and to modify one existing 2,000 bhp reciprocating engine.
2. Projected or Actual Date of Commencement of Construction: 09/01/01
3. Projected Date of Completion of Construction: 12/01/01

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. 0390029-001-AV.

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

<table>
<tr><td colspan="4">1. Facility UTM Coordinates:
Zone: 16 East (km): 719.97 North (km): 3377.39</td></tr>
<tr><td colspan="4">2. Facility Latitude/Longitude:
Latitude (DD/MM/SS): 30/30/38 Longitude (DD/MM/SS): 84/42/28</td></tr>
<tr><td>3. Governmental Facility Code:
0</td><td>4. Facility Status Code:
A</td><td>5. Facility Major Group SIC Code:
49</td><td>6. Facility SIC(s):
4922</td></tr>
<tr><td colspan="4">7. Facility Comment (limit to 500 characters):

Compressor Station No. 14 is an existing natural gas pipeline compressor station with six reciprocating compressor engines and one compressor turbine.</td></tr>
</table>

Facility Contact

<table>
<tr><td colspan="3">1. Name and Title of Facility Contact: Wade Collins, Team Environmental Leader</td></tr>
<tr><td colspan="3">2. Facility Contact Mailing Address:
Organization/Firm: Florida Gas Transmission Company
Street Address: Rt. 3, Box 3390, Hwy 65 South
City: Quincy State: FL Zip Code: 32351-9803</td></tr>
<tr><td colspan="3">3. Application Contact Telephone Numbers:
Telephone: (850) 350-5300 Fax: (850) 350-5301</td></tr>
</table>

Facility Regulatory Classifications

Check all that apply:

1. [ ] Small Business Stationary Source?	[ ] Unknown
2. [X] Major Source of Pollutants Other than Hazardous Air Pollutants (HAPs)?	
3. [ ] Synthetic Minor Source of Pollutants Other than HAPs?	
4. [X] Major Source of Hazardous Air Pollutants (HAPs)?	
5. [ ] Synthetic Minor Source of HAPs?	
6. [ ] One or More Emissions Units Subject to NSPS?	
7. [ ] One or More Emission Units Subject to NESHAP?	
8. [ ] Title V Source by EPA Designation?	
9. Facility Regulatory Classifications Comment (limit to 200 characters): HAPs major source definition based on calculations performed using the Gas Research Institute's GRI-HAPCalc 3.0 software.	

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 lb/hour	tons/year	4. Basis for Emissions Cap	5. Pollutant Comment
NO_X	A				
CO	A				
VOC	B				
SO_2	B				
PM	B				
HAPs	A				

C. FACILITY SUPPLEMENTAL INFORMATION

Supplemental Requirements

1. Area Map Showing Facility Location: [X]Attached, Document ID: *Narrative Fig. 1-1* [ ] Not Applicable [ ] Waiver Requested
2. Facility Plot Plan: [X] Attached, Document ID:_*Att. B*__ [ ] Not Applicable [X] Waiver Requested
3. Process Flow Diagram(s): [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested
4. Precautions to Prevent Emissions of Unconfined Particulate Matter: [ ] Attached, Document ID:________ [X] Not Applicable [ ] Waiver Requested
5. Fugitive Emissions Identification: [ ] Attached, Document ID:________ [X] Not Applicable [ ] Waiver Requested
6. Supplemental Information for Construction Permit Application: [X] Attached, Document ID:__*Att. C*_ [ ] Not Applicable
7. Supplemental Requirements Comment: Attachment B contains a plot plan. Attachment C has vendor-supplied information. Attachment D has supporting calculations. Attachment E consists of a pre-modification test report for Engine 1404 and a test summary for modified unit 1205.

Additional Supplemental Requirements for Title V Air Operation Permit Applications

8. List of Proposed Insignificant Activities: [ ] Attached, Document ID:_______ [X] Not Applicable
9. List of Equipment/Activities Regulated under Title VI: [ ] Attached, Document ID:_______ [ ] Equipment/Activities On site but Not Required to be Individually Listed [X] Not Applicable
10. Alternative Methods of Operation: [ ] Attached, Document ID:_______ [X] Not Applicable
11. Alternative Modes of Operation (Emissions Trading): [ ] Attached, Document ID:_______ [X] Not Applicable
12. Identification of Additional Applicable Requirements: [ ] Attached, Document ID:_______ [X] Not Applicable
13. Risk Management Plan Verification: [ ] 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:____________________) [ ] Plan to be submitted to CEPPO (Date required:____________________) [X] Not Applicable
14. Compliance Report and Plan: [ ] Attached, Document ID:_______ [X] Not Applicable
15. Compliance Certification (Hard-copy Required): [ ] Attached, Document ID: _______ [X] 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

1. Type of Emissions Unit Addressed in This Section: (Check one)

[X] 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).

[ ] 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.

[ ] 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.

2. Regulated or Unregulated Emissions Unit? (Check one)

[X] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):

15,700 bhp natural gas fired turbine compressor unit, Engine No. 1408

4. Emissions Unit Identification Number: ID: [X] No ID [ ] ID Unknown

5. Emissions Unit Status Code: A	6. Initial Startup Date: 10/14/01	7. Emissions Unit Major Group SIC Code: 49	8. Acid Rain Unit? [ ]

9. Emissions Unit Comment: (Limit to 500 Characters)

The proposed new turbine engine will be a Pignone PGT10B engine compressor unit ISO rated at 15,700 bhp. Fuel will be exclusively natural gas from FGT's gas pipeline. The proposed engine will incorporate dry, low NO_X combustion technology.

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: 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	mmBtu/hr
2. Maximum Incineration Rate: NA	lb/hr	tons/day
3. Maximum Process or Throughput Rate: NA		
4. Maximum Production Rate: NA		
5. Requested Maximum Operating Schedule:	24 hours/day 52 weeks/year	7 days/week 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%.		

C. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

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	

D. EMISSI2ON POINT (STACK/VENT) INFORMATION
(Regulated Emissions Units Only)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram? 1408		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: None		
5. Discharge Type Code: V	6. Stack Height: 61.5 feet	7. Exit Diameter: 7.6 feet
8. Exit Temperature: 909 °F	9. Actual Volumetric Flow Rate: 215,230 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): 719.97 North (km): 3377.39		
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 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): fuel use based on vendor heat rate value of 7804 Btu/bhp-hr plus 10%. 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_2			EL
PM			EL
NO_X			EL
CO			EL
PM_{10}			EL
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: 14.1 lb/hour 61.76 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): (14.1 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: 14.1 lb/hour 61.76 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: 22.50 lb/hour 98.55 tons/year	4. Synthetically Limited? [Y]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year	
6. Emission Factor: 12.70 lb/hr @ 75% load; 6.9 lb/hr @ 100% load Reference: Vendor's data	7. Emissions Method Code: 5
8. Calculation of Emissions (limit to 600 characters): (22.5 lb/hr)(1 ton/2000 lb)(8760 hr/yr) = 98.55 tons/yr 100% load for 6570 hr/yr, 60% load for 1314 hr/yr and 50% load for 876 hr/yr. (5.14 lb/hr)(1 ton/2000 lb)(6570 hr/yr) = 16.88 tons/yr (17.34 lb/hr)(1 ton/2000 lb)(1314 hr/yr) = 11.39 tons/yr (22.5 lb/hr)(1 ton/2000 lb)(876 hr/yr) = 9.86 tons/yr 16.88 tpy + 11.39 tpy + 9.86 tpy = 38.1 tpy = 8.71 lb/hr	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Vendor's data based on ISO conditions at various loads.	

Allowable Emissions Allowable Emissions ___1_ of __3___

1. Basis for Allowable Emissions Code: ESCPSD	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units:	4. Equivalent Allowable Emissions: 5.14 lb/hour 16.9 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): Hours at 100% load = to 6750 hr/yr or more (5.14 lb/hr)(1 ton/2000 lb)(6570 hr/yr) = 16.88 tons/yr	

Allowable Emissions Allowable Emissions ___2_ of __3___

1. Basis for Allowable Emissions Code: ESCPSD	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units:	4. Equivalent Allowable Emissions: 17.34 lb/hour 11.4 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): Hours at 60% load = to 1314 hr/yr or less (17.34 lb/hr)(1 ton/2000 lb)(1314 hr/yr) = 11.39 tons/yr	

Allowable Emissions Allowable Emissions ___3_ of __3___

1. Basis for Allowable Emissions Code: ESCPSD	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units:	4. Equivalent Allowable Emissions: 22.5 lb/hour 9.9 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): Hours at 100% load = to 876 hr/yr or less (22.5 lb/hr)(1 ton/2000 lb)(876 hr/yr) = 9.86 tons/yr	

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 6.39 tons/year	4. Synthetically Limited? [Y]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year	
6. Emission Factor: 14.6 lb/hr THC 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 100% load for 6570 hr/yr, 60% load for 1314 hr/yr and 50% load for 876 hr/yr. (0.29 lb/hr)(1 ton/2000 lb)(6570 hr/yr) = 0.95 tons/yr (1.15 lb/hr)(1 ton/2000 lb)(1314 hr/yr) = 0.76 tons/yr (1.46 lb/hr)(1 ton/2000 lb)(876 hr/yr) = 0.64 tons/yr 0.95 tpy + 0.76 tpy + 0.64 tpy = 2.35 tpy = 0.54 lb/hr	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Vendor's data based on ISO conditions at various loads for total hydrocarbons (THC). VOCs assumed to be 10% of THC	

Allowable Emissions Allowable Emissions __1__ of __3__

1. Basis for Allowable Emissions Code: ESCPSD	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units:	4. Equivalent Allowable Emissions: 0.29 lb/hour 0.95 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): Hours at 100% load = to 6750 hr/yr or more (0.29 lb/hr)(1 ton/2000 lb)(6570 hr/yr) = 0.89 tons/yr	

Allowable Emissions Allowable Emissions __2__ of __3__

1. Basis for Allowable Emissions Code: ESCPSD	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units:	4. Equivalent Allowable Emissions: 1.15 lb/hour 0.76 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): Hours at 100% load = to 1314 hr/yr or more (1.15 lb/hr)(1 ton/2000 lb)(1314 hr/yr) = 0.76 tons/yr	

Allowable Emissions Allowable Emissions __3__ of __3__

1. Basis for Allowable Emissions Code: ESCPSD	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units:	4. Equivalent Allowable Emissions: 1.46 lb/hour 0.64 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): Hours at 100% load = to 876 hr/yr or more (1.46 lb/hr)(1 ton/2000 lb)(876 hr/yr) = 0.64 tons/yr	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: SO_2	2. Total Percent Efficiency of Control:
3. Potential Emissions: 3.70 lb/hour 16.22 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 gr S/100 scf)(0.1296 MMscf/hr)(1 lb/7000 gr) = 1.85 lb S/hr
(1.85 lb S/hr)(2 lb SO_2/lb S) = 3.70 lb SO_2/hr
(3.70 lb SO_2/hr)(8760 hr/yr)(1 ton/2000 lb) = 16.22 ton/yr

9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):

SO_2 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 SO_2 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 3.88 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)(134.27 MM Btu/hr) = 0.89 lb/hr (0.89 lb/hr)(8760 hr/yr)(1 ton/2000 lb) = 3.88 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: 0.751 lb/hour 3.29 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): (0.0217g/hp-hr)(15,700 hp-hr)(1 lb/453.6 g) = 0.751 lb/hr (0.751/lb/hr)(8760 hr/yr)(1 ton/2000 lb) = 3.29 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: VE20	2. Basis for Allowable Opacity: [X] Rule [ ] 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):	

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:	[ ] Rule [ ] 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 [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested	
2. Fuel Analysis or Specification [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested	
3. Detailed Description of Control Equipment [ ] Attached, Document ID:________ [X] Not Applicable [ ] Waiver Requested	
4. Description of Stack Sampling Facilities [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested	
5. Compliance Test Report [ ] Attached, Document ID:________ [ ] Previously submitted, Date:__________ [X] Not Applicable	
6. Procedures for Startup and Shutdown [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested	
7. Operation and Maintenance Plan [ ] Attached, Document ID:________ [X] Not Applicable [ ] Waiver Requested	
8. Supplemental Information for Construction Permit Application [X] Attached, Document ID:_*Narrative*__ [ ] Not Applicable	
9. Other Information Required by Rule or Statute [ ] Attached, Document ID:________ [X] Not Applicable	
10. Supplemental Requirements Comment: Supplemental information is provided in the narrative description and Attachment C accompanying these forms.	

Additional Supplemental Requirements for Title V Air Operation Permit Applications

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

1. Type of Emissions Unit Addressed in This Section: (Check one)

[X] 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).

[ ] 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.

[ ] 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.

2. Regulated or Unregulated Emissions Unit? (Check one)

[X] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):

13,026 bhp natural gas fired turbine compressor unit, Engine No. 1407

4. Emissions Unit Identification Number: [X] No ID
ID: [ ] ID Unknown

5. Emissions Unit Status Code: A	6. Initial Startup Date: 2/15/01	7. Emissions Unit Major Group SIC Code: 49	8. Acid Rain Unit? [ ]

9. Emissions Unit Comment: (Limit to 500 Characters)

The existing Solar Mars 90 turbine engine will be uprated from 10,350 bhp to 13, 026 bhp. Fuel will be exclusively natural gas from the FGT's gas pipeline. The proposed engine will incorporate dry, low NO_X combustion technology.

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: Solar	Model Number: Mars 90 T-13000S
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:	112.81	mmBtu/hr
2. Maximum Incineration Rate: NA	lb/hr	tons/day
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 112.81 MM Btu/hr based on vendor specifications of 7,842 Btu/hp-hr plus 10% and 13,026 bhp.		

C. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

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	

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? 1408	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: None	

5. Discharge Type Code: V	6. Stack Height: 58 feet	7. Exit Diameter: 7.5 x 8 feet
8. Exit Temperature: 867 °F	9. Actual Volumetric Flow Rate: 179,531 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): 719.97 North (km): 3377.39	
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 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: 0.10847	5. Maximum Annual Rate: 950.21	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): fuel use based on vendor heat rate value plus 10%. 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_2			EL
PM			EL
NO_X			EL
CO			EL
PM_{10}			EL
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: 10.17 lb/hour 44.54 tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year	
6. Emission Factor: 10.17 lb/hr Reference: Vendor's data	7. Emissions Method Code: 5
8. Calculation of Emissions (limit to 600 characters): (10.17 lb/hr)(1 ton/2000 lb)(8760hr/1 yr) = 44.54 tons/year	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Vendor's data based on ISO conditions with 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: 10.2 lb/hour 44.5 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 195 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: 12.38 lb/hour 54.22 tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year	
6. Emission Factor: 12.38 lb/hr Reference: Vendor's data	7. Emissions Method Code: 5
8. Calculation of Emissions (limit to 600 characters): (12.38 lb/hr)(1 ton/2000 lb)(8760 hr/1 yr) = 54.22 tons/year	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Vendor emission factor is based on a guaranteed value of 50 ppmv. FGT testing of similar units has never given values higher than 35 ppmv and they have usually been below 20 ppmv. 40 ppmv is more representative of expected values.	

Allowable Emissions Allowable Emissions __NA__ of ____

1. Basis for Allowable Emissions Code:	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: 0.355 lb/hour 1.55 tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year	
6. Emission Factor: 3.546 lb/hr UHC Reference: Vendor's data	7. Emissions Method Code: 5
8. Calculation of Emissions (limit to 600 characters): Vendor factor for unburned hydrocarbons (UHC) = 3.546 lb/hr. Assume 10% is VOC. (0.355 lb/hr)(1 ton/2000 lb)(8760 hr/1 yr) = 1.55 tons/year	
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: SO2	2. Total Percent Efficiency of Control:
3. Potential Emissions: 3.10 lb/hour 13.57 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 gr S/100 scf)(0.10804 MMscf/hr)(1 lb/7000 gr) = 1.54 lb S/hr
(1.54 lb S/hr)(2 lb SO2/lb S) = 3.10 lb SO2/hr
(3.10 lb SO2/hr)(8760 hr/yr)(1 ton/2000 lb) = 13.57 ton/yr

9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):

Based on vendor's heat rate data plus 10%.
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: 3.09 lb/hour 13.5 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/PM10	2. Total Percent Efficiency of Control:
3. Potential Emissions: 0.74 lb/hour 3.25 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)(112.36 MM Btu/hr) = 0.74 lb/hr
(0.74 lb/hr)(8760 hr/yr)(1 ton/2000 lb) = 3.25 ton/y

9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):

Based on vendor's heat rate data plus 10%.

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: 0.623 lb/hour 2.73 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 g/hp-hr)(13,026 hp-hr)(1 lb/453.6 g) = 0.623 lb/hr (0.623 lb/hr)(8760 hr/yr)(1 ton/2000 lb) = 2.73 ton/yr	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Detailed calculations provided in Attachment D. HAP emissions are 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: VE20	2. Basis for Allowable Opacity: [X] Rule [ ] 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):	

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:	[ ] Rule [ ] 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 [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested
2. Fuel Analysis or Specification [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested
3. Detailed Description of Control Equipment [ ] Attached, Document ID:________ [X] Not Applicable [ ] Waiver Requested
4. Description of Stack Sampling Facilities [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested
5. Compliance Test Report [ ] Attached, Document ID:________ [ ] Previously submitted, Date:__________ [X] Not Applicable
6. Procedures for Startup and Shutdown [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested
7. Operation and Maintenance Plan [ ] Attached, Document ID:________ [X] Not Applicable [ ] Waiver Requested
8. Supplemental Information for Construction Permit Application [X] Attached, Document ID:_Narrative__ [ ] Not Applicable
9. Other Information Required by Rule or Statute [ ] Attached, Document ID:________ [X] Not Applicable
10. Supplemental Requirements Comment: Supplemental information is provided in the narrative description and Attachment C accompanying these forms. Emissions testing has not been performed on this unit.

Additional Supplemental Requirements for Title V Air Operation Permit Applications

11. Alternative Methods of Operation
[ ] Attached, Document ID:________ [X] Not Applicable

12. Alternative Modes of Operation (Emissions Trading)
[ ] Attached, Document ID:________ [X] Not Applicable

13. Identification of Additional Applicable Requirements
[ ] Attached, Document ID:________ [X] Not Applicable

14. Compliance Assurance Monitoring Plan
[ ] Attached, Document ID:________ [X] Not Applicable

15. Acid Rain Part Application (Hard-copy Required) NA

[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
Attached, Document ID:________

[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
Attached, Document ID:________

[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)
Attached, Document ID:________

[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
Attached, Document ID:________

[ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)
Attached, Document ID:________

[ ] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)
Attached, Document ID:________

[ ] 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

1. Type of Emissions Unit Addressed in This Section: (Check one)

[X] 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).

[ ] 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.

[ ] 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.

2. Regulated or Unregulated Emissions Unit? (Check one)

[X] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):

Reciprocating I.C. Engine 1404, 2000 bhp, natural gas fired

4. Emissions Unit Identification Number: ID: 007 — [ ] No ID [ ] ID Unknown

5. Emissions Unit Status Code:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
A	1966	49	[ ]

9. Emissions Unit Comment: (Limit to 500 Characters)

This is an existing 2000 bhp reciprocating compressor engine that is being modified. See Narrative Section 2.2.3 for description of modifications. The modification will result in a decrease in NO_x emissions and an increase in fuel use.

Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method): See Narrative Section 2.2.3.	
2. Control Device or Method Code(s):	

Emissions Unit Details

1. Package Unit: Manufacturer: Worthington	Model Number: SEHG-8	
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:	16.5	mmBtu/hr
2. Maximum Incineration Rate: NA	lb/hr	tons/day
3. Maximum Process or Throughput Rate: NA		
4. Maximum Production Rate: NA		
5. Requested Maximum Operating Schedule:	24 hours/day 52 weeks/year	7 days/week 8760 hours/year
6. Operating Capacity/Schedule Comment (limit to 200 characters): Manufacturer rated at 2000 bhp. Heat output based on expected 10% increase after modification.		

C. EMISSIONS UNIT REGULATIONS2
(Regulated Emissions Units Only)

List of Applicable Regulations

FDEP Title V Core List	
62-296.320(4)(b)1 General Visible Emissions Standards	

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? 1404	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: None		
5. Discharge Type Code: V	6. Stack Height: 28 feet	7. Exit Diameter: 1.44 feet
8. Exit Temperature: 700 °F	9. Actual Volumetric Flow Rate: 11,637 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): 719.97 North (km): 3377.39		
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 reciprocating internal combustion engine driving a natural gas compressor, operating full time.		
2. Source Classification Code (SCC): 2-02-002-54	3. SCC Units: million cubic feet burned	
4. Maximum Hourly Rate: 0.0159	5. Maximum Annual Rate: 139.02	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_2			EL
PM/PM_{10}			EL
NO_X			EL
CO	99		EL
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: 40.56 lb/hour 177.7 tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year	
6. Emission Factor: 9.2 g/hp-hr Reference: Test data for similar unit	7. Emissions Method Code: 1
8. Calculation of Emissions (limit to 600 characters): (9.2 g/hp-hr)(2000 bhp)(1lb/453.6 g) = 40.56 lb/hr (40.56 lb/hr)(8760 hr/yr)(1 ton/2000 lb) = 177.7 ton/yr	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Expected emission rate based upon test data for modified engine of the same model.	

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: CO	2. Total Percent Efficiency of Control:
3. Potential Emissions: 3.53 lb/hour 15.5 tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year	
6. Emission Factor: 0.8 g/hp-hr Reference: Test data for similar unit	7. Emissions Method Code: 1
8. Calculation of Emissions (limit to 600 characters): (0.8 g/hp-hr)(2000 bhp)(1lb/453.6 g) = 3.53 lb/hr (3.53 lb/hr)(1 ton/2000 lb)(8760 hr/1 yr) = 15.5 tons/year	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Expected emission rate based upon test data for modified engine of the same model. Catalytic converter used for control.	

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: VOC	2. Total Percent Efficiency of Control:
3. Potential Emissions: 0.44 lb/hour 1.93 tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year	
6. Emission Factor: 0.1 g/hp-hr Reference: Test data for similar unit	7. Emissions Method Code: 1
8. Calculation of Emissions (limit to 600 characters): (0.1 g/hp-hr)(2000 bhp)(1lb/453.6 g) = 0.44 lb/hr (0.44 lb/hr)(8760 hr/yr)(1 ton/2000 lb) = 1.93 ton/yr	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Expected emission rate based upon test data for modified engine of the same model.	

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: SO2	2. Total Percent Efficiency of Control:
3. Potential Emissions: 0.45 lb/hour 2.0 tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year	
6. Emission Factor: 10 grains/100 scf Reference: FERC maximum allowable	7. Emissions Method Code: 2
8. Calculation of Emissions (limit to 600 characters): (10.0 gr S/100 scf)(0.0159 MM scf/hr)(1 lb/7000 gr) = 0.23 lb S/hr (0.23 lb S/hr)(2 lb/lb S) = 0.45 lb SO2/hr (0.45 lb SO2/hr)(8760 hr/yr)(1 ton/2000 lb) = 1.98 ton/yr	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Projected fuel use based on test data. 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 ___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: PM	2. Total Percent Efficiency of Control:
3. Potential Emissions: 0.16 lb/hour 0.72 tons/year	4. Synthetically Limited? [ ]
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 lb/MM Btu)(16.5 MM Btu/hr) = 0.16 lb/hr (0.16 lb/hr)(8760 hr/yr)(1 ton/2000 lb) = 0.72 ton/y	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Projected fuel use based on test data.	

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: 0.76 lb/hour 3.3 tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year	
6. Emission Factor: 0.172 g/hp-hr Reference: GRI-HAPCalc 3.0	7. Emissions Method Code: 5
8. Calculation of Emissions (limit to 600 characters): (0.172 g/hp-hr)(2,000 hp-hr)(1 lb/453.6 g) = 0.758 lb/hr (0.758 lb/hr)(8760 hr/yr)(1 ton/2000 lb) = 3.32 ton/yr	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Detailed calculations provided in Attachment D. HAP emissions are 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: VE20	2. Basis for Allowable Opacity: [X] Rule [ ] 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:	[ ] Rule [ ] 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 [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested	
2. Fuel Analysis or Specification [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested	
3. Detailed Description of Control Equipment [ ] Attached, Document ID:________ [X] Not Applicable [ ] Waiver Requested	
4. Description of Stack Sampling Facilities [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested	
5. Compliance Test Report [ ] Attached, Document ID:________ [ ] Previously submitted, Date:__________ [X] Not Applicable	
6. Procedures for Startup and Shutdown [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested	
7. Operation and Maintenance Plan [ ] Attached, Document ID:________ [X] Not Applicable [ ] Waiver Requested	
8. Supplemental Information for Construction Permit Application [X] Attached, Document ID:_Narrative [ ] Not Applicable	
9. Other Information Required by Rule or Statute [ ] Attached, Document ID:________ [X] 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. Attachment D contains an emissions test report for the pre-modification unit.	

Additional Supplemental Requirements for Title V Air Operation Permit Applications

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

1. Type of Emissions Unit Addressed in This Section: (Check one)

[ ] 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).

[ ] 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.

[X] 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.

2. Regulated or Unregulated Emissions Unit? (Check one)

[ ] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[X] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):

Fugitive emissions from component leaks.

4. Emissions Unit Identification Number:
[X] ID: [ ] ID Unknown

5. Emissions Unit Status Code: C	6. Initial Startup Date: 12/01/00	7. Emissions Unit Major Group SIC Code: 49	8. Acid Rain Unit? [ ]

9. Emissions Unit Comment: (Limit to 500 Characters)

These are new fugitive leak emissions from new components (valves, flanges, etc.)

8**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: Dwell Time: Incinerator Afterburner Temperature:		 °F seconds °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):				

C. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

List of Applicable Regulations

None	

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: 16 East (km): 719.97 North (km): 3377.39		
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):		

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			NS

G. EMISSIONS UNI2 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: 0.084 lb/hour 0.37 tons/year	4. Synthetically Limited? [ ]
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 Emission Estimates"	7. Emissions Method Code: 5

8. Calculation of Emissions (limit to 600 characters):

Assume non-methane/non-ethane fraction is 5%.

(EPA tpy factor for specific component type) (Number of components of specific type) = tpy.

lb/hr = (tons/year)(2000 lb/ton)(1 yr/8760 hr)

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):

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

Visible Emissions Limitation: Visible Emissions Limitation ___NA__ of _____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: [ ] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
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: [ ] Rule [ ] 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 [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested
2. Fuel Analysis or Specification [ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested
3. Detailed Description of Control Equipment [ ] Attached, Document ID:________ [X] Not Applicable [ ] Waiver Requested
4. Description of Stack Sampling Facilities [ ] Attached, Document ID:_______ [ ] Not Applicable [X] Waiver Requested
5. Compliance Test Report [ ] Attached, Document ID:________ [ ] Previously submitted, Date:_______________ [X] Not Applicable
6. Procedures for Startup and Shutdown [ ] Attached, Document ID:________ [X] Not Applicable [ ] Waiver Requested
7. Operation and Maintenance Plan [ ] Attached, Document ID:________ [X] Not Applicable [ ] Waiver Requested
8. Supplemental Information for Construction Permit Application [X] Attached, Document ID:_Narrative [ ] Not Applicable
9. Other Information Required by Rule or Statute [ ] Attached, Document ID:________ [X] Not Applicable
10. Supplemental Requirements Comment: Process flow diagrams and fuel analyses have been previously submitted. Supplemental information is provided in the narrative description and Attachment D accompanying these forms.

Additional Supplemental Requirements for Title V Air Operation Permit Applications

11. Alternative Methods of Operation
    [ ] Attached, Document ID:________ [X] Not Applicable

12. Alternative Modes of Operation (Emissions Trading)
    [ ] Attached, Document ID:________ [X] Not Applicable

13. Identification of Additional Applicable Requirements
    [ ] Attached, Document ID:________ [X] Not Applicable

14. Compliance Assurance Monitoring Plan
    [ ] Attached, Document ID:________ [X] Not Applicable

15. Acid Rain Part Application (Hard-copy Required)

    [ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
    Attached, Document ID:________

    [ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
    Attached, Document ID:________

    [ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)
    Attached, Document ID:________

    [ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
    Attached, Document ID:________

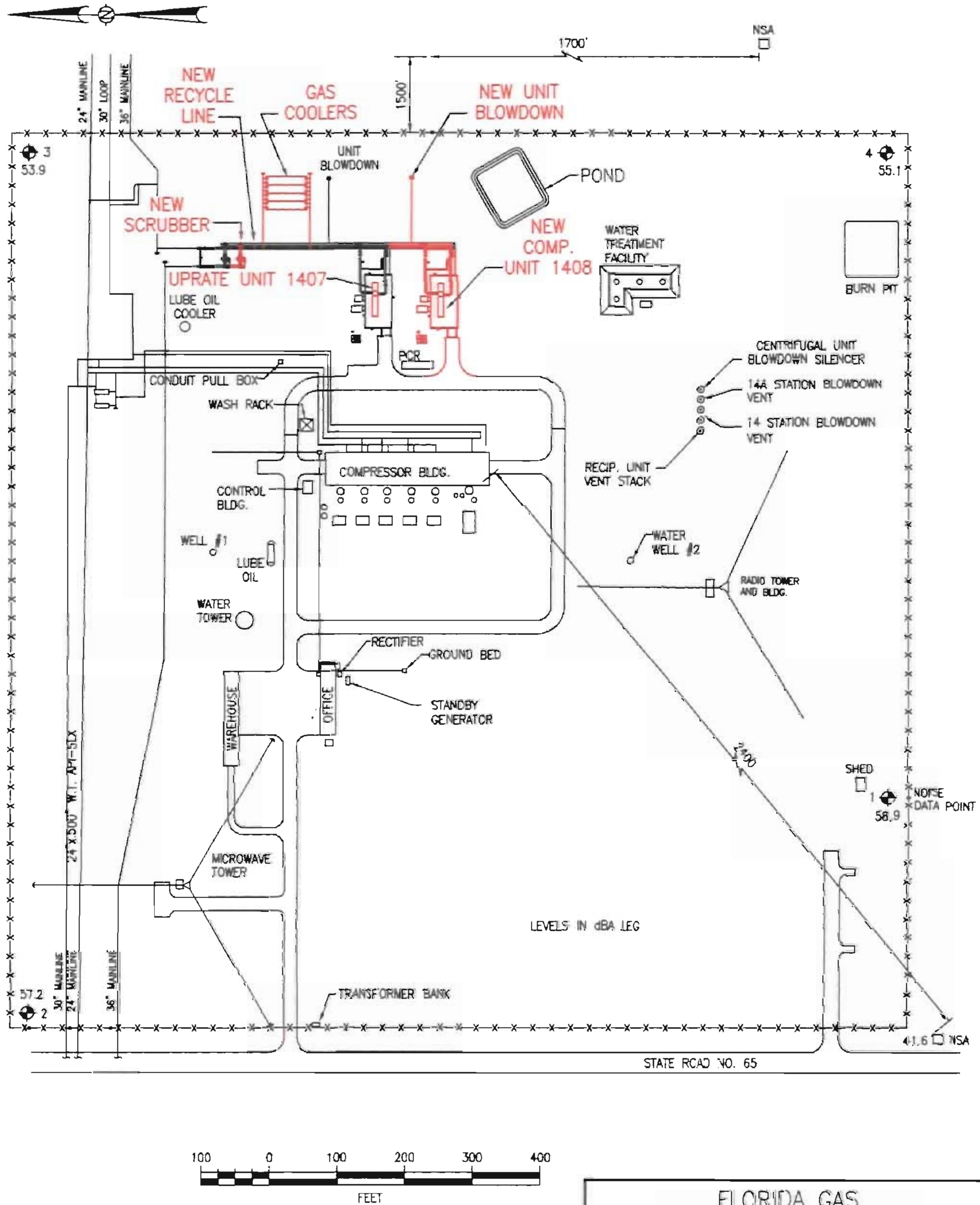
    [ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)
    Attached, Document ID:________

    [ ] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)
    Attached, Document ID:________

    [X] Not Applicable

Attachment B

Plot Plan



NOISE DATA:

Avg. 3–15 Sec.
LEQ taken 2 p.m. 1/8/91
Temp. 52°F
Wind: 2–3 MPH SE

FLORIDA GAS TRANSMISSION COMPANY

PROPOSED FGT PHASE V
COMPRESSOR STATION NO. 14A
PLOT PLAN

DWG. NO. NV-4 3/15/00

NV4.DWG - 07/17/2000 - 08:03

Attachment C

Vendor Information

Pignone Model PGT10B Turbine

Solar Model Mars 90 T-13000S Turbine

HIS Emission Reduction Systems Model DeCOHx Converter/Silencer

Pignone Model PGT10B Turbine

Nuovo Pignone FIRENZE	CLIENTE - CUSTOMER ENRON ENGINEERING COMPANY LOCALITA' - PLANT LOCATION FLORIDA/ALABAMA - USA
COMMESSA - JOB **1604865-66-67-68**	IMPIANTO - PLANT FGT PHASE V

TITOLO - TITLE

EXPECTED EMISSION DATA

REV	DESCRIZIONE - DESCRIPTION	PREP'D	CONT CHK'D	APP. APPR'D	DATA - DATE
2	GENERAL REVISION	AC			15/12/00
1	CUSTOMER COMMENTS INCLUDED	AC			02/11/00
0	EMESSO - ISSUED	AC	Caprarelli	Fierro	04/10/00

ITEM

N. SOM38867/4

LINGUA-LANG.	PAGINA-SHEET
A	1 / 2

SOSTITUISCE IL - REPLACES
SOSTITUITO DA - REPLACED BY

File: c:\[illegible]

Nuovo Pignone

FIRENZE

ISO

% Load	100	90	80	70	60	50
Hp	15700	14130	12560	10990	9420	7850
Exhaust ACFM	203557	197108	190636	179898	167739	155705
Exhaust Mass Flow lb/s	103.54	103.45	103.33	100.07	95.56	90.81
ExhaustTemp °F	909	868	826	793	763	735
Fuel Flowrate MMbtu/hr	122.52	114.17	105.72	96.10	86.25	76.61
Fuel Heat val. Btu/lb	20823	20823	20823	20823	20823	20823
Fuel Flow lb/h	5884	5483	5077	4615	4142	3679
NOx ppmvd @15%O2	25	25	25	25	25	25
CO ppmvd @15%O2	15	15	20	30	55	75
UHC ppvw @15%O2	7	7	10	20	30	40
VOC Lb/h	0.29104	0.29104	0.41516	0.80036	1.14704	1.4552
UHC Lb/h	1.36	1.36	1.94	3.74	5.36	6.8
NOx Lb/h	14.071	14.06	14.04	13.6	12.99	12.34
CO Lb/h	5.14	5.13	6.82	10.23	17.34	22.5

NOTES:

1) NOx values in ppmvd at ISO condition are contractually guaranteed. All other values per the above table have to be considered as expected values not subject to any contractual obligation.

2) In order to give in theis document the expected worst case conditions. All values herein are based on the referenced percentage of load at Full Speed.

		ITEM	
		N. SOM33867/4	
3	REVISED	LINGUA-LANG. A	PAGINA-SHEET 2 / 3
REV	DESCRIZIONE - DESCRIPTION		

SOSTITUISCE IL - REPLACES

SOSTITUITO DA - REPLACED BY

Solar Model Mars 90 T-13000S Turbine

SOLAR TURBINES INCORPORATED
ENGINE PERFORMANCE CODE REV. 2.85
CUSTOMER: FGT
JOB ID:

DATE RUN: 22-NOV-00
RUN BY: Casadonte, Corrine

NEW EQUIPMENT PREDICTED EMISSION PERFORMANCE
DATA FOR STATION 14

Fuel: SD NATURAL GAS
Water Injection: NO
Number of Engines Tested: 0
Model: MARS 90-T13002S CS/MD 122F MATCH GAS
Emissions Data: REV. 0.0

Customer: FGT
Inquiry Number: Station 12

CRITICAL WARNINGS IN USE OF DATA FOR PERMITTING

1. Short term permitting values such as PPMV or lbs/hr should be based on worst case actual operating conditions specific to the application and the site. Worst case for one pollutant is not necessarily the same for another. The values on this form are only predicted emissions at one specific operating condition; not necessarily the worst case.

2. Long term reference emission units (e.g. tons/yr) should reference the average conditions at the site (e.g. ISO). That number should not be derived from the worst case value referenced above, or conversely this average must not be used to calculate worst case.

3. Nominal values are based on actual test results, or predicted in the case of no actual engine tests. Expected maximum values should be referenced for permitting.

4. If a SoLoNOx model is planned to be installed in the future, use no less than 50 PPMv CO.

The following predicted emissions performance is based on the following specific single point: (see attached)

Hp= 13026, %Full Load= 100.0, Elev= 200 ft, %RH= 60.0, Temperature= 59.0 F

NOX		CO		UHC		
NOM	MAX	NOM	MAX	NOM	MAX	
*	25.00	*	50.00	*	25.000	PPMvd at 15% O2
*	10.17	*	12.38	*	3.546	lbm/hr
*	44.54	*	54.24	*	15.532	ton/yr

Hp= 12375, %Full Load= 95.0, Elev= 200 ft, %RH= 60.0, Temperature= 59.0 F

NOX		CO		UHC		
NOM	MAX	NOM	MAX	NOM	MAX	
*	25.00	*	50.00	*	25.000	PPMvd at 15% O2
*	9.76	*	11.88	*	3.402	lbm/hr
*	42.73	*	52.03	*	14.901	ton/yr

Hp= 11723, %Full Load= 90.0, Elev= 200 ft, %RH= 60.0, Temperature= 59.0 F

NOX		CO		UHC		
NOM	MAX	NOM	MAX	NOM	MAX	
*	25.00	*	50.00	*	25.000	PPMvd at 15% O2
*	9.33	*	11.35	*	3.252	lbm/hr
*	40.84	*	49.73	*	14.242	ton/yr

Hp= 11072, %Full Load= 85.0, Elev= 200 ft, %RH= 60.0, Temperature= 59.0 F

NOX		CO		UHC		
NOM	MAX	NOM	MAX	NOM	MAX	
*	25.00	*	50.00	*	25.000	PPMvd at 15% O2
*	8.92	*	10.86	*	3.109	lbm/hr
*	39.06	*	47.56	*	13.619	ton/yr

Hp= 9769, %Full Load= 75.0, Elev= 200 ft, %RH= 60.0, Temperature= 59.0 F

NOX		CO		UHC		
NOM	MAX	NOM	MAX	NOM	MAX	
*	25.00	*	50.00	*	25.000	PPMvd at 15% O2
*	8.47	*	10.32	*	2.954	lbm/hr
*	37.11	*	45.18	*	12.939	ton/yr

Hp= 9118, %Full Load= 70.0, Elev= 200 ft, %RH= 60.0, Temperature= 59.0 F

NOX		CO		UHC		
NOM	MAX	NOM	MAX	NOM	MAX	
*	25.00	*	50.00	*	25.000	PPMvd at 15% O2
*	8.26	*	10.05	*	2.879	lbm/hr
*	36.16	*	44.03	*	12.610	ton/yr

* NOMINAL EMISSIONS DATA UNAVAILABLE FOR THIS ENGINE

OTHER IMPORTANT NOTES

1. Solar does not provide maximum values for water-to-fuel ratio, SOx, particulates, or conditions outside those above without separate written approval.
2. Solar can optionally provide factory testing in San Diego to ensure the actual unit(s) meet the above values within the tolerances quoted. Pricing and schedule impact will be provided upon request.
3. Fuel must meet Solar standard fuel specification ES 9-98. Predicted emissions are based on the attached fuel composition, or, San Diego natural gas or equivalent.
4. If the above information is being used regarding existing equipment, it should be verified by actual site testing.

SOLAR TURBINES INCORPORATED
ENGINE PERFORMANCE CODE REV. 2.85
CUSTOMER: FGT
JOB ID: STATION 14

DATE RUN: 22-NOV-00
RUN BY: Casadonte, Corrine

MARS 90-T13002S
CS/MD
122F MATCH
GAS
TME-2S REV. 2.1

DATA FOR NOMINAL PERFORMANCE

Fuel Type SD NATURAL GAS

Elevation	Feet	200
Inlet Loss	in. H2O	0
Exhaust Loss	in. H2O	0

	LOAD	**FULL**	**95%**	**90%**	**85%**	**75%**	**70%**
Engine Inlet Temp.	Deg. F	59.0	59.0	59.0	59.0	59.0	59.0
Relative Humidity	%	60.0	60.0	60.0	60.0	60.0	60.0
Elevation Loss	Hp	96	91	86	81	71	67
Inlet Loss	Hp	0	0	0	0	0	0
Exhaust Loss	Hp	0	0	0	0	0	0
Driven Equipment Speed	RPM	8412	8292	8154	8013	7806	7687
Optimum Equipment Speed	RPM	8412	8292	8154	8013	7806	7687
Gas Generator Speed	RPM	11168	11066	10964	10865	10702	10614
Specified Load	Hp	FULL	12375	11723	11072	9769	9118
Net Output Power	Hp	13026	12375	11723	11072	9769	9118
Fuel Flow	MMBtu/hr	102.15	98.02	93.72	89.64	85.17	83.01
Heat Rate	Btu/Hp-hr	7842	7921	7994	8096	8719	9104
Inlet Air Flow	lbm/hr	316804	311200	305346	298866	287432	281950
Engine Exhaust Flow	lbm/hr	320719	314933	308889	302232	290619	285050
PCD	psi(g)	226.8	220.6	214.3	207.5	191.2	183.3
PT Inlet Temp. (T5)	Deg. F	1253	1227	1201	1179	1183	1186
Compensated PTIT	Deg. F	1272	1247	1221	1198	1203	1205
Exhaust Temperature	Deg. F	867	853	838	827	845	854

HIS Emission Reduction Systems Model DeCOHx Converter/Silencer

HIS Emissions Reduction Systems

HIS Emissions Reduction Systems

DeCOEx SILENCER in OXIDATION SERVICE

* SPECIFICATIONS
* OPERATION CONDITIONS
* INSTALLATION INSTRUCTIONS
* CLEANING INSTRUCTIONS
* DISASSEMBLY INSTRUCTIONS
* TROUBLE SHOOTING INSTRUCTIONS

9837 Whithorn Drive • Houston, Texas 77095 • 281-463-6883
P.O. Box 1639 • Cypress, Texas 77410 • Fax 281-463-6951

OXIDATION SERVICE

DeCOHx

H.L. Harris

The DeCOHx Silencer in oxidation service provides simultaneous reduction of CO, NMHC, aldehydes and HAP exhaust emissions, and exhaust noise for lean burning (oxygen rich), engines.

SPECIFICATIONS (General)

The DeCOHx Silencer design shall be multi-chamber, reactive type for the noise level specified, or the "generic" description "Commercial," "Standard," "Residential," or "Hospital."

Construction shall be of heavy gauge, carbon steel plate, minimum 11 gauge, rolled and continuously welded, incorporating standard flanged and dished heads for pressure vessel-like construction.

Flanges shall be 150 lb. F.F. ANSI diameter and drilling template.

Couplings shall be 3000 lb. rating and shall be sufficient in number to provide sample ports for: Catalyst upstream temperature, catalyst downstream temperature, high temperature alarm/shutdown, and drain.

Pressure drop, including exit loss to atmosphere, will be limited to 5.0 inches of water column, unless otherwise specified.

The DeCOHx Silencer shall be equipped with optional mounting brackets, trunnion pins, legs, or other types of supports for horizontal or vertical installation.

The DeCOHx Silencer shall be equipped with a "catalyst portal" at near midsection for easy access to the catalyst monolith, a seal ring shall provide the catalyst monolith a seal against exhaust gas bypass, and support to withstand vibration and thermal stress.

The DeCOHx Silencer shall be installed in a manner which best fits the piping configuration (with side inlet and/or side outlet) and in a location where inlet gas temperature is approximately 550°F minimum to 1200°F maximum.

The DeCHOx Silencer shall have external surfaces metallized by the flame spray method for carbon steel construction.

OXIDATION SERVICE

DeCOHx

H.L. Harris

CATALYST

A noble metal catalyst is offered for simultaneous reduction of CO, NMHC, aldehydes and HAP. Due to the high concentrations of oxygen in the exhaust of lean burn engines, the oxidation of CO and NMHC can easily be accomplished by the following reactions:

1. $2CO + O_2 \rightarrow 2CO_2$
2. $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$
3. $2H_2 + O_2 \rightarrow 2H_2O$

PERFORMANCE

Operating as prescribed in the "OPERATING CONDITIONS" portion of these specifications, the DeCHOx Silencer will perform to reduce exhaust emissions to the following minimum values. Catalyst application can be made to provide emissions rates lower than those stated here.

CO	reduction by 90% or more
NMHC/ROG	reduction to 70% (depending on gas composition and exhaust gas temperature]

New catalyst performance can be more than 99 percent efficient. As aging and accumulation of sulphated ash occur, performance will be within above limits until cleaning is required.

The catalyst in the DeCOHx Silencer has an operational life expectancy of five (5) to seven (7) years. Operation and maintenance within good operating practices will provide a long and trouble-free life.

Best Available Copy

for Oil and Fuel Specifications
Oxidation Service

DeCOMx

H.L. Harris

CATALYTIC CONVERTER/SILENCER OPERATING CONDITIONS

Exhaust gas temperature to the catalyst is to be 550°F minimum to 1200°F maximum. Reaction occurs at catalyst inlet temperature lower than 550°F, but reduction efficiency is decreased. Exhaust gas temperature below 700°F reduces the oxidation efficiency of VOCs.

Engine crankcase is to be properly vented to reduce oil carryover to the exhaust stream.

Combustibles content in the exhaust gas shall not produce catalyst outlet temperature higher than 1600°F.

Engine lube oil shall be no ash (0.0%) or low ash (0.5%) type. Oil lube additive packages shall not contain heavy metals or compounds in excess of those described in the following paragraph.

The following contaminants are known catalyst deactivators and contribute to shortened catalyst life: Heavy and base metals such as lead, mercury, arsenic, antimony, zinc, copper, tin, iron, barium, nickel and chrome, sulphur, silicon and phosphorous. Hence, the content of these elements in emissions at the catalytic inlet must not singularly exceed 1.0 ppm, or collectively must not exceed 5.0 ppm.

Chlorinated compounds in the fuel gas are not to exceed 10 ppm. Silicon compounds in the fuel gas are not to exceed 1 ppm. (Sulphur compounds in the fuel gas are not to exceed 400 ppm.)

Contaminants in excess of these amounts shall void the warranty.

Engine operation and maintenance shall be in accordance with manufacturers' recommended procedures at minimum and within good operation practices. A preventive or predictive maintenance program with attention to manufacturer's specific low emission operating parameters is preferred.

INSTALLATION

The DeCOHx Silencer is installed in the same manner as the usual exhaust silencer or muffler, either in the horizontal or vertical position. Location should be as close to the engine manifold as practical, where exhaust temperature is at least 550°F.

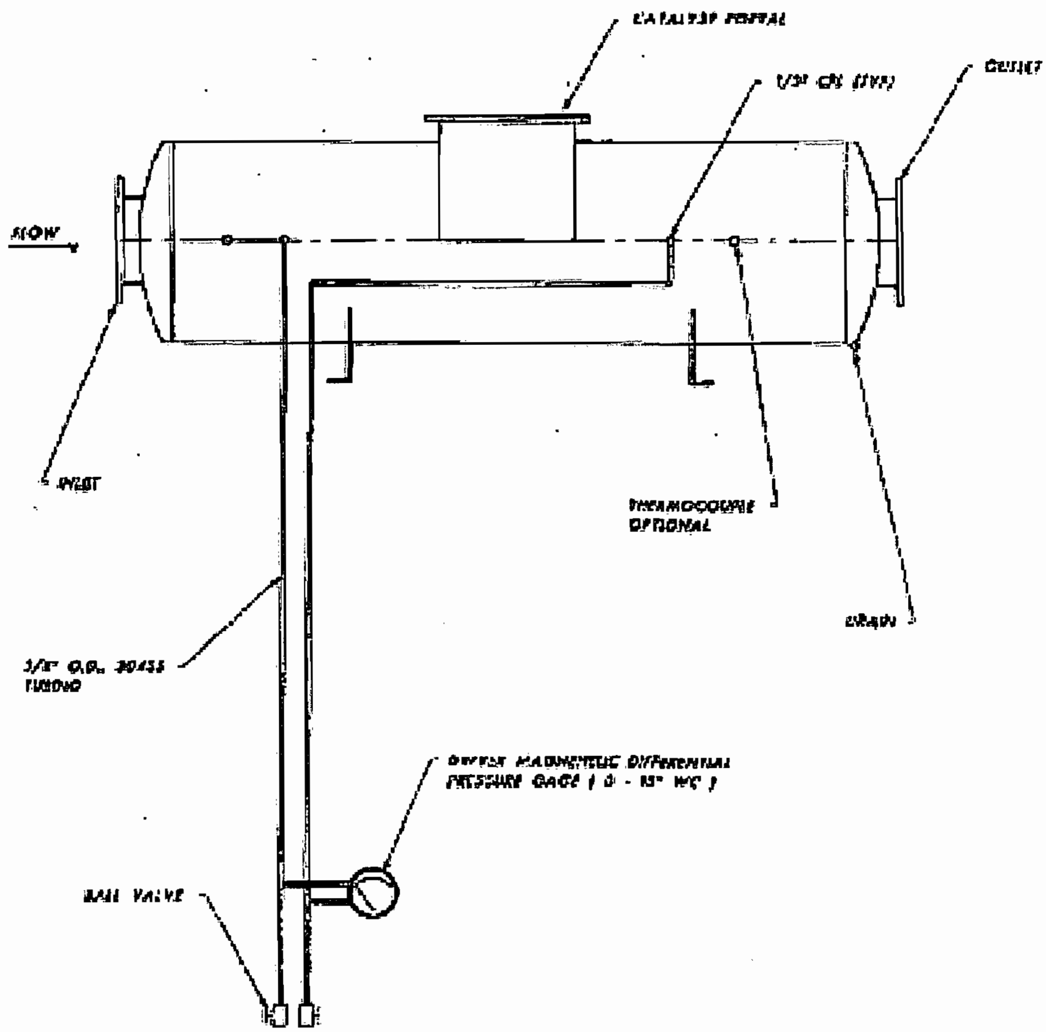
The DeNOx Silencer shall be properly supported within the limits of good piping practice.

Multiple couplings are provided for gas sampling, pressure differential measurements, temperature monitoring, and drain of free liquid and condensate. See Figure 1 for typical installation of sample lines, differential pressure gage and thermocouple.

DeCONx Silencer - Oxidation Service

SAMPLE LINE CONFIGURATION

REFERENCE	DeCONx
PREPARED BY	H.L. Harris



Houston Industrial Silencing

OXIDATION SERIES

DeCORx

M.L. Harris

CLEANING

The DeNOx Silencer catalyst module is accessible through the catalyst portal. Determine the safest method to disassemble the unit, then follow instructions described below.

There are several methods suggested for cleaning the catalyst monolith depending on the degree of loading. Following are some suggestions:

When the catalyst inlet has an accumulation of residual ash and other products of combustion (not caked oil), surfaces can be cleaned with the application of low pressure dry steam from the outlet side of the catalyst, blowing the dirt away from (instead of blowing into) the surface of the catalyst.

Another method is to soak the catalyst monolith in a solution of State 999 detergent in deionized water, rinse with deionized water, then blow dry when the particulate has soaked free.

When the "honeycomb" catalyst inlet is severely covered with oil carryover and other products of combustion, it is recommended that the module be cleaned with an ammonium hydroxide wash, free of lead and other heavy metals, and other contaminates which could poison the catalyst.

For assurance of cleanliness and inspection including refurbishment and repair, return the catalyst module to HIS.

Attachment D

Emission Calculations

Engine Emissions

Engine HAP Emissions

Fugitive Leak Emissions

Engine Emissions

Engine No. 1407 EPN: 008

NOx Emissions: (Based on Vendor Data)

lb NOx/hr =10.17

tons NOx/yr =(lb NOx/hr)(hr/yr)(1 ton/2000 lb)
=(10.17 lb NOx/hr)(8760 hr/yr)(1 ton/2000 lb)
=44.54

CO Emissions: (Based on Vendor Data)

lb CO/hr =12.38

tons CO/yr =(lb CO/hr)(hr/yr)(1 ton/2000 lb)
=(12.38 lb CO/hr)(8760 hr/yr)(1 ton/2000 lb)
=54.24

VOC Emissions: (Based on Vendor Data)

lb VOC/hr =0.354

tons VOC/yr =(lb VOC/hr)(hr/yr)(1 ton/2000 lb)
=(0.354 lb VOC/hr)(8760 hr/yr)(1 ton/2000 lb)
=1.55

SO2 Emissions: (Based on FERC Limits)

lb S/hr =(gr S/100 scf)(MMscf/hr)(1 lb/7000 gr)
=(10 gr S/100 scf)(0.1085 MMscf/hr)(1 lb/7000 gr)
=1.55

lb SO2/hr =(lb S/hr)(2 lb SO2/lb S)
=(1.55 lb S/hr)(2 lb SO2/lb S)
=3.10

tons SO2/yr =(lb SO2/hr)(hr/yr)(1 ton/2000 lb)
=(3.10 lb SO2/hr)(8760 hr/yr)(1 ton/2000 lb)
=13.57

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

lb PM/hr =(lb PM/MMBtu)(MMBtu/hr)
=(0.0066 MMBtu/hr)(112.36 MMBtu/hr)
=0.74

tons PM/yr =(lb PM/hr)(hr/yr)(1 ton/2000 lb)
=(0.74 lb PM/hr)(8760 hr/yr)(1 ton/2000 lb)
=3.2

Engine No. 1408 EPN: 010

CO Emissions: (Based on Vendor Data)

A	lb CO/hr =	5.14@	100% load
B	lb CO/hr =	17.34@	60% load
C	lb CO/hr =	22.5@	50% load

A	75% of year =	6570 hours
B	15% of year =	1314 hours
C	10% of year =	876 hours

tons CO = (lb CO/hr)(hr/yr)(1 ton/2000 lb)
= (5.14 lb CO/hr)(6570 hr/yr)(1 ton/2000 lb)
= 16.88

tons CO = (lb CO/hr)(hr/yr)(1 ton/2000 lb)
= (17.34 lb CO/hr)(1314 hr/yr)(1 ton/2000 lb)
= 11.39

tons CO = (lb CO/hr)(hr/yr)(1 ton/2000 lb)
= (22.5 CO/hr)(876 hr/yr)(1 ton/2000 lb)
= 9.86

tons CO/yr = (16.88 tons/yr) + (11.39 tons/yr) + (9.86 tons/yr)
= 38.13

VOC Emissions: (Based on Vendor Data)

A	lb VOC/hr =	0.29@	100% load
B	lb VOC/hr =	1.15@	60% load
C	lb VOC/hr =	1.46@	50% load

A	75% of year =	6570 hours
B	15% of year =	1314 hours
C	10% of year =	876 hours

tons VOC/yr = (lb VOC/hr)(hr/yr)(1 ton/2000 lb)
= (0.29 lb VOC/hr)(6570 hr/yr)(1 ton/2000 lb)
= 0.95

tons VOC/yr = (lb VOC/hr)(hr/yr)(1 ton/2000 lb)
= (1.15 lb VOC/hr)(1314 hr/yr)(1 ton/2000 lb)
= 0.76

tons VOC/yr = (lb VOC/hr)(hr/yr)(1 ton/2000 lb)
= (1.46 lb VOC/hr)(876 hr/yr)(1 ton/2000 lb)
= 0.64

tons CO/yr = (0.95 tons/yr) + (0.76 tons/yr) + (0.64 tons/yr)
= 2.35

NOx Emissions: (Based on Vendor Data)

lb NOx/hr = 14.10

tons NOx/yr = (lb NOx/hr)(hr/yr)(1 ton/2000 lb)
= (14.10 lb NOx/hr)(8760 hr/yr)(1 ton/2000 lb)
= 61.76

SO2 Emissions: (Based on FERC Limits)

lb S/hr = (gr S/100 scf)(MMscf/hr)(1 lb/7000 gr)
= (10 gr S/100 scf)(0.1296 MMscf/hr)(1 lb/7000 gr)
= 1.85

lb SO2/hr = (lb S/hr)(2 lb SO2/lb S)
= (1.85 lb S/hr)(2 lb SO2/lb S)
= 3.70

tons SO2/yr = (lb SO2/hr)(hr/yr)(1 ton/2000 lb)
= (3.70 lb SO2/hr)(8760 hr/yr)(1 ton/2000 lb)
= 16.22

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

lb PM/hr = (lb PM/MMBtu)(MMBtu/hr)
= (0.066 MMBtu/hr)(0.1296 MMBtu/hr)
= 0.89

tons PM/yr = (lb PM/hr)(hr/yr)(1 ton/2000 lb)
= (0.89 lb PM/hr)(8760 hr/yr)(1 ton/2000 lb)
= 3.90

Engine No. 1404 EPN: 007

NOx Emissions: (Based on Test Data for Similar Unit)

lb NOx/hr =(9.2 g/bhp-hr)(2000 bhp)(1 lb/453.59 g)
40.56

tons NOx/yr =(lb NOx/hr)(hr/yr)(1 ton/2000 lb)
=(40.6 lb NOx/hr)(8760 hr/yr)(1 ton/2000 lb)
=177.67

CO Emissions: (Based on Test Data for Similar Unit)

lb CO/hr =(0.8 g/bhp-hr)(2000 bhp)(1 lb/453.59 g)
3.53

tons CO/yr =(lb CO/hr)(hr/yr)(1 ton/2000 lb)
=(3.53 lb CO/hr)(8760 hr/yr)(1 ton/2000 lb)
=15.45

VOC Emissions: (Based on Test Data for Similar Unit)

lb VOC/hr =(0.1 g/bhp-hr)(2000 bhp)(1 lb/453.59 g)
0.441

tons VOC/yr =(lb VOC/hr)(hr/yr)(1 ton/2000 lb)
=(0.44 lb VOC/hr)(8760 hr/yr)(1 ton/2000 lb)
=1.93

SO2 Emissions: (Based on FERC Limits)

lb S/hr =(gr S/100 scf)(MMscf/hr)(1 lb/7000 gr)
=(10 gr S/100 scf)(0.0159 MMscf/hr)(1 lb/7000 gr)
=0.23

lb SO2/hr =(lb S/hr)(2 lb SO2/lb S)
=(0.23 lb S/hr)(2 lb SO2/lb S)
=0.45

tons SO2/yr =(lb SO2/hr)(hr/yr)(1 ton/2000 lb)
=(0.45 lb SO2/hr)(8760 hr/yr)(1 ton/2000 lb)
=1.99

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

lb PM/hr =(lb PM/MMBtu)(MMBtu/hr)
=(0.0 MMBtu/hr)(0.0159 MMBtu/hr)
=0.16

tons PM/yr =(lb PM/hr)(hr/yr)(1 ton/2000 lb)
=(0.16 lb PM/hr)(8760 hr/yr)(1 ton/2000 lb)
=0.72

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 1408 HAP Emission Factors and Emissions

Chemical	g/bhp-hr	tpy	lbs/hour	Factor set
Formaldehyde	0.0146323	2.22	0.5060	EPA
Acetaldehyde	0.0003443	0.05	0.0119	EPA
1,3-Butadiene	0.0000019	0.00	0.0001	EPA
Acrolein	0.000034	0.01	0.0012	EPA
Propional	0.000865	0.13	0.0299	GRI Field
Propylene Oxide	0.0001248	0.02	0.0043	EPA
n-Nitrosodimethylamine	0.000001	0.00	0.0000	EPA
Benzene	0.0006025	0.09	0.0208	EPA
Toluene	0.0005595	0.08	0.0193	EPA
Ethylbenzene	0.0001033	0.02	0.0036	EPA
Xylenes(m,p,o)	0.0001162	0.02	0.0040	EPA
2,2,4-Trimethylpentane	0.0016053	0.24	0.0555	GRI Field
n-Hexane	0.0015058	0.23	0.0521	GRI Field
Phenol	0.0001101	0.02	0.0038	GRI Field
n-Nitrosomorpholine	0.000001	0.00	0.0000	EPA
Naphthalene	0.0006025	0.09	0.0208	EPA
2-Methylnaphthalene	0.0000013	0.00	0.0000	GRI Field
Biphenyl	0.0003305	0.05	0.0114	GRI Field
Phenanthrene	0.0000005	0.00	0.0000	GRI Field
Chrysene	0.000001	0.00	0.0000	GRI Field
Beryllium	0.0000001	0.00	0.0000	GRI Field
Phosphorous	0.0000652	0.01	0.0023	GRI Field
Chromium	0.0000056	0.00	0.0002	EPA
Chromium	0.0000082	0.00	0.0003	GRI Field
Manganese	0.0000069	0.00	0.0002	EPA
Nickel	0.0000061	0.00	0.0002	GRI Field
Cobalt	0.0000016	0.00	0.0001	GRI Field
Arsenic	0.0000002	0.00	0.0000	EPA
Selenium	0.0000003	0.00	0.0000	GRI Field
Cadmium	0.0000036	0.00	0.0001	EPA
Mercury	0.0000019	0.00	0.0001	EPA
Lead	0.0000689	0.01	0.0024	EPA
TOTALS:	**0.0217114**	**3.29**	**0.7508**	

Turbine 1407 HAP Emission Factors and Emissions

Chemical	g/bhp-hr	tpy	Lbs/hour	Factor set
Formaldehyde	0.0146323	1.84	0.4198	EPA
Acetaldehyde	0.0003443	0.04	0.0099	EPA
1,3-Butadiene	0.0000019	0.00	0.0001	EPA
Acrolein	0.000034	0.00	0.0010	EPA
Propional	0.000865	0.11	0.0248	GRI Field
Propylene Oxide	0.0001248	0.02	0.0036	EPA
n-Nitrosodimethylamine	0.000001	0.00	0.0000	EPA
Benzene	0.0006025	0.08	0.0173	EPA
Toluene	0.0005595	0.07	0.0161	EPA
Ethylbenzene	0.0001033	0.01	0.0030	EPA
Xylenes(m,p,o)	0.0001162	0.01	0.0033	EPA
2,2,4-Trimethylpentane	0.0016053	0.20	0.0461	GRI Field
n-Hexane	0.0015058	0.19	0.0432	GRI Field
Phenol	0.0001101	0.01	0.0032	GRI Field
n-Nitrosomorpholine	0.000001	0.00	0.0000	EPA
Naphthalene	0.0006025	0.08	0.0173	EPA
2-Methylnaphthalene	0.0000013	0.00	0.0000	GRI Field
Biphenyl	0.0003305	0.04	0.0095	GRI Field
Phenanthrene	0.0000005	0.00	0.0000	GRI Field
Chrysene	0.000001	0.00	0.0000	GRI Field
Beryllium	0.0000001	0.00	0.0000	GRI Field
Phosphorous	0.0000652	0.01	0.0019	GRI Field
Chromium	0.0000056	0.00	0.0002	EPA
Chromium	0.0000082	0.00	0.0002	GRI Field
Manganese	0.0000069	0.00	0.0002	EPA
Nickel	0.0000061	0.00	0.0002	GRI Field
Cobalt	0.0000016	0.00	0.0000	GRI Field
Arsenic	0.0000002	0.00	0.0000	EPA
Selenium	0.0000003	0.00	0.0000	GRI Field
Cadmium	0.0000036	0.00	0.0001	EPA
Mercury	0.0000019	0.00	0.0001	EPA
Lead	0.0000689	0.01	0.0020	EPA
TOTALS:	**0.0217114**	**2.73**	**0.6229**	

Engine 1404 HAP Emission Factors and Emissions

Chemical	g/bhp-hr	tpy	Lbs/hour	Factor set
Formaldehyde	0.127006	2.45	0.5595	EPA
Methanol	0.0044452	0.09	0.0196	EPA
Acetaldehyde	0.0163293	0.32	0.0719	EPA
Acrolein	0.0074	0.14	0.0326	GRI Literature
Benzene	0.0034927	0.07	0.0154	EPA
Toluene	0.0036287	0.07	0.0160	EPA
Ethylbenzene	0.0003221	0.01	0.0014	EPA
Xylenes(m,p,o)	0.0012701	0.02	0.0056	EPA
2,2,4-Trimethylpentane	0.0013154	0.03	0.0058	EPA
n-Hexane	0.0032205	0.06	0.0142	EPA
Phenol	0.0000907	0.00	0.0004	EPA
Styrene	0.0001724	0.00	0.0008	EPA
Naphthalene	0.0000381	0.00	0.0002	EPA
Biphenyl	0.0007711	0.01	0.0034	EPA
Fluorene	0.0000367	0.00	0.0002	EPA
Ethylene Dibromide	0.0003629	0.01	0.0016	EPA
Vinyl Chloride	0.0001225	0.00	0.0005	EPA
Methylene Chloride	0.000313	0.01	0.0014	EPA
1,1-Dichloroethane	0.0001905	0.00	0.0008	EPA
1,3-Dichloropropene	0.0002177	0.00	0.0010	EPA
Chlorobenzene	0.0002177	0.00	0.0010	EPA
Chloroform	0.0002313	0.00	0.0010	EPA
1,1,2-Trichloroethane	0.0002087	0.00	0.0009	EPA
1,1,2,2-Tetrachloroethane	0.0004082	0.01	0.0018	EPA
Carbon Tetrachloride	0.0002994	0.01	0.0013	EPA
TOTALS:	**0.1721109**	**3.32**	**0.7582**	

Fugitive Leak Emissions

Fugitive Leak Emissions - FGT Compressor Station No. 14

Fugitive Emissions Factors					
			Emissions *		
Component		Service	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 EmissionEstimates"

New Component Emissions					
Component	Service	Component	Emissions *	NM/NE	Emissions
	2	Count	Factor (ton/yr)	Fraction	(ton/yr)
Valves	Gas	54	0.0434606	0.05	0.12
Connector	8Gas	0	0.0019316	0.05	0.00
Flanges	Gas	90	0.0037666	0.05	0.02
Open-Ended Line	Gas	15	0.0193158	0.05	0.01
Pumps	Gas	1	0.023179	0.05	0.00
Other	Gas	088	0.0849895	0.05	0.00
Valves	Light Oil	7	0.0241448	1.00	0.17
Connector	Light Oil	0	0.0020282	1.00	0.00
Flanges	Light Oil	18	0.0010624	1.00	0.02
Open-Ended Line	Light Oil	2	0.0135211	1.00	0.03
Pumps	Light Oil	0	0.1255527	1.00	0.00
Other	Light Oil	0	0.0724343	1.00	0.00
Valves	Heavy Oil	3	0.0000811	1.00	0.00
Connector	Heavy Oil	0	0.0000724	1.00	0.00
Flanges	Heavy Oil	11	0.0000038	1.00	0.00
Open-Ended Line	Heavy Oil	0	0.0013521	1.00	0.00
Other	Heavy Oil	0	0.0002994	1.00	0.00
				TOTAL:	**0.37**

Attachment E

Test Reports

Engine 1404 Pre-modification Report
Test Report Summary of Modified Engine 1504

Engine 1404 Pre-modification Report

TEST REPORT
ON
EXHAUST EMISSIONS

FROM

TWO WORTHINGTON SEHG-8
COMPRESSOR ENGINES
AT
COMPRESSOR STATION NO. 14
NEAR
QUINCY, FLORIDA

PREPARED FOR

FLORIDA GAS TRANSMISSION COMPANY

MAY, 2000

CUBIX JOB NO. 5825

PREPARED BY

Cubix Corporation
http://www.cubixcorp.com

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APPENDICES:

A. Field Data Sheets
B. Example Calculations
C. Fuel Analysis and Calculations
D. Operational Data
E. Quality Assurance Activities
F. Calibration Certifications
G. Strip Chart Records

INTRODUCTION

Emission testing was conducted on two reciprocating engines in service at Florida Gas Transmission Station 14 located eight miles southwest of Quincy, Florida. Nitrogen oxides (NO_X), carbon monoxide (CO), and other combustion products were measured in the exhaust of the engine. Cubix Corporation's Southeast Regional Office of Gainesville, Florida conducted these tests April 27, 2000.

The purpose of this testing was to provide baseline mass emission rates for two Worthington SEHG-8 engines (Units 1404 and 1405). For each source, three one-hour test runs were conducted documenting engine operational data, emission concentrations, and mass emission rates.

The tests followed the procedures set forth in the Code of Federal Regulations, Title 40, Part 60, Appendix A, Methods 1, 2, 3a, 4, 7e, 9, 10, 19 and 25a. Table 1 summarizes the background information pertinent to these tests.

This report has been reviewed and is approved for submittal by the following representatives:

Cubix Corporation

Florida Gas Transmission Co.

TABLE 1:
Background Data

Source Owner:	**Florida Gas Transmission Company** 601 South Lake Destiny Drive Maitland, Florida 32751 (407) 875-5865 TEL (407) 875-5896 FAX Attn: Clay Roesler, D.E.S.
Test Contractor:	**Cubix Corporation, SE Regional Office** 4536 NW 20th Drive Gainesville, Florida 32605 (352) 378-0332 TEL (352) 378-0354 FAX Attn: Leonard Brenner
Process Description:	Reciprocating compressor engines are used to compress natural gas for pipeline transmission.
Test Dates:	April 27, 2000
Locations:	8 miles southwest of Quincy, Florida
Emission Sampling Points:	Sampling on each reciprocating engine occurred from appropriately positioned sample ports on the exhaust stack of each source. Please see Appendix A for stack diagrams.
Test Participants:	**Florida Gas Transmission** George Gardener William Rogers **Enron Construction & Engineering** Marcello Minotti V. Duane Pierce (AQMcs)

Cubix Corporation
Leonard Brenner
Roger Paul Osier

Test Methods:

Environmental Protection Agency (EPA) Method 1 was used for selection of velocity traverse point locations.

EPA Method 2 was used for conducting stack gas velocity, i.e., pitot tube, measurements.

EPA Method 3a was used for determination of oxygen (O_2) and carbon dioxide (CO_2) concentrations.

EPA Method 4 was used for determination of stack gas moisture content.

Stoichiometric calculations were also used for moisture content determination.

EPA Method 7e was used for determination of oxides of nitrogen (NO_X) concentrations.

EPA Method 9 was used for determination of visual emission observations.

EPA Method 10 was used for determination of carbon monoxide (CO) concentrations.

EPA Method 19 was used for verification of volumetric flow rates by stoichiometric calculations based on O_2 and CO_2 "F Factors".

EPA Method 25a was used for determination of total hydrocarbon (THC) concentrations. VOC is calculated from THC and fuel analysis (see Appendix B, *Example Calculations*) Measurements were conducted on a methane basis.

SUMMARY OF RESULTS

FGT owns and operates Compressor Station 12 approximately 8 miles southwest of Quincy, Florida. At this station, a number of reciprocating compressor engines are utilized for the compression of natural gas for transport in an underground pipeline. The following units were tested to establish baseline emission rates for a specific engine type:

Unit 1404	Worthington SEHG-8
Unit 1405	Worthington SEHG-8

The tests on these sources are the subject of this report.

For each source, three one-hour test runs were conducted for each required EPA test method. NO_X, CO, THC, O_2, and CO_2 emissions were continuously monitored during each of these runs. Moisture content was determined gravimetrically during each test run using a chilled water impingement system. Stack velocity measurements were performed concurrently with each test run. Each unit was operating at greater than 90% of site rated torque and horsepower during each test run

Tables 2-3 are summaries of the testing results. Each summary table contains operating data recorded during the test from the engine's control panels (supplied by FGT personnel), ambient conditions, the measured emissions, and calculated mass emission rates. The emission rates for NO_X and CO are reported in terms of parts per million by volume (ppmv) on a dry basis, pounds per hour (lbs/hr), tons per year (tons/yr), and grams per brake horsepower hour (g/bhp-hr). Emission rates for Volatile Organic Compounds (VOC) (as derived from measured THC concentrations and the non methane, non ethane fraction of the fuel gas) are presented in terms of lbs/hr and g/bhp-hr.

Volumetric flow and mass emission rates were determined by two different techniques. The first technique employed a physical measurement of exhaust flow (EPA Methods 1-4), which included measurements of stack gas molecular weight, stack gas moisture, stack gas temperature, atmospheric pressure, and stack gas static and differential pressures (i.e., velocity). The field data sheets, used for collection of data specific to stack gas moisture and velocity, are in Appendix A.

The second technique employed a stoichiometric calculation (EPA Method 19) based on measurements of diluent gas (O_2 or CO_2) concentration, "F Factors" determined from fuel composition, and the engine's fuel consumption rate. This technique is performed to verify the accuracy of the physical measurement technique. Sometimes measuring engine exhaust flow with a pitot tube in a location with turbulent, pulsating flow (i.e., before a silencer) can produce inaccurate flow rate values.

Pollutant mass emission rates were calculated using the volumetric flow rates determined by EPA Methods 1-4. Examples of mass emission rate calculations and other calculations necessary for the presentation of the results of this section are contained in Appendix B. FGT determined and supplied the engine brake-specific horsepower data used in the determination of the emission rate units of g/bhp-hr.

Operational data obtained during the testing is presented in Appendix D. Records of quality assurance activities are in Appendix E. Certifications of calibration gases and equipment used to conduct tests at this facility are in Appendix F. Appendix G contains a copy of the strip chart records of the analyzer monitored emission concentrations

TABLE 2: Unit 1404
Baseline

Florida Gas Transmission
Compressor Station No. 14
8 miles SW of Quincy, FL on SR 65
Worthington SEHG-8 Compressor Engine — **2050 bhp @ 345 rpm**
Technicians: LJB, RPO

Test Run No.	1404-C-1	1404-C-2	1404-C-3	
Date	4/27/00	4/27/00	4/27/00	
Start Time	14:10	15:30	16:48	
Stop Time	15:10	16:30	17:48	
Engine/Compressor Operation				**Averages**
Engine Load (bhp, measured at the compressor)	1942	1927	1927	**1932**
Fuel Horsepower (bhp, based upon fuel torque)	1876	1862	1857	**1865**
Engine Speed (rpm)	344	343	343	**343**
Torque (%, full load = 2050 bhp at 345 rpm)	91.9	91.3	91.0	**91.4**
Ignition Timing (° BTDC)	18.0	18.0	18.0	**18.0**
Air Manifold Pressure ("Hg)	6.5	6.5	6.4	**6.4**
Air Manifold Temperature (°F)	95	95	94	**95**
Fuel Manifold Pressure (psig)	17.3	17.2	17.2	**17.3**
Station Suction Pressure (psig)	695	696	696	**696**
Station Suction Temperature (°F)	73.0	73.0	73.0	**73**
Station Discharge Pressure (psig)	928	926	925	**926**
Station Discharge Temperature (°F)	116.0	115.3	115.0	**115.4**
Compressor Flow Rate (MMSCFD)	112	113	113	**112.7**
Loading Step Number	1	1	1	**-**
Engine Fuel Data (Natural Gas)				
Fuel Heating Value (Btu/SCF, HHV)	1040.1	1040.1	1040.1	**1040.1**
Fuel Specific Gravity	0.5870	0.5870	0.5870	**0.5870**
O_2 "F-factor" (DSCFex/MMBtu @ 0% excess air)	8640	8640	8640	**8640**
CO_2 "F-factor" (DSCFex/MMBtu @ 0% excess air)	1027	1027	1027	**1027**
Fuel Flow (SCFH)	13,931	13,856	13,822	**13,870**
Heat Input (MMBtu/hr)	14.49	14.41	14.38	**14.43**
Brake-specific Fuel Consumption (Btu/bhp-hr)	7,461	7,479	7,461	**7467**
Ambient Conditions				
Atmospheric Pressure ("Hg)	29.67	29.63	29.64	**29.65**
Temperature (°F) : Dry bulb	83.0	81.0	79.8	**81.3**
(°F): Wet bulb	65.1	61.2	61.0	**62.4**
Humidity (lbs moisture/lb air)	0.0090	0.0069	0.0070	**0.0076**
Measured Emissions				
NO_X (ppmv, dry basis)	2015.5	1900.5	1941.0	**1952.3**
CO (ppmv, dry basis)	172.6	177.7	177.7	**176.0**
THC (ppmv, wet basis)	992.2	1057.9	1064.2	**1038.1**
Fuel VOC Fraction (% non-methane/non-ethane)	2.60	2.60	2.60	**2.60**
VOC (ppmv, wet basis)	25.8	27.5	27.7	**27.0**
O_2 (% volume, dry basis)	11.06	11.04	11.03	**11.04**
CO_2 (% volume, dry basis)	5.60	5.54	5.56	**5.57**
F_O (fuel factor, range = 1.600-1.836 for NG)	1.76	1.78	1.78	**1.77**
Stack Volumetric Flow Rates				
via Pitot Tube (SCFH, dry basis)	2.93E+05	2.92E+05	2.92E+05	**2.92E+05**
via O_2 "F_d-factor" (SCFH, dry basis)	2.66E+05	2.64E+05	2.63E+05	**2.64E+05**
via CO_2 "F_c-factor" (SCFH, dry basis)	2.66E+05	2.67E+05	2.66E+05	**2.66E+05**
Calculated Emission Rates (via pitot tube)				
NO_X (lbs/hr)	70.6	66.3	67.7	**68.2**
CO (lbs/hr)	3.68	3.77	3.77	**3.74**
VOC (lbs/hr, based on THC emissions and fuel VOC)	0.355	0.373	0.376	**0.368**
NO_X (tons/yr)	309	290	296	**299**
CO (tons/yr)	16.1	16.5	16.5	**16.4**
VOC (tons/yr)	1.55	1.64	1.65	**1.61**
NO_X (g/bhp-hr)	17.1	16.2	16.6	**16.6**
CO (g/bhp-hr)	0.890	0.919	0.922	**0.910**
VOC (g/bhp-hr)	0.086	0.091	0.092	**0.090**

TABLE 3: Unit 1405
Baseline

Florida Gas Transmission
Compressor Station No. 14
8 miles SW of Quincy, FL on SR 65
Worthington SEHG-8 Compressor Engine — 2050 bhp @ 345 rpm
Technicians: LJB, RPO

Test Run No.	1405-C-1	1405-C-2	1405-C-3	
Date	4/27/00	4/27/00	4/27/00	
Start Time	09:21	10:40	11:57	
Stop Time	10:21	11:40	12:57	
Engine/Compressor Operation				**Averages**
Engine Load (bhp, measured at the compressor)	1944	1913	1938	**1932**
Fuel Horsepower (bhp, based upon fuel torque)	1953	1923	1956	**1944**
Engine Speed (rpm)	345	345	345	**345**
Torque (%, full load = 2050 bhp at 345 rpm)	95.3	93.8	95.3	**94.8**
Ignition Timing (° BTDC)	18.0	18.0	18.0	**18.0**
Air Manifold Pressure ("Hg)	6.7	6.7	6.8	**6.7**
Air Manifold Temperature (°F)	95	96	91	**94**
Fuel Manifold Pressure (psig)	13.5	13.5	13.6	**13.5**
Station Suction Pressure (psig)	698	695	694	**696**
Station Suction Temperature (°F)	73.0	73.0	73.0	**73**
Station Discharge Pressure (psig)	927	921	927	**925**
Station Discharge Temperature (°F)	115.0	114.7	116.0	**115.2**
Compressor Flow Rate (MMSCFD)	118	118	116	**117.2**
Loading Step Number	6	6	6	**-**
Engine Fuel Data (Natural Gas)				
Fuel Heating Value (Btu/SCF, HHV)	1040.1	1040.1	1040.1	**1040.1**
Fuel Specific Gravity	0.5870	0.5870	0.5870	**0.5870**
O_2 "F-factor" (DSCFex/MMBtu @ 0% excess air)	8640	8640	8640	**8640**
CO_2 "F-factor" (DSCFex/MMBtu @ 0% excess air)	1027	1027	1027	**1027**
Fuel Flow (SCFH)	14,533	14,427	14,542	**14,500**
Heat Input (MMBtu/hr)	15.12	15.01	15.12	**15.08**
Brake-specific Fuel Consumption (Btu/bhp-hr)	7,775	7,844	7,804	**7808**
Ambient Conditions				
Atmospheric Pressure ("Hg)	29.76	29.75	29.73	**29.75**
Temperature (°F) : Dry bulb	68.1	73.0	77.3	**72.8**
(°F): Wet bulb	57.0	56.5	59.9	**57.8**
Humidity (lbs moisture/lb air)	0.0073	0.0058	0.0069	**0.0067**
Measured Emissions				
NO_X (ppmv, dry basis)	1985.0	1839.8	1811.1	**1878.6**
CO (ppmv, dry basis)	170.7	177.8	167.0	**171.8**
THC (ppmv, wet basis)	991.9	1028.6	1134.7	**1051.7**
Fuel VOC Fraction (% non-methane/non-ethane)	2.60	2.60	2.60	**2.60**
VOC (ppmv, wet basis)	25.8	26.7	29.5	**27.3**
O_2 (% volume, dry basis)	11.04	11.11	11.11	**11.09**
CO_2 (% volume, dry basis)	5.50	5.50	5.49	**5.50**
F_O (fuel factor, range = 1.600-1.836 for NG)	1.79	1.78	1.78	**1.79**
Stack Volumetric Flow Rates				
via Pitot Tube (SCFH, dry basis)	2.94E+05	2.88E+05	3.01E+05	**2.94E+05**
via O_2 "F_d-factor" (SCFH, dry basis)	2.77E+05	2.77E+05	2.79E+05	**2.78E+05**
via CO_2 "F_c-factor" (SCFH, dry basis)	2.82E+05	2.80E+05	2.83E+05	**2.82E+05**
Calculated Emission Rates (via pitot tube)				
NO_X (lbs/hr)	69.7	63.4	65.1	**66.1**
CO (lbs/hr)	3.65	3.73	3.65	**3.68**
VOC (lbs/hr, based on THC emissions and fuel VOC)	0.357	0.360	0.413	**0.377**
NO_X (tons/yr)	305	278	285	**289**
CO (tons/yr)	16.0	16.3	16.0	**16.1**
VOC (tons/yr)	1.56	1.58	1.81	**1.65**
NO_X (g/bhp-hr)	16.2	15.0	15.1	**15.4**
CO (g/bhp-hr)	0.848	0.880	0.848	**0.859**
VOC (g/bhp-hr)	0.083	0.085	0.096	**0.088**

ANALYTICAL TECHNIQUE

The emissions from two Worthington compressor engines were measured to determine the quantity of emissions being emitted to the atmosphere under full load operating conditions. The sampling and analysis procedures used during these tests conformed with those outlined in The Code of Federal Regulations, Title 40, Part 60, Appendix A, Methods 1, 2, 3a, 4, 7e, 9, 10, 19, and 25a. This section of the report describes the analytical techniques and procedures used during the testing.

The test matrix for each engine consisted of three-one hour test runs following each required test method. The stack gas was analyzed for NO_X, CO, THC, O2, and CO_2 by continuous instrumental monitors. THC analysis was on a wet basis; all other exhaust gas analyses were performed on a dry basis. Table 4 lists the instruments and detection principles used for these analyses.

Provisions were made to introduce the calibration gases to the instrumental monitors via two paths: 1) directly to the instruments via the sample manifold quick-connects and rotameters, and 2) through the complete sampling system including the sample probe, filter, heat trace, condenser, sample line, manifold, and rotameters. The former method was used for quick, convenient calibration checks. The latter method was used to demonstrate that the sample was not altered due to leakage, reactions, or adsorption within the sampling system (sample system bias check). A NO_X standard calibration gas was introduced into the NO_X analyzer directly. Then the response from the NO_X analyzer was noted as the calibration gas was introduced at the probe. Any difference between the two responses in the instrument was attributed to the bias of the sample system. Following the span gas bias check, a zero gas bias check was performed on the NO_X analyzer using nitrogen, or another calibration gas as a zero for NO_X, to check for any zero gas bias of the sample system. In accordance with EPA Method 3a, this span and zero bias check procedure was repeated for the O_2 and CO_2 analyzers. This procedure was also used for the CO analyzer (although not required by EPA Method 10). All calibrations for the THC analyzer were performed through the entire system as required by EPA Method 25a. While not required the more stringent bias and drift corrections of EPA Method 6c were applied to reported concentrations of THC.

As shown in Figure 1, a $^1/_2$-inch diameter stainless steel probe was inserted into the sample port of the stack. The gas sample was continuously pulled through the probe and transported via a 100-foot long $^3/_8$-inch diameter heat-traced Teflon® line into the mobile laboratory using a stainless steel/Teflon®

diaphragm pump. At the pump exit the pressurized sample was pushed into a heated sample manifold. A portion of this hot, wet sample was delivered to the THC analyzer. The bulk of the gas stream then passed into a stainless steel minimum contact condenser to dry the sample stream and into the (dry) sample manifold. From the manifold, the sample was partitioned to the analyzers through glass and stainless steel rotameters for flow control of the sample.

Instrumental monitors were housed in an air-conditioned trailer-mounted mobile laboratory. Gaseous calibration standards were provided in aluminum cylinders with concentrations certified by the vendor. EPA Protocol No. 1 was used to determine the cylinder concentrations where applicable (i.e., NO_X calibration gases).

EPA Method 1 was used to determine the velocity traverse point locations. Prior to conducting the tests, a cyclonic flow check was conducted. No significant cyclonic flow was encountered. The stack met the minimum criteria set forth in the method. The location of the sample ports and the pitot tube traverse point distances for the engine are denoted in the "Circular Stack Sampling Traverse Point Layout" data sheet, see Appendix A.

EPA Method 2 was used for determination of stack gas velocity during each run. Pitot tubes and either an inclined gauge oil manometer or NIST-traceable digital electronic manometer were used to measure the differential pressure at each traverse point. The stack temperature was determined with a K-type thermocouple and digital thermometer.

Stack volumetric flow rates were also determined using EPA Method 19 O_2 and CO_2 "F Factors". These "F Factors" and the heating value of the fuel were based on a fuel analysis provided by FGT's in-house laboratory. The fuel analysis and Cubix's fuel calculation table can be found in Appendix C of this report.

The stack gas analyses for CO_2 and O_2 concentrations were performed in accordance with procedures set forth in EPA Method 3a. Instrumental analyses were used in lieu of an Orsat or Fyrite procedure due to the greater accuracy and precision provided by the instruments. The CO_2 analyzer was based on the principle of infrared absorption; and, the O_2 analyzer operated using a current generating micro-fuel cell.

The F_O calculation of EPA Method 3b (Section 4.1.1) was used to verify that the ratios of O_2 to CO_2 combustion byproducts were within an acceptable range during each test run. In each case the F_O fell within the expected values for natural gas.

EPA Method 4 was used to measure the moisture content of the stack gas. A chilled liquid impingement system was used in conjunction with a calibrated dry gas meter to pull a sample greater than 21 scf coincident with each test run. A K-type (chromel-alumel) thermocouple was used in conjunction with a digital thermometer to determine the last impinger temperature in the chilled liquid impingement sampling train. This parameter is measured to ensure that the gas stream is cooled to a minimum of 68 degrees Fahrenheit as required by sampling methodology.

EPA Method 7e procedures were used to determine concentrations of NO_X (via chemiluminescence). NO_X mass emission rates were calculated as if the NO_X emissions were only in the form of NO_2. This approach corresponds to EPA's convention; however, it tends to overestimate the actual NO_X mass emission rates since the majority of NO_X is in the form of NO. NO has less mass per unit volume (i.e., lbs. of emissions per ppmv concentration) than NO_2.

CO emission concentrations were quantified in accordance with procedures set forth in EPA Method 10. A continuous non-dispersive infrared (NDIR) analyzer was used for this purpose. This reference method analyzer was equipped with a gas correlation filter that removes most interference from moisture, CO_2, and other combustion products.

THC measurements were made via EPA Method 25a. Measurements were made and reported on a methane basis. A flame ionization detector (FID) analyzer was used for this purpose. VOC concentrations were calculated based on the percentage by weight of non-methane/non-ethane hydrocarbons present in the fuel gas. This calculation assumes a proportionate burn ratio, and presents a "worst case" VOC concentration.

Electronic data logs were used to provide a record of the testing on Units 1404 and 1405. These data may also be found in Appendix G.

Cubix personnel collected ambient absolute pressure, temperature and humidity data. A wet/dry bulb sling psychrometer was used to determine ambient temperature and humidity conditions. An aircraft-type aneroid barometer (altimeter) was used to measure absolute atmospheric pressure.

FGT personnel also collected key operational data during each of the test runs and supplied it to Cubix. Key operational data collected included a current fuel analysis, fuel flow, fuel and air manifold pressures/temperatures, suction and discharge pressures, brake horsepower, engine torque, and engine speed. Horsepower measurements presented in the summary tables are those recorded by an engine analyst at or near the start of each test run. Grams per brake horsepower-hour calculations are on this basis.

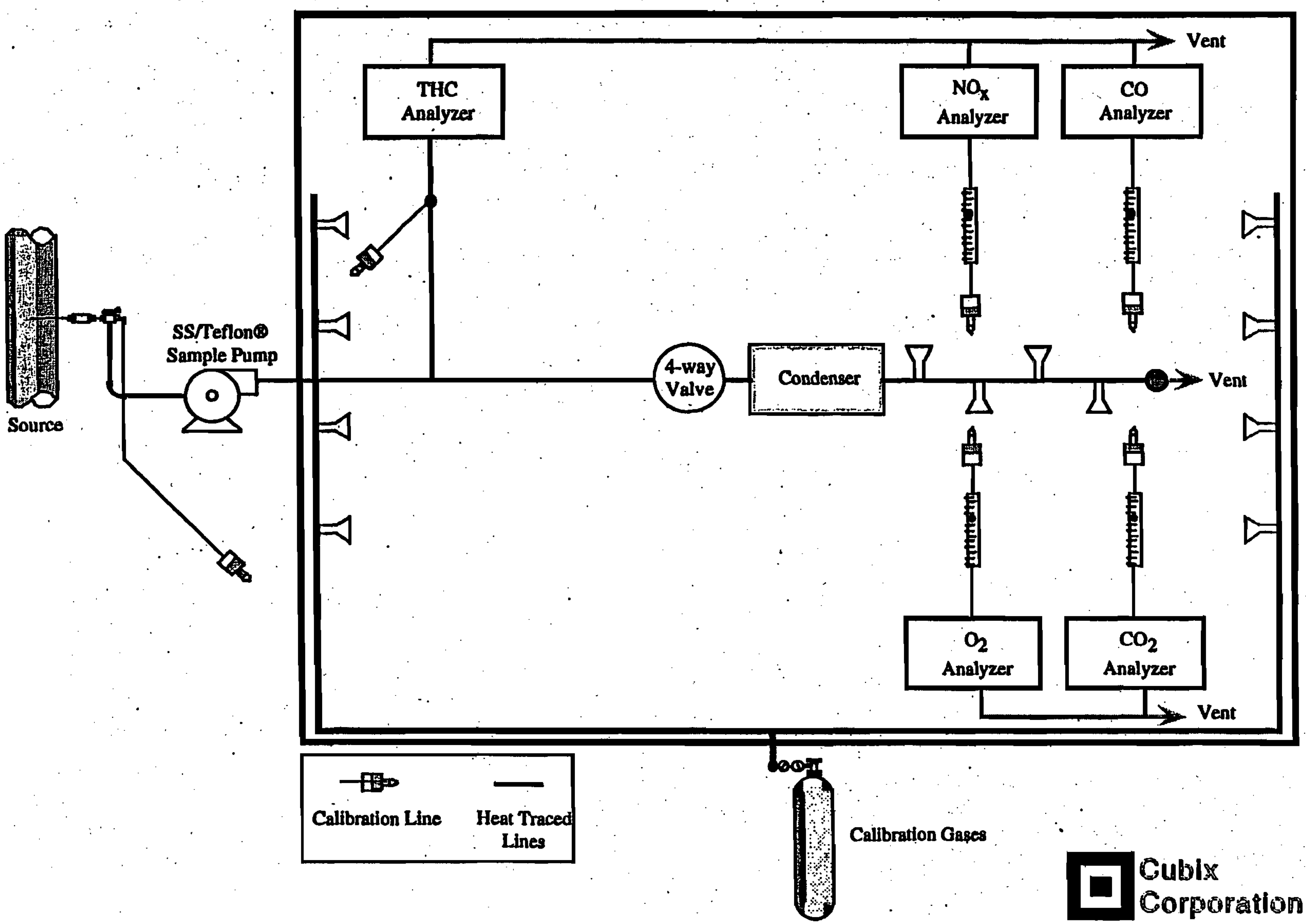
Emission calculations were conducted by a computer spreadsheet as shown in Tables 2-3 of this report. Example calculations were performed manually using a hand-held calculator in order to verify the formulas used in the spreadsheet. Example calculations are in Appendix B of this report.

TABLE 4
ANALYTICAL INSTRUMENTATION

Parameter	Model and Manufacturer	Common Use Ranges	Sensitivity	Response Time (sec.)	Detection Principle
NOx	TECO 10	0-10 ppm 0-100 ppm 0-200 ppm 0-500 ppm 0-1,000 ppm	0.1 ppm	1.7	Thermal reduction of NO to NO_2 Chemiluminescence of reaction of NO with O_3. Detection by PMT. Inherently linear for listed ranges.
CO	TECO 48H	0-10 ppm 0-100 ppm 0-500 ppm 0-1,000 ppm	1 ppm	10.0	Infrared absorption, gas filter correlation detector, microprocessor based linearization.
CO_2	Servomex 1400	0-20% 0-4%	0.02%	10.0	Infrared absorption, solid state detector
O_2	Teledyne Model 320	0-10% 0-23%	0.10%	15.0	Paramagnetic, inherently linear
THC	JUM Model 3-300	0-10, 0-100, 0-1000, 0-10000 0-100000 ppm	0.2 ppm	5.0	Flame ionization of hydrocarbons inherently linear over 2 orders of magnitude.
Temperature	Omega HH-26K	-120 to 2000 °F	0.1 °F	n/a	Chromel-alumel, K-type thermocouple with digital thermometer. Response time based on thermocouple design.

NOTE: Higher ranges available by sample dilution
Other ranges available via signal attenuation.

FIGURE 1
SAMPLE SYSTEM DIAGRAM



QUALITY ASSURANCE ACTIVITIES

A number of quality assurance activities were undertaken before, during and after this testing project. This section of the report in conjunction with the documentation in Appendix E describes each of those activities.

Each instrument's response was checked and adjusted in the field prior to the collection of data via a multi-point calibration. The instrument's linearity was checked by first adjusting the instrument's zero and span responses to zero nitrogen and an upscale calibration gas in the range of the expected concentrations. The instrument response was then challenged with other calibration gases of known concentration. For NO_X, CO, THC, O_2, and CO_2, the instrument's response was accepted as being linear if the response of the other calibration gases agreed within _2% span of the predicted values. The response of the infrared absorption type CO and CO_2 analyzers is made linear through electronic suppression.

The efficiency of the NO_2 to NO converter in the NO_X analyzer was checked by monitoring a mixture of NO in N_2 standard gas and zero grade air from a Tedlar® bag. When this bag is mixed and exposed to sunlight, the NO is oxidized to NO_2. If the NO_X instrument's converter is 100% efficient, then the total NO_X response does not decrease as the NO in the bag is converted to NO_2. The criterion for acceptability is demonstrable NO_X converter efficiency greater than 90%; this is demonstrated if the concentration of NO_X does not decrease by more than 2% of the highest read value over a 30-minute period. The strip chart and data log excerpts that demonstrate the converter efficiency test are available in Appendix G. Quality assurance worksheets, found in Appendix E, also summarize the results of each converter efficiency test.

System bias checks were performed both before and after the sampling system was used for emissions testing. The sampling system's integrity was tested by comparing the responses of the NO_X analyzer to a calibration gas (and a zero gas) introduced via two paths as previously described in the *Analytical Techniques* section of this report. This system bias test was performed to assure that no alteration of the sample had occurred during the test due to leakage, reactions, or absorption. Similarly, system bias checks were performed with CO, O_2, and CO_2 for added assurance of sample system integrity. Examination of the strip chart excerpts and Instrumental Analysis Quality Assurance Data worksheet in Appendix E shows that the analyzer response via both sample paths agreed within ±5%.

The residence time of the sampling and measurement system was estimated using the pump flow rate and the sampling system volume. The pump's rated flow rate is 0.8 scf per minute (scfm) at 5 psig. The sampling system volume was approximately 0.39 scf. Therefore, the minimum sample residence time was approximately 29 seconds.

Cubix Corporation and instrument vendors conducted interference response tests on the NO_X, CO, and O_2 analyzers. The sum of the interference responses for H_2O, C_3H_8, CO, CO_2 and O_2 is less than 2 percent of the applicable full-scale span value. The instruments used for the tests meet the performance specifications for EPA Methods 3a, 7e, 10, and 20. The results of the interference tests are available in Appendix E of this report.

The sampling system was leak checked by demonstrating that it could hold a vacuum greater than 10 inches of mercury (Hg) for at least 1 minute with a decline of less than 1 inch Hg. A leak test was conducted after the sample system was set up (i.e., before testing began) and before the system was dismantled (i.e., after testing was completed). These tests were conducted to insure that ambient air was not diluting the sampling system. The actual vacuum was greater than 25 inches Hg in each case with no leakage detected.

Prior to and following each test run, the analyzers were checked for zero and span drift using the calibration gas line attached to the sample probe. This brackets each test run by calibrations and documents the precision of the data just collected. Based on the applicable test method, the criterion for acceptable data is that each instrument drift no more than ±3% or ±5% of the full-scale response. Appendix E contains quality assurance tables summarizing all calibration error checks and the zero and span checks that were performed for each test run. These worksheets (as prepared from the strip chart records) show that no drift in excess of each gas constituent's calibration requirement was found. The worksheets also contain data used to correct gas concentrations for drift (Method 6c, equation 6c-1).

The control gases used to calibrate the instruments were analyzed and certified by the compressed gas vendors to ±1% accuracy for each calibration gas. EPA Protocol No. 1 was used, where applicable (i.e., NO_X gases), to assign the concentration values traceable to the National Institute of Standards and Technology (NIST), Standard Reference Materials (SRM's). The gas calibration sheets as prepared by the vendor are contained in Appendix F.

The pitot tube tips used during the testing were visually inspected to insure that they met the criteria of EPA Method 2. The pitot tube lines were leak checked in the field in accordance with EPA Method 2 guidelines each time connection to a manometer was made.

The dry gas meters used for the moisture trains were calibrated prior to testing in accordance with EPA Method 4. A NIST reference instrument, a bell prover, was used for these calibrations. Calibration certification documentation of the dry gas meters can be found in Appendix F.

Appendix F also contains calibration data on the altimeter and thermocouples used during this testing.

Cubix collected and reported the enclosed test data in accordance with the procedures and quality assurance activities described in this test report. Cubix makes no warranty as to the suitability of the test methods. Cubix assumes no liability relating to the interpretation and use of the test data.

APPENDIX A:
FIELD DATA SHEETS

Cubix Corporation

FIELD TEST PARTICIPANTS

SIGN IN SHEET

Job Name FGT, Station 14, Quincy, Fl NOx Study **DATE(S):** 4-27-00

Job Number 5825 **PERMIT #** 0390029-001-AV

Plant Name/Location Station #14, Quincy, Fl

Emission Source(s) Units 1405 & 1404, Worthington Compressor Engines SEHG-8's Compressor Engines

PARTICIPANTS:

CUBIX CORPORATION — Test Contractor

FGT — Owner/Operator

FDEP (not present) — Regulatory Agency

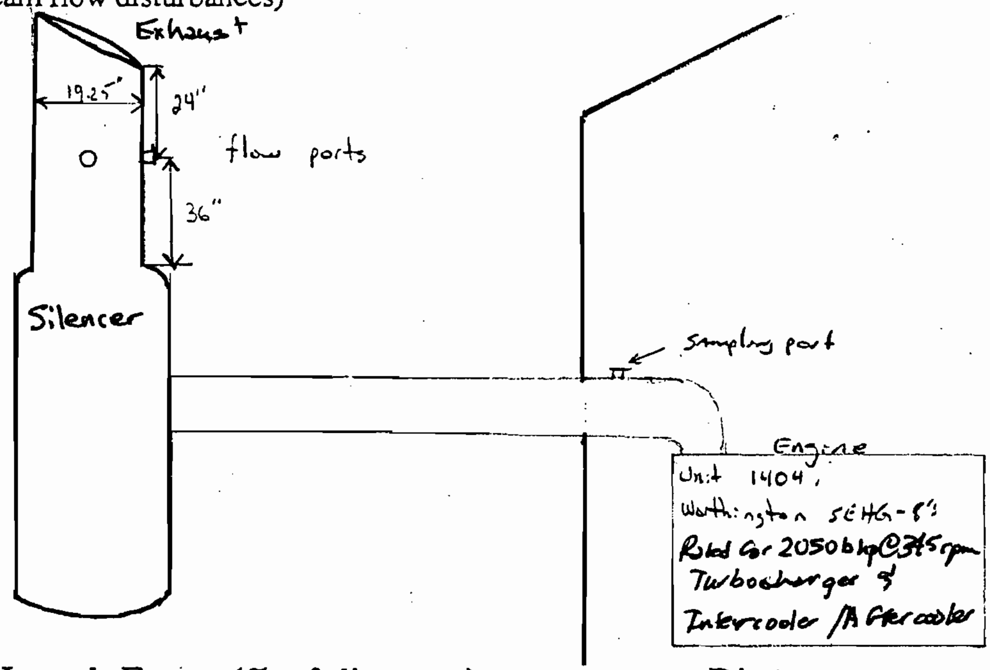
Name:	Affliation:	Position:	Phone Number	Job Safety Review (Y/N)
Leonard Brenner	Cubix Corporation	Project Manager	352 378-0332	Y
Roger Paul Osier	Cubix Corporation	Field Tech	352-378-0332	Y
V. Duane Pierce	FGT / A&M Co	Consultant	281 373 5365	Y
William Rogers	Florida Gas	Engine Specialist	850-350-5120	Y

Circular Stack Sampling Traverse Point Layout
(EPA Method 1)

Date: 4-27-00
Plant: FGT, Station 14 Quincy, Fl
Source: Unit 1404, Worthington SEHG-8 Compressor Engine
Technician(s): RPD, LSB

Port + Stack ID: 20.75 in.
Port Extension: 1.50 in.
Stack ID: 19.25 in.
Stack Area: 2.02 ft^2
Total Req'd Traverse Pts: 16
No. of Traverse Pts: 8 /diam
No. of Traverse Pts: 8 /port

Stack Diagram (Side View showing major unit components, dimensions and nearest upstream & downstream flow disturbances)



Traverse Point Number	Length Factor (% of diameter) Number of Points per Diameter 4	6	8	12	Distance from Reference Point (inches)
1	6.7	4.4	3.2	2.1	2.12
2	25.0	14.6	10.5	6.7	3.52
3	75.0	29.6	19.4	11.8	5.23
4	93.3	70.4	32.3	17.7	7.72
5		85.4	67.7	25.0	14.53
6		95.6	80.6	35.6	17.02
7			89.5	64.4	18.73
8			96.8	75.0	20.13
9				82.3	
10				88.2	
11				93.3	
12 -				97.9	

EPA Methods 1-4: Velocity, Moisture Content, Molecular Weight, and Volumetric Flow Rates

Test Run No.	**1404-C-1**	**1404-C-2**	**1404-C-3**
Date	4/27/2000	4/27/2000	4/27/2000
Start Time (Moisture Run Times)	14:11	15:26	16:46
Stop Time (Moisture Run Times)	14:48	16:15	17:21
Stack Moisture & Molecular Wt. via EPA Methods 3a & 4			
O_2 (% volume, dry basis)	11.06	11.04	11.03
CO_2 (% volume, dry basis)	5.60	5.54	5.56
Beginning Meter Reading (ft^3)	461.722	486.472	520.417
Ending Meter Reading (ft^3)	486.128	520.053	543.687
Beginning Impingers Weight (g)	2579.3	2557.4	2633.4
Ending Impingers Weight (g)	2639.1	2633.4	2687.2
Dry Gas Meter Factor (K_d)	1.0050	1.0050	1.0050
Dry Gas Meter Temperature (°F begin)	110	117	105
Dry Gas Meter Temperature (°F end)	116	113	110
Atmospheric Pressure ("Hg, absolute)	29.67	29.63	29.64
Volume of Water Vapor Collected (SCF)	2.820	3.583	2.537
Volume of Air Metered (SCF)	22.404	30.678	21.546
Stack Gas Moisture (% volume)	11.18	10.46	10.53
Dry Gas Fraction	0.8882	0.8954	0.8947
Stack Gas Molecular Wt. (lbs/lb-mole)	28.07	28.14	28.14
Stack Moisture via Stoichiometry			
Combustion Moisture (% volume @ 0% excess air)	18.77	18.77	18.77
Moisture Content (% volume, stoichiometric)	10.28	9.98	10.09
Stack Flow Rate via Pitot Tube			
ΔP #1	1.47	1.47	1.39
ΔP #2	1.61	1.52	1.58
ΔP #3	1.66	1.59	1.67
ΔP #4	1.59	1.78	1.77
ΔP #5	1.58	1.59	1.58
ΔP #6	1.48	1.48	1.44
ΔP #7	1.37	1.33	1.35
ΔP #8	1.28	1.12	1.27
ΔP #9	1.56	1.48	1.38
ΔP #10	1.62	1.62	1.52
ΔP #11	1.70	1.66	1.58
ΔP #12	1.63	1.62	1.53
ΔP #13	1.56	1.49	1.68
ΔP #14	1.43	1.44	1.47
ΔP #15	1.38	1.29	1.32
ΔP #16	1.26	1.22	1.13
Pitot Tube Factor	0.84	0.84	0.84
Sum of Square Root of ΔP's	19.6504	19.4410	19.4265
Number of Traverse Points	16	16	16
Average Square Root of ΔP's	1.2282	1.2151	1.2142
Average Temperature (°F)	781.9	780.1	777.1
Static Pressure ("H_2O)	-0.95	-1.18	-1.03
Stack Diameter (inches)	19.25	19.25	19.25
Stack Area (ft^2)	2.0211	2.0211	2.0211
Stack Velocity (ft/min)	6470	6394	6380
Stack Flow, wet (ACFM)	13076	12922	12894
Average Stack Flow, dry (SCFH)	**2.93E+05**	**2.92E+05**	**2.92E+05**

MOISTURE & VELOCITY FIELD DATA SHEET

Date: 4-27-00
Plant: FGT, Station 14, Quincy, Fl
Source: Unit 1404 Worthington SEHG-8 Compressor Engine
Technicians: RIO, LJB
Atm. Pressure: 29.67 "Hg (Pb)
Test Run No.: 1404-C-1

Dry Gas Meter ID: T-10 Equimeter
Dry Gas Meter Factor: 1.0050 (Kd)
Pitot Tube No/Type: #1010/1/4" S.S. S-Type
Pitot Tube Factor: 0.84
Static Pressure: -0.95 "H_2O (Pg)
Ave. Stack Temp. 781.9 °F (Ts)

Collection Data

Sample Box	T-10 Moisture	
Leak Check ≤ 0.02 ft^3/min		
Pre-Test Leak Check	0.000 ft^3/min; 24.5 "Hg Vac.	
Post-Test Leak Check	0.000 ft^3/min; 24.5 "Hg Vac.	
	Initial	Final
Time	14:11	14:48
DGM Reading (ft^3 or L)	461.722	486.128
DGM Average Temp (°F)	110	116
Last Impinger Temp. (°F)	65	64.5
DGM Flow Rate	40	40
O_2 (% vol.)		
CO_2 (% vol.)		

Impingment System

Impinger	Contents	Initial Weight	Final Weight
1	Di H_2O	683.1	732.3
2	Di H_2O	712.9	717.7
3	MT	531.1	531.4
4	S: Gel	652.2	657.7
5			
6			
Totals		2579.3	2639.1

Velocity System Leak Check

Leak Check ≤ 0.1 "H_2O/min at a pressure ≥ 3.0 "H_2O	+	−	
Pre-Test Leak Check	0.0	0.0	"H_2O/min
	6.0	5.5	"H_2O Pres.
Post-Test Leak Check	0.0	0.0	"H_2O/min
	3.9	4.1	"H_2O Pres.

Velocity Traverse Data
with Stack Temperature and Cyclonic Flow Check

Point	ΔP ("H_2O)	°F	α	Point	ΔP ("H_2O)	°F	α
1-1	1.47	777	5	2-1	1.56	778	4
1-2	1.61	783	3	2-2	1.62	781	2
1-3	1.66	785	2	2-3	1.70	783	3
1-4	1.59	787	6	2-4	1.63	785	6
1-5	1.58	786	7	2-5	1.56	787	7
1-6	1.48	788	5	2-6	1.43	787	7
1-7	1.37	781	2	2-7	1.38	783	2
1-8	1.28	773	1	2-8	1.26	765	5

MOISTURE & VELOCITY FIELD DATA SHEET

Date: 4-27-00	Dry Gas Meter ID: T-10 Equimeter
Plant: FGT, Station 14, Quincy, Fl	Dry Gas Meter Factor: 1.0050 (Kd)
Source: Unit 1404 @ Worthington SEHG-8 Compressor Engine	Pitot Tube No/Type: #010/¼" S.S. S-Type
Technicians: RPO, LJB	Pitot Tube Factor: 0.84
Atm. Pressure: 29.63 "Hg (Pb)	Static Pressure: -1.18 "H_2O (Pg)
Test Run No.: 1404-C-2	Ave. Stack Temp. 780.1 °F (Ts)

Collection Data

Sample Box	T-10 Moisture	
Leak Check ≤ 0.02 ft³/min		
Pre-Test Leak Check	0.000 ft³/min	25.0 "Hg Vac.
Post-Test Leak Check	0.000 ft³/min	25.0 "Hg Vac.
	Initial	Final
Time	15:26	16:15
DGM Reading (ft³ or L)	486.472	520.053
DGM Average Temp (°F)	117	113
Last Impinger Temp. (°F)	66	64
DGM Flow Rate	40	40
O_2 (% vol.)		
CO_2 (% vol.)		

Impingment System

Impinger	Contents	Initial Weight	Final Weight
1	D.H₂O	650.6	713.1
2	D.H₂O	717.7	724.6
3	MT	531.4	531.5
4	S:Gel	657.7	664.2
5			
6			
Totals		2557.4	2633.4

Velocity System Leak Check

Leak Check ≤ 0.1 "H_2O/min at a pressure ≥ 3.0 "H_2O	+	−	
Pre-Test Leak Check	0.0	0.0	"H_2O/min
	4.3	7.1	"H_2O Pres.
Post-Test Leak Check	0.0	0.0	"H_2O/min
	3.5	4.9	"H_2O Pres.

Velocity Traverse Data
with Stack Temperature and Cyclonic Flow Check

Point	ΔP ("H_2O)	°F	α	Point	ΔP ("H_2O)	°F	α
1-1	1.47	776	na	2-1	1.48	776	na
1-2	1.52	779		2-2	1.62	779	
1-3	1.59	782		2-3	1.66	782	
1-4	1.78	784		2-4	1.62	784	
1-5	1.59	786		2-5	1.49	785	
1-6	1.48	786		2-6	1.44	785	
1-7	1.33	779		2-7	1.29	780	
1-8	1.12	765		2-8	1.22	773	

Moisture & Velocity Field Data Sheet

Date: 4-27-00
Plant: FGT Station 14, Quincy, FL
Source: Unit 1404 @ Worthington SEHG-8 Compressor Engine
Technicians: RPO, LJB
Atm. Pressure: 29.64 "Hg (Pb)
Test Run No.: 1404-C-3

Dry Gas Meter ID: T-10 Equimeter
Dry Gas Meter Factor: 1.0050 (Kd)
Pitot Tube No/Type: #1010/1/4" S.S. S-Type
Pitot Tube Factor: 0.84
Static Pressure: -1.03 "H_2O (Pg)
Ave. Stack Temp. 777.1 °F (Ts)

Collection Data

Sample Box	T-10 Moisture	
Leak Check ≤ 0.02 ft^3/min		
Pre-Test Leak Check	0.000 ft^3/min	25 "Hg Vac.
Post-Test Leak Check	0.000 ft^3/min	25 "Hg Vac.
	Initial	Final
Time	16:46	17:21
DGM Reading (ft^3 or L)	520.417	543.687
DGM Average Temp (°F)	105	110
Last Impinger Temp. (°F)	66	58
DGM Flow Rate	40	40
O_2 (% vol.)		
CO_2 (% vol.)		

Impingment System

Impinger	Contents	Initial Weight	Final Weight
1	Di H2O	713.6	757.8
2	Di H2O	724.6	728.9
3	MT	531.5	531.9
4	Si Gel	664.2	668.6
5			
6			
Totals		2633.4	2687.2

Velocity System Leak Check

Leak Check ≤ 0.1 "H_2O/min at a pressure ≥ 3.0 "H_2O	+	−	
Pre-Test Leak Check	0.0	0.0	"H_2O/min
	3.6	4.1	"H_2O Pres.
Post-Test Leak Check	0.0	0.0	"H_2O/min
	4.7	6.2	"H_2O Pres.

Velocity Traverse Data
with Stack Temperature and Cyclonic Flow Check

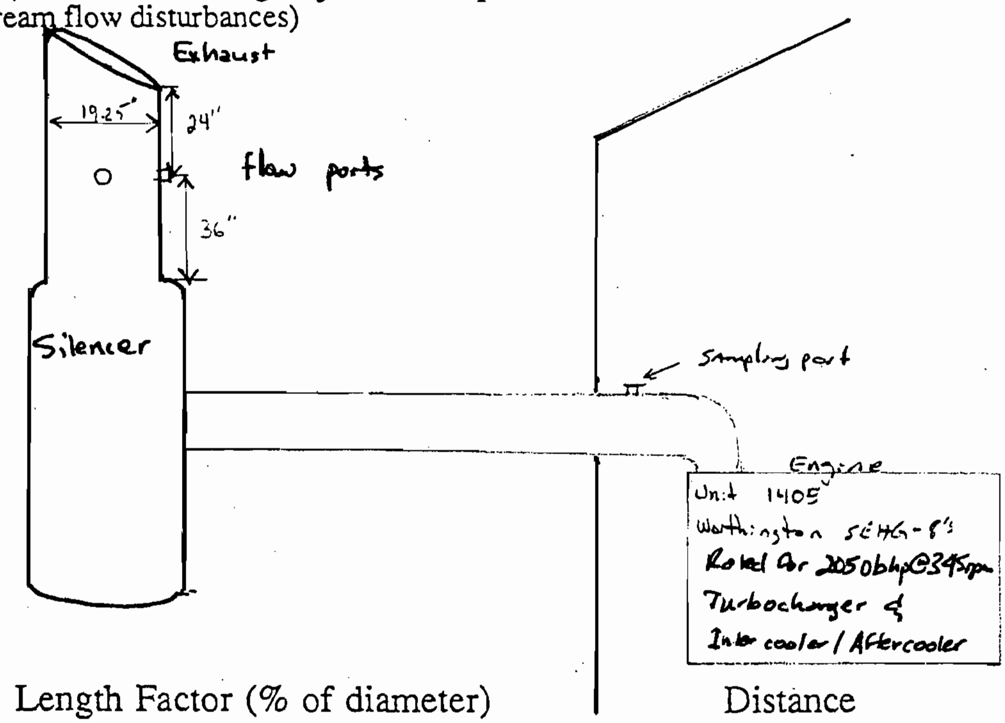
Point	ΔP ("H_2O)	°F	α	Point	ΔP ("H_2O)	°F	α
1-1	1.39	773	na	2-1	1.38	771	na
1-2	1.58	777		2-2	1.52	775	
1-3	1.67	779		2-3	1.58	777	
1-4	1.77	781		2-4	1.53	779	
1-5	1.58	782		2-5	1.68	781	
1-6	1.44	781		2-6	1.47	782	
1-7	1.35	778		2-7	1.32	781	
1-8	1.27	765		2-8	1.13	771	

Circular Stack Sampling Traverse Point Layout
(EPA Method 1)

Date: 4-27-00
Plant: FGT, Station 14 Quincy, Fl
Source: Unit 1405, a Worthington SEHG-8 Compressor Engine
Technician(s): RPD, LJB

Port + Stack ID: 20.75 in.
Port Extension: 1.50 in.
Stack ID: 19.25 in.
Stack Area: 2.02 ft^2
Total Req'd Traverse Pts: 16
No. of Traverse Pts: 8 /diam
No. of Traverse Pts: 8 /port

Stack Diagram (Side View showing major unit components, dimensions and nearest upstream & downstream flow disturbances)



Traverse Point Number	Length Factor (% of diameter) Number of Points per Diameter 4	6	8	12	Distance from Reference Point (inches)
1	6.7	4.4	3.2	2.1	2.12
2	25.0	14.6	10.5	6.7	3.52
3	75.0	29.6	19.4	11.8	5.23
4	93.3	70.4	32.3	17.7	7.72
5		85.4	67.7	25.0	14.53
6		95.6	80.6	35.6	17.02
7			89.5	64.4	18.73
8			96.8	75.0	20.13
9				82.3	
10				88.2	
11				93.3	
12 -				97.9	

EPA Methods 1-4: Velocity, Moisture Content, Molecular Weight, and Volumetric Flow Rates

Test Run No.	**1405-C-1**	**1405-C-2**	**1405-C-3**
Date	4/27/2000	4/27/2000	4/27/2000
Start Time (Moisture Run Times)	09:32	10:39	11:56
Stop Time (Moisture Run Times)	10:10	11:20	12:38
Stack Moisture & Molecular Wt. via EPA Methods 3a & 4			
O_2 (% volume, dry basis)	11.04	11.11	11.11
CO_2 (% volume, dry basis)	5.50	5.50	5.49
Beginning Meter Reading (ft^3)	377.028	403.247	431.604
Ending Meter Reading (ft^3)	402.973	431.345	461.440
Beginning Impingers Weight (g)	2486.5	2556.7	2514
Ending Impingers Weight (g)	2556.7	2625.4	2582.9
Dry Gas Meter Factor (K_d)	1.0050	1.0050	1.0050
Dry Gas Meter Temperature (°F begin)	75	84	92
Dry Gas Meter Temperature (°F end)	85	102	110
Atmospheric Pressure ("Hg, absolute)	29.76	29.75	29.73
Volume of Water Vapor Collected (SCF)	3.310	3.239	3.249
Volume of Air Metered (SCF)	25.349	26.798	28.031
Stack Gas Moisture (% volume)	11.55	10.79	10.39
Dry Gas Fraction	0.8845	0.8921	0.8961
Stack Gas Molecular Wt. (lbs/lb-mole)	28.01	28.10	28.15
Stack Moisture via Stoichiometry			
Combustion Moisture (% volume @ 0% excess air)	18.77	18.77	18.77
Moisture Content (% volume, stoichiometric)	10.02	9.90	9.86
Stack Flow Rate via Pitot Tube			
ΔP #1	1.40	1.32	1.67
ΔP #2	1.70	1.51	1.81
ΔP #3	1.65	1.61	1.67
ΔP #4	1.70	1.65	1.69
ΔP #5	1.72	1.63	1.62
ΔP #6	1.50	1.47	1.41
ΔP #7	1.40	1.22	1.31
ΔP #8	1.20	0.96	1.17
ΔP #9	1.40	1.44	1.53
ΔP #10	1.70	1.49	1.61
ΔP #11	1.75	1.68	1.69
ΔP #12	1.80	1.70	1.80
ΔP #13	1.60	1.63	1.67
ΔP #14	1.55	1.52	1.57
ΔP #15	1.30	1.29	1.36
ΔP #16	0.93	0.94	1.19
Pitot Tube Factor	0.84	0.84	0.84
Sum of Square Root of ΔP's	19.6563	19.1402	19.8661
Number of Traverse Points	16	16	16
Average Square Root of ΔP's	1.2285	1.1963	1.2416
Average Temperature (°F)	770.2	769.0	764.0
Static Pressure ("H_2O)	-1.20	-1.2	-1.45
Stack Diameter (inches)	19.25	19.25	19.25
Stack Area (ft^2)	2.0211	2.0211	2.0211
Stack Velocity (ft/min)	6440	6259	6482
Stack Flow, wet (ACFM)	13015	12649	13101
Average Stack Flow, dry (SCFH)	**2.94E+05**	**2.88E+05**	**3.01E+05**

MOISTURE & VELOCITY FIELD DATA SHEET

Date: 4-27-00
Plant: FGT, Station 14, Quincy, Fl
Source: Unit 1405
Technicians: RIO, LJB
Atm. Pressure: 29.76 " Hg (Pb)
Test Run No.: 1405-C-1

Dry Gas Meter ID: T-10 Equimeter
Dry Gas Meter Factor: 1.0050 (Kd)
Pitot Tube No/Type: #1010 / 1/4" S.S. S-Type
Pitot Tube Factor: 0.84
Static Pressure: -1.2 "H_2O (Pg)
Ave. Stack Temp. 770.2 °F (Ts)

Collection Data

Sample Box	T-10 Moisture	
Leak Check ≤ 0.02 ft³/min		
Pre-Test Leak Check	0.000 ft³/min 24.5 "Hg Vac.	
Post-Test Leak Check	0.000 ft³/min 24.5 "Hg Vac.	
	Initial	Final
Time	9:32	10:10
DGM Reading (ft³ or L)	377.028	402.973
DGM Average Temp (°F)	75	85
Last Impinger Temp. (°F)	52.9 ~~67~~	56.5
DGM Flow Rate	40	40
O_2 (% vol.)		
CO_2 (% vol.)		

Velocity System Leak Check

Leak Check ≤ 0.1 "H_2O/min at a pressure ≥ 3.0 "H_2O	+	−	
Pre-Test Leak Check	0.0	0.0	"H_2O/min
	4.7	3.2	"H_2O Pres.
Post-Test Leak Check	0.0	0.0	"H_2O/min
	4.9	5.3	"H_2O Pres.

Impingment System

Impinger	Contents	Initial Weight	Final Weight
1	Di H_2O	617.2	678.3
2	Di H_2O	699.0	702.4
3	mT	529.7	530.2
4	Si Gel	640.6	645.8
5			
6			
Totals		2486.5	2556.7

Velocity Traverse Data
with Stack Temperature and Cyclonic Flow Check

Point	ΔP ("H_2O)	°F	α	Point	ΔP ("H_2O)	°F	α
1-1	1.4	772	2	2-1	1.4	775	4
1-2	1.7	775	3	2-2	1.7	774	0
1-3	1.65	776	7	2-3	1.75	775	3
1-4	1.7	776	1	2-4	1.8	777	2
1-5	1.72	776	5	2-5	1.6	771	5
1-6	1.5	774	6	2-6	1.55	774	7
1-7	1.4	768	10	2-7	1.3	765	8
1-8	1.2	745	8	2-8	0.93	740	3

Moisture & Velocity Field Data Sheet

Date: 4-27-00	Dry Gas Meter ID: T-10 Equimeter
Plant: FGT, Station 14, Quincy, Fl	Dry Gas Meter Factor: 1.0050 (Kd)
Source: Unit 1405, a Worthington SEHG-8 compressor Engine	Pitot Tube No/Type: #1010 / 1/4" S.S. S-Type
Technicians: RPO, LJB	Pitot Tube Factor: 0.84
Atm. Pressure: 29.75 " Hg (Pb)	Static Pressure: -1.2 "H_2O (Pg)
Test Run No.: 1405-C-2	Ave. Stack Temp. 769.0 °F (Ts)

Collection Data

Sample Box	T-10 Moisture	
Leak Check ≤ 0.02 ft³/min		
Pre-Test Leak Check	0.006 ft³/min; 25 "Hg Vac.	
Post-Test Leak Check	0.002 ft³/min; 24.5 "Hg Vac.	
	Initial	Final
Time	10:39	11:20
DGM Reading (ft³ or L)	403.247	431.345
DGM Average Temp (°F)	84	102
Last Impinger Temp. (°F)	65	60
DGM Flow Rate	40	40
O_2 (% vol.)		
CO_2 (% vol.)		

Impingment System

Impinger	Contents	Initial Weight	Final Weight
1	DiH_2O	678.3	736.9
2	DiH_2O	702.4	706.7
3	mT	530.2	530.6
4	S.Gel	645.8	651.2
5			
6			
Totals		2556.7	2625.4

Velocity System Leak Check

Leak Check ≤ 0.1 "H_2O/min at a pressure ≥ 3.0 "H_2O	+	−	
Pre-Test Leak Check	0.0	0.0	"H_2O/min
	3.6	4.3	"H_2O Pres.
Post-Test Leak Check	0.0	0.0	"H_2O/min
	5.2	6.3	"H_2O Pres.

Velocity Traverse Data
with Stack Temperature and Cyclonic Flow Check

Point	ΔP ("H_2O)	°F	α	Point	ΔP ("H_2O)	°F	α
1-1	1.32	770	NA	2-1	1.44	767	N/A
1-2	1.51	772		2-2	1.49	771	
1-3	1.61	776		2-3	1.68	772	
1-4	1.65	778		2-4	1.70	775	
1-5	1.63	778		2-5	1.63	775	
1-6	1.47	778		2-6	1.52	776	
1-7	1.22	769		2-7	1.29	770	
1-8	0.96	740		2-8	0.94	737	

Moisture & Velocity Field Data Sheet

Date: 4-27-00
Plant: FGT, Station 14, Quincy, Fl
Source: Unit 1405, a Worthington SEHG-8 Compressor Engine
Technicians: RPO, LJB
Atm. Pressure: 29.73 " Hg (Pb)
Test Run No.: 1405-C-3

Dry Gas Meter ID: T-10 Equimeter
Dry Gas Meter Factor: 1.0050 (Kd)
Pitot Tube No/Type: #1010 / 1/4" S.S. S-TYPE
Pitot Tube Factor: 0.84
Static Pressure: -- 1.45 "H_2O (Pg)
Ave. Stack Temp. 764.0 °F (Ts)

Collection Data

Sample Box	T-10 Moisture	
Leak Check ≤ 0.02 ft³/min		
Pre-Test Leak Check	0.000 ft³/min 25 "Hg Vac.	
Post-Test Leak Check	0.000 ft³/min 24.0 "Hg Vac.	
	Initial	Final
Time	11:56	12:38
DGM Reading (ft³ or L)	431.604	461.440
DGM Average Temp (°F)	92	110
Last Impinger Temp. (°F)	66	60.4
DGM Flow Rate	40	40
O_2 (% vol.)		
CO_2 (% vol.)		

Impingment System

Impinger	Contents	Initial Weight	Final Weight
1	D:H_2O	625.5	683.1
2	D:H_2O	706.7	712.9
3	mT	530.6	531.1
4	SiGel	651.2	655.8
5			
6			
Totals		2514	2582.9

Velocity System Leak Check

Leak Check ≤ 0.1 "H_2O/min at a pressure ≥ 3.0 "H_2O	+	−	
Pre-Test Leak Check	0.0	0.0	"H_2O/min
	4.6	3.9	"H_2O Pres.
Post-Test Leak Check	0.0	0.0	"H_2O/min
	5.7	3.6	"H_2O Pres.

Velocity Traverse Data
with Stack Temperature and Cyclonic Flow Check

Point	ΔP ("H_2O)	°F	α	Point	ΔP ("H_2O)	°F	α
1-1	1.67	763	na	2-1	1.53	762	na
1-2	1.81	766		2-2	1.61	766	
1-3	1.67	768		2-3	1.69	768	
1-4	1.69	769		2-4	1.80	770	
1-5	1.62	770		2-5	1.67	771	
1-6	1.41	769		2-6	1.57	771	
1-7	1.31	762		2-7	1.36	766	
1-8	1.17	734		2-8	1.19	749	

APPENDIX B:
EXAMPLE CALCULATIONS

Example Calculations

(Note: Any differences between these calculations and the computer generated field summaries are attributed to numerical rounding and truncating.)

Corrected Emission Concentrations

Refers to test run 1404-C-1 (Eq. 6c-1)

$$C_{gas} = (Ç - C_o) \times \frac{C_{ma}}{C_m - C_o} = \text{equation 6c-1}$$

$ÇNOx$ = concentration of NOx (uncorrected) = 2048.4 ppmv
C_o = avg. of initial and final cal. bias checks, zero gas = 61.5 ppmv
C_m = avg. of initial and final cal. bias checks, drift check gas = 3504.0 ppmv
C_{ma} = actual concentration of upscale cal. gas = 3492 ppmv

$$\mathbf{CNOx} = (2048.4 - 61.5) \times \frac{3492}{3504.0 - 61.5} = \mathbf{2015.5\ ppmv}$$

$ÇCO$ = concentration of CO (uncorrected) = 169.4 ppmv
C_o = avg. of initial and final cal. bias checks, zero gas = (-0.35) ppmv
C_m = avg. of initial and final cal. bias checks, drift check gas = 439.1 ppmv
C_{ma} = actual concentration of upscale cal. gas = 447.0 ppmv

$$\mathbf{CCO} = (169.4 - (-035) \times \frac{447.0}{439.1 - (-0.35)} = \mathbf{172.7\ ppmv}$$

$ÇO_2$ = concentration of O_2 (uncorrected) = 11.26%
C_o = avg. of initial and final cal. bias checks, zero gas = 0.21%
C_m = avg. of initial and final cal. bias checks, drift check gas = 12.11%
C_{ma} = actual concentration of upscale cal. gas = 11.91%

$$\mathbf{CO_2} = (11.26 - 0.21) \times \frac{11.91}{12.11 - 0.21} = \mathbf{11.06\%}$$

$ÇCO_2$ = concentration of CO_2 (uncorrected) = 5.58%
C_o = avg. of initial and final cal. bias checks, zero gas = 0.16%
C_m = avg. of initial and final cal. bias checks, drift check gas = 7.91%
C_{ma} = actual concentration of upscale cal. gas = 8.00%

$$\mathbf{CCO_2} = (5.58 - 0.16) \times \frac{8.00}{7.91 - 0.16} = \mathbf{5.60\%}$$

$ÇTHC$ = concentration of THC (uncorrected) = 978.0 ppmv
C_o = avg. of initial and final cal. bias checks, zero gas = (-3.5) ppmv
C_m = avg. of initial and final cal. bias checks, drift check gas = 1788.0 ppmv

C_{ma} = actual concentration of upscale cal. gas = 1811.0 ppmv

$$\textbf{CTHC} = (978.0 - (-3.5)) \times \frac{1811}{1788.0 - (-3.5)} = \textbf{992.2 ppmv}$$

Calculation of VOC from THC ppmv and fuel analysis

Refers to test run 1404-C-1

CTHC = 992.2 ppmv
%NM,NE = 2.60% (from fuel analysis)

CVOC = CTHC x %NM, NE
= 992.2 x 0.026

CVOC = 25.8 ppmv

F_O Calculation to Verify O2/CO2 Measurements

Refers to test run 1404-C-1

C_{CO2} = concentration of cabon dioxide = 5.60% (from analyzer)
C_{O2} = concentration of oxygen = 11.06% (from analyzer)

$$F_O = \frac{20.9 - \%\ O2}{\%\ CO2}$$

$$F_O = \frac{20.9 - 11.06}{5.60}$$

F_O = 1.757 *(acceptable F_O values for natural gas = 1.600 to 1.836)*

Moisture Content via EPA Method 4
Refers to test run 1404-C-1 (eq. 4-4)

V_1 = initial dry gas meter reading = 461.722 ft^3
V_2 = final dry gas meter reading = 486.128 ft^3
V_M = total gas sample volume collected
= $V_2 - V_1$ = 24.406 ft^3
Y = dry gas meter factor (unitless) = 1.005
$V_{Mcorrected}$ = V_M x Y = 24.406 x 1.005
= 24.528 ft^3

W_i = initial weight of impinger train = 2579.3 g
W_f = final weight of impinger train = 2639.1 g
W_{tot} = total weight gain of all impingers (g)
= $W_f - W_i$ = 59.80 g

K_2 = 1.335 liters /1.0 gram @ EPA STP

$$K_3 = \left(\frac{528°R}{29.92"Hg}\right) \times 28.3\ l/ft^3 = 499.4 \text{ @ EPA STP}$$

P_{atm} = atmospheric pressure (in Hg), ground level = 29.67
T = average temperature of Dry Gas Meter (°F) = 113

$$V_{M(std)} = \left(\frac{V_{Mcorrected} \times P_{atm} \times K_3}{T + 460}\right)$$

$$= \left(\frac{24.528 \times 29.67 \times 499.4}{113 + 460}\right) = 634.269$$

B_{WS} = moisture fraction by volume

$$= \left(\frac{W_{tot} \times K_2}{(W_{tot} \times K_2) + V_{M(std)}}\right)$$

$$= \left(\frac{59.8 \times 1.335}{(59.8 \times 1.335) + 634.269}\right)$$

B_{WS} = 0.1118 = 11.18% moisture

Stack Gas Molecular Weight
Refers to test run 1404-C-1 (eq. 3-1 and eq. 2-5)

M_S	= wet molecular weight of stack gas (lb/lb-mole)	
M_d	= dry molecular weight of stack gas (lb/lb-mole)	
B_{WS}	= moisture fraction by volume = 0.1118	
MW_{H_2O}	= molecular wt of H_2O	= 18 lb/lb-mole
MW_{CO_2}	= molecular wt of CO_2	= 44 lb/lb-mole
MW_{O_2}	= molecular wt of O_2	= 32 lb/lb-mole
MW_{N_2}	= molecular wt of N_2	= 28 lb/lb-mole
C_{CO_2}	= vol. fraction dry CO_2	= 0.0560 (from analyzer)
C_{O_2}	= vol. fraction dry O_2	= 0.1106 (from analyzer)
C_{N_2}	= vol. fraction dry = $1-(C_{CO_2} + C_{O_2})$ =0.8334	
$1-B_{WS}$	= dry gas fraction	= 0.8882

M_S = wt. of CO_2 + wt. of O_2 + wt. of N_2 (Eq. 3-1)

$= ((MW_{CO_2} \times C_{CO_2}) + (MW_{O_2} \times C_{O_2}) + (MW_{N_2} \times C_{N_2}))$

$= ((44 \times 0.0560)+(32 \times 0.1106) + (28 \times 0.8334))$

$\mathbf{M_S}$ **= 29.338 lb/lb-mole**

$M_d = (18 \times B_{WS}) + ((1-B_{WS}) \times M_d)$ (Eq 2-5)
$= (18 \times 0.1118) + (0.8882 \times 29.338)$

$\mathbf{M_d}$ **= 28.07**

Stack Gas Flow Rate via Pitot Tube

Refers to test run 1404-C-1 (eq. 2-6, 2-8, 2-9, 2-10)

C_p = pitot tube coefficient, dimensionless = 0.84

ΔP = pressure difference in stack as measured (in. H_2O)

$(\sqrt{\Delta P})_{avg}$ = average of square root of ΔP's =1.2282 (from pitot readings)

t_s = stack temperature = 781.9°F

T_s = absolute stack temperature, °R

= t_s + 460 = 1241.9 °R (eq. 2-8)

K_p = pitot tube constant = 85.49 ft/sec $\sqrt{\left(\frac{\text{lb/lb mole x in. Hg}}{\text{°R x in. } H_2O}\right)}$

= pitot tube constant =5129 ft/min $\sqrt{\left(\frac{\text{lb/lb mole x in. Hg}}{\text{°R x in. } H_2O}\right)}$

K_y = standard temperature/pressure constant

$$= \frac{528°R}{29.92 \text{ "Hg}} \text{ x } \frac{60 \text{ minutes}}{\text{hour}} = 1059$$

P_b = atmospheric pressure (in Hg) = 29.67

P_g = stack static pressure (in. H_2O) = (-0.95)

P_s = absolute stack pressure (eq. 2-6)

= P_b + (P_g x .0735 in.Hg / in.H_2O) = 29.60 in. Hg

$$A = \text{area of stack (ft}^2) = \frac{\frac{\text{diameter}^2}{4} \text{ x } \Pi}{144 \text{ in}^2/\text{ft}^2}$$

$$= \frac{\frac{19.25^2}{4} \text{ x } 3.1416}{144 \text{ in}^2/\text{ft}^2} = 2.0211 \text{ ft}^2$$

v_s = stack velocity (ft/min)

$$= K_p \text{ x } C_p \text{ x } (\sqrt{\Delta P})_{avg} \text{ x } \sqrt{\frac{T_s}{P_s \text{ x } M_s}} \text{ (eq. 2-9)}$$

$$= 5129 \text{ x } 0.84 \text{ x } 1.2282 \text{ x } \sqrt{\frac{1241.9}{29.60 \text{ x } 28.07}}$$

= 6,469.3 ft/min at stack conditions

Q_a = stack flow rate (ft^3/min)

= v_s x A , where A= area of stack = 2.0211 ft^2

= 6,469.3 x 2.0211 = 13,075.1 ft^3/min at stack conditions

Qd = stack flow rate on dry basis at standard conditions (DSCFH)

$$= Q_a \times K_y \times \frac{P_s}{T_s} \times 1 - B_{WS} \text{ (eq. 2-10)}$$

$$= 13{,}075.1 \times 1059 \times \frac{29.60}{1241.9} \times 0.8882$$

Qd = 293,128 DSCFH = 2.93E+05 DSCFH

Qw = stack flow rate on wet basis at standard conditions (DSCFH)

$$= Q_a \times K_y \times \frac{P_s}{T_s}$$

$$= 13{,}075.1 \times 1059 \times \frac{29.60}{1241.9}$$

Qw = 330,024 DSCFH = 3.30E+05 DSCFH

Mass Emission Rates using EPA Methods 1-4, lb/hr
Refers to test run 1404-C-1

CNOx	=2015.5 ppmv (corrected)
CCO	= 172.2 ppmv (corrected)
CVOC	= 25.8 PPMV (calculated from corrected THC)
Qd	= 2.93E+05 (from pitot tube data)
Qw	= 3.30E+05 (from pitot tube data)
MW of NOx	= 46.01 lb/lb-mole
MW of CO	= 28.00 lb/lb-mole
MW of VOC (as CH_4)	= 16.01 lb/lb-mole

for ideal gas, 385.15 SCF = 1.0 lb/mole @ EPA STP

E_X = mass emission rate of x, (lb/hr)

$$=C_X \text{ x } Qd \text{ x } 10^{-6} \text{ x } \frac{MW}{385.15}$$

$$E_{NOx} = 2015.5 \text{ x } 2.93E{+}05 \text{ x } 10^{-6} \text{ x } \frac{46.01}{385.15}$$

$$\mathbf{E_{NOx} = 70.55 \text{ lb/hr}}$$

$$E_{CO} = 172.2 \text{ x } 2.93E{+}05 \text{ x } 10^{-6} \text{ x } \frac{28.00}{385.15}$$

$$\mathbf{E_{CO} = 3.67 \text{ lb/hr}}$$

$$E_{voc} = 25.8 \text{ x } 3.30E{+}05 \text{ x } 10^{-6} \text{ x } \frac{16.01}{385.15}$$

$$\mathbf{E_{voc} = 0.354 \text{ lb/hr}}$$

Mass Emission Rates using EPA Methods 1-4, g/BHp-H

Refers to test run 1404-C-1

ENOx	= 70.55 lb/hr
ECO	= 3.67 lb/hr
CVOC	= 0.354 lb/hr
BHp	= 1942
g/lb	= 454

$$\text{g/BHp-H} = \frac{E_X \times \text{g/lb}}{\text{BHp}}$$

$$\text{NOx g/Hp-H} = \frac{70.55 \times 454}{1942}$$

NOx g/Hp-H = 9.71

$$\text{CO g/Hp-H} = \frac{3.67 \times 454}{1942}$$

CO g/Hp-H = 0.84

$$\text{VOC g/Hp-H} = \frac{0.354 \times 454}{1942}$$

VOC g/Hp-H = 0.083

APPENDIX C:
FUEL ANALYSIS AND CALCULATIONS

Enron Corp
Houston, Texas
CHROMATOGRAPH REPORT
for 04/00

04/27/00 08:20:32
PAGE 1

Chromatograph ID: 8031
Chromatograph Name: PERRY STREAM #2
Chromatograph Code: S

Check Limits	Lower	Upper
BTU:	0	9999
Sp. Gravity:	0.0000	3.2767

POI Number: 0

Dy	N2	CO2	Grav	BTU	Methane	Ethane	Propane	Ibutane	Nbutane	Ipentan	Npentan	C6	C7	H2	Helium	Oxygen
1	0.4023	0.6265	0.5844	1038.1638	95.6249	2.6881	0.3741	0.0887	0.0812	0.0331	0.0214	0.0298	0.0298	0.0000	0.0000	0.0000
2	0.3942	0.6419	0.5841	1037.4976	95.6773	2.6368	0.3728	0.0862	0.0792	0.0317	0.0204	0.0297	0.0298	0.0000	0.0000	0.0000
3	0.4099	0.6662	0.5848	1037.7128	95.6045	2.6298	0.3988	0.0930	0.0865	0.0330	0.0214	0.0284	0.0284	0.0000	0.0000	0.0000
4	0.4154	0.6509	0.5865	1040.6236	95.3409	2.8503	0.4274	0.1020	0.0925	0.0356	0.0228	0.0311	0.0311	0.0000	0.0000	0.0000
5	0.4006	0.6546	0.5850	1038.4141	95.5754	2.6839	0.3901	0.0941	0.0831	0.0345	0.0221	0.0307	0.0308	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.4068	0.6669	0.5873	1041.5866	95.2628	2.8520	0.4826	0.1078	0.1099	0.0326	0.0214	0.0285	0.0286	0.0000	0.0000	0.0000
8	0.4261	0.6786	0.5877	1041.6417	95.2346	2.8438	0.4684	0.1096	0.1118	0.0371	0.0256	0.0322	0.0323	0.0000	0.0000	0.0000
9	0.4254	0.7037	0.5873	1040.3099	95.2593	2.8316	0.4599	0.1063	0.1046	0.0321	0.0202	0.0285	0.0286	0.0000	0.0000	0.0000
10	0.4159	0.7169	0.5870	1039.6824	95.3010	2.8075	0.4477	0.1025	0.1007	0.0311	0.0196	0.0285	0.0285	0.0000	0.0000	0.0000
11	0.4242	0.7385	0.5875	1039.8057	95.2264	2.8476	0.4498	0.1020	0.1016	0.0316	0.0200	0.0291	0.0292	0.0000	0.0000	0.0000
12	0.4239	0.7454	0.5885	1041.1900	95.1180	2.8975	0.4774	0.1108	0.1097	0.0340	0.0218	0.0308	0.0308	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14	0.4185	0.7454	0.5885	1041.3553	95.1569	2.8336	0.4958	0.1135	0.1150	0.0354	0.0226	0.0316	0.0317	0.0000	0.0000	0.0000
15	0.4074	0.7495	0.5892	1042.4002	95.0852	2.8805	0.5161	0.1174	0.1186	0.0371	0.0237	0.0322	0.0323	0.0000	0.0000	0.0000
16	0.4068	0.7577	0.5890	1041.9814	95.1218	2.8486	0.5031	0.1158	0.1161	0.0372	0.0238	0.0345	0.0346	0.0000	0.0000	0.0000
17	0.4063	0.7723	0.5885	1040.8428	95.1627	2.8292	0.4862	0.1128	0.1122	0.0345	0.0217	0.0310	0.0311	0.0000	0.0000	0.0000
18	0.4182	0.7644	0.5877	1039.5228	95.2814	2.7479	0.4537	0.1080	0.1042	0.0359	0.0229	0.0316	0.0317	0.0000	0.0000	0.0000
[illegible]	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20	0.4176	0.6685	0.5869	1040.7150	95.3224	2.8140	0.4532	0.1034	0.1031	0.0339	0.0224	0.0307	0.0307	0.0000	0.0000	0.0000
21	0.4323	0.6595	0.5882	1042.6927	95.0999	2.9870	0.4864	0.1085	0.1110	0.0337	0.0220	0.0298	0.0298	0.0000	0.0000	0.0000
22	0.4220	0.7402	0.5892	1042.4987	95.0320	2.9576	0.4957	0.1122	0.1109	0.0373	0.0240	0.0340	0.0341	0.0000	0.0000	0.0000
23	0.4101	0.7078	0.5874	1040.6677	95.2600	2.8276	0.4741	0.1045	0.1022	0.0335	0.0214	0.0294	0.0294	0.0000	0.0000	0.0000
24	0.4038	0.7048	0.5873	1040.6496	95.2866	2.8095	0.4724	0.1053	0.1059	0.0318	0.0203	0.0298	0.0298	0.0000	0.0000	0.0000
25	0.4141	0.6962	0.5882	1042.0750	95.1286	2.9368	0.4938	0.1085	0.1119	0.0316	0.0203	0.0290	0.0291	0.0000	0.0000	0.0000
26	0.3947	0.6874	0.5874	1041.4406	95.2576	2.8498	0.4837	0.1081	0.1100	0.0312	0.0199	0.0288	0.0288	0.0000	0.0000	0.0000
27	0.4000	0.6872	0.5871	1040.9130	95.2838	2.8412	0.4682	0.1053	0.1061	0.0314	0.0198	0.0284	0.0285	0.0000	0.0000	0.0000
28	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
29	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Avg: 0.3299 0.5610 0.4698 832.4794

Remarks: DAY 9 EST'D FROM DAY 8.

04/01-04/30: 8031

Gas Fuel F Factor & Heating Value Caculation

Florida Gas Transmission
Sample ID: Perry Lab, Stream #2
Time: Daily Average
Date: April 27, 1999

CALCULATION OF DENSITY AND HEATING VALUE @ 60°F and 30 in Hg

Component	% Volume	Molecular Wt.	Density (lb/ft3)	% volume x Density	weight %	Component Gross Btu/lb	Weight Fract. Btu	Gross Heat Value (Btu/SCF)	Volume Fract. Btu
Hydrogen		2.016	0.0053	0.00000	0.0000	61100	0.00	325.0	0
Oxygen		32.000	0.0846	0.00000	0.0000	0	0.00	0.0	0
Nitrogen	0.4000	28.016	0.0744	0.00030	0.6627	0	0.00	0.0	0
Carbon dioxide	0.6872	44.010	0.1170	0.00080	1.7905	0	0.00	0.0	0
Carbon monoxide		28.010	0.0740	0.00000	0.0000	4347	0.00	322.0	0
Methane	95.2838	16.041	0.0424	0.04040	89.9690	23879	21483.70	1013.0	965.225
Ethane	2.8412	30.067	0.0803	0.00228	5.0807	22320	1134.02	1792.0	50.9143
Ethylene		28.051	0.0746	0.00000	0.0000	21644	0.00	1614.0	0
Propane	0.4682	44.092	0.1196	0.00056	1.2470	21661	270.12	2590.0	12.1264
propylene		42.077	0.1110	0.00000	0.0000	21041	0.00	2336.0	0
Isobutane	0.1053	58.118	0.1582	0.00017	0.3710	21308	79.05	3363.0	3.54124
n-butane	0.1061	58.118	0.1582	0.00017	0.3738	21257	79.46	3370.0	3.57557
Isobutene		56.102	0.1480	0.00000	0.0000	20840	0.00	3068.0	0
Isopentane	0.0314	72.144	0.1904	0.00006	0.1331	21091	28.08	4008.0	1.25851
n-pentane	0.0198	72.144	0.1904	0.00004	0.0840	21052	17.67	4016.0	0.79517
n-hexane +	0.0569	86.169	0.2274	0.00013	0.2881	20940	60.34	4762.0	2.70958
Hydrogen sulfide		34.076	0.0911	0.00000	0.0000	7100	0.00	647.0	0
total	100.00	Average Density		0.04490	100.0000	Gross Heating Value Btu/lb	23152	Gross Heating Value Btu/SCF	1040.1
		Specific Gravity		0.58699					

CALCULATION OF F FACTORS

Component	Mol. Wt.	C Factor	H Factor	% volume	Fract. Wt.	Weight Percents: Carbon	Hydrogen	Nitrogen	Oxygen
Hydrogen	2.016	0	1	0.00	0.0000		0		
Oxygen	32.000	0	0	0.00	0.0000				0
Nitrogen	28.016	0	0	0.40	11.2064			0.660423463	
Carbon dioxide	44.010	0.272273	0	0.69	30.2437	0.485283438			1.29576
Carbon monoxide	28.010	0.42587	0	0.00	0.0000	0			0
Methane	16.041	0.75	0.25	95.28	1528.4474	67.55665614	22.5188854		
Ethane	30.067	0.8	0.2	2.84	85.4264	4.027525183	1.0068813		
Ethylene	28.051	0.85714	0.14286	0.00	0.0000	0	0		
Propane	44.092	0.81818	0.181818	0.47	20.6439	0.995397261	0.22119966		
Propene	42.077	0.85714	0.14286	0.00	0.0000	0	0		
Isobutane	58.118	0.82759	0.17247	0.11	6.1198	0.298476841	0.06220266		
n-butane	58.118	0.82759	0.17247	0.11	6.1663	0.300744472	0.06267524		
Isobutene	56.102	0.85714	0.14286	0.00	0.0000	0	0		
Isopentane	72.144	0.83333	0.16667	0.03	2.2653	0.111250829	0.0222507		
n-pentane	72.144	0.83333	0.16667	0.02	1.4285	0.070151797	0.0140307		
n-hexane	86.169	0.83721	0.16279	0.06	4.9030	0.241910155	0.04703784		
Hydrogen sulfide	34.076	0	0.058692	0.00	0.0000	0	0		
Totals				99.99990	1696.8507	74.08739612	23.96	0.660423463	1.29576

CALCULATED VALUES		
O_2 F Factor (dry)	**8640**	DSCF of Exhaust/MM Btu of Fuel Burned @ 0% excess air
O_2 F Factor (wet)	**10637**	SCF of Exhaust/MM Btu of Fuel Burned @ 0% excess air
Moisture F Factor	**1997**	SCF of Water/MM Btu of Fuel Burned @ 0% excess air
Combust. Moisture	**18.77**	volume % water in flue gas @ 0% excess air
CO_2 F Factor	**1027**	DSCF of CO2/MM Btu of Fuel Burned @ 0% excess air
Fuel VOC % (non-C1)	**7.67%**	
Fuel VOC % (non-C1,C2)	**2.60%**	

			1404			
24-Apr-00						
		AS FOUND			AS LEFT	
		test	actual			
FUEL TEMP.		69	69			69
MANIFOLD TEMP.						
MANIFOLD RESS.						
	RUNNING TEST					
FUEL STATIC PRESS.		0	0			0
		50	50			50
		100	100			100
	RUNNING TEST	77.4	77.4			77.4
FUEL HEADER PRESS.						
FUEL DIFF.		0	0			0
		10	10			10
		20	20			20
	ORIFICE PLATE	2 X 1.125				

				1405				
	24-Apr-00							
			AS FOUND			AS LEFT		
			test	actual				
FUEL TEMP.			69	69			69	
MANIFOLD TEMP.								
MANIFOLD RESS.								
	RUNNING TEST							
FUEL STATIC PRESS.			0	0			0	
			50	50			50	
			100	100			100	
	RUNNING TEST		78.5	78.5			78.5	
FUEL HEADER PRESS.								
FUEL DIFF.			0	0			0	
			25	25			25	
			45	45			45	
	ORIFICE PLATE		2 x 1.125					

APPENDIX D:
OPERATIONAL DATA

1404-C-1

Compressor Health Report
FloridaGas
Unit 140~~1~~ Worthington BDC-1

Name:	~~1401-C~~ 1404-C	Model:	BDC-1	Date:	4/27/00 1:36:05 PM
Location:	Quincy Compressor St	Unit Mfr:	Worthington	Serial No.:	

Mechanical Efficiency, %	95	Marker Correction Angle, deg	88.0	Periods Collected (PT)	10
Overall Efficiency, %	85	Stroke, (ins)	15.000		
Atmospheric Pressure, psia	14.7	Speed, RPM	345	Specific Gravity	0.554
Load Step	1				

Cyl End	Stg	Clr Set (%)	Bore (ins)	Rod Diam (ins)	ConRod Length (ins)	Pressure Ps (psig)	Pressure Pd (psig)	Temp. Ts	Temp. Td	Comp. Ratio	Calc. Capacity (mmscfd)	Indicated Power (ihp)	Suction Loss (ihp)	Disch. Loss (ihp)	Flow Balance	Dis T Delta (F)	Rod Load (%)	SVE (%)	DVE (%)
1H	1	199	16.500	N/A	40.000	691	926	67F	111F	1.33	31.06	432.8	23.0	22.5	1.00	11	116C	65	53
1C	1	128	16.500	4.000	40.000	690	923	67F	111F	1.33	35.00	493.2	23.5	32.9	1.02	11	45T	79	64
2H	1	202	16.500	N/A	40.000	694	923	67F	111F	1.32	30.60	420.3	25.6	25.6	1.00	12	118C	64	53
2C	1	127	16.500	4.000	40.000	688	920	67F	111F	1.33	34.98	498.5	24.1	41.5	1.00	11	44T	79	64

Notes:
1. Rod loading is based on maximum differential pressure across the rings. C - Compression, T - Tension. Forces due to inertia are not accounted for in this table.
2. Flow Balance = capacity from suction VE / capacity from discharge VE.
3. If the flow balance is much greater than 1.0 suspect leaking suction valves or rings. If the flow balance is much less than 1.0 suspect leaking discharge valves or rings.
4. Discharge Temp. Delta = actual discharge temp - theoretical.
5. If Suction or Discharge Temperatures are not found, some calculations may not be available as indicated by a "--".
6. Gas power = Total indicated power for all cylinders / Mechanical Efficiency.
7. Compressor total brake power = Gas power + Auxiliary brake power * RPM / Rated RPM.
8. Derated power is obtained by derating the rated power to actual run speed.
9. Compressor efficiency is the total indicated power - suction and discharge losses as a percentage of the total indicated power.
10. Marker Type: Encoder (ENC) and Trap Type: 9002.
11. Channel Resonance Correction (CRC) applied: 1C 1H 2H 2C
12. Corrected VE applied, PS and PD values Corrected: None

Total Indicated Power, (ihp)	1845	@	345	RPM	Rated Power, (bhp)	2030	@	345	RPM
Gas Power, (ghp)	1942	@	345	RPM	Derated Power, (bhp)	2029	@	345	RPM
Auxiliary Power, (bhp)	0	@	345	RPM	Percent Torque Load, %	96	%		
Compressor Total Power, (bhp)	1942	@	345	RPM	Compressor Efficiency, %	88	%		

Observations and Recommendations	Machine Condition Notes

Analyst Signature: 4/27/00 1:48:00 PM

1404-C-1c

1404 UNIT OPERATING DATA

TEST # 1404-C-2

2:14:51	4/27/00

ENGINE SPEED	343	RPM	AMBIENT TEMPERATURE	89	°F
IGNITION TIMING OUTPUT	18.0	°BTDC	LOAD STEP NUMBER	1	
IGNITION TIMING w\LIGHT			STATION SUCTION PRESSURE	695	PSIG
GOVERNOR SETTING			STATION SUCTION TEMP.	73	°F
			STATION DISCH. PRESSURE	928	PSIG
AIR MANIFOLD PRESS.	6.6	"Hg	STATION DISCH. TEMP.	116	°F
AIR MANIFOLD TEMP.	95	°F	COMPRESSOR FLOW RATE	112	MMSCFD
TURBOCHARGER VIBRATION	0.58	IN/SEC	"A" COMP. EFFICIENCY	80	%
FUEL STATIC PRESS.	75.2	PSIG	"B" COMP. EFFICIENCY	82	%
FUEL DIFF. PRESS.	17.8	"H20	AVERAGE COMP. EFFICIENCY	81	%
FUEL GAS HEADER PRESS.	17.4	PSIG	"A" COMP. SUCTION TEMP.	67	°F
FUEL TEMP.	76	°F	"B" COMP. SUCTION TEMP.	67	°F
COMPUTER FUEL FLOW SCF	13966		"A" COMP. DISCHARGE TEMP.	111	°F
			"B" COMP. DISCHARGE TEMP.	111	°F
AGA3 CAL. FUEL FLOW SCF			FUEL TORQUE HP	1885	BHP
CYLINDER #1 TEMP.	815	°F	TORQUE	93	%
CYLINDER #2 TEMP.	835	°F	GEO. HP	1928	BHP
CYLINDER #3 TEMP.	816	°F	GEO. HP - FUEL TORQUE HP	-47	BHP
CYLINDER #4 TEMP.	797	°F			
CYLINDER #5 TEMP.	852	°F	PFM 2000 BHP		
CYLINDER #6 TEMP.	806	°F			
CYLINDER #7 TEMP.	833	°F	PFM 2000 %TORQUE		
CYLINDER #8 TEMP.	798	°F			
MODE	AUTO				

M PS

1404-C-1a

1404 UNIT OPERATING DATA

2:45:05	4/27/00	TEST # 1404-C-1b

ENGINE SPEED	345	RPM
IGNITION TIMING OUTPUT	18.0	°BTDC
IGNITION TIMING w\LIGHT		
GOVERNOR SETTING		
AIR MANIFOLD PRESS.	6.3	"Hg
AIR MANIFOLD TEMP.	95	°F
TURBOCHARGER VIBRATION	0.55	IN/SEC
FUEL STATIC PRESS.	75.0	PSIG
FUEL DIFF. PRESS.	17.4	"H20
FUEL GAS HEADER PRESS.	17.2	PSIG
FUEL TEMP.	77	°F
COMPUTER FUEL FLOW SCF	13926	
AGA3 CAL. FUEL FLOW SCF		
CYLINDER #1 TEMP.	814	°F
CYLINDER #2 TEMP.	829	°F
CYLINDER #3 TEMP.	816	°F
CYLINDER #4 TEMP.	795	°F
CYLINDER #5 TEMP.	850	°F
CYLINDER #6 TEMP.	806	°F
CYLINDER #7 TEMP.	832	°F
CYLINDER #8 TEMP.	799	°F
MODE	AUTO	

AMBIENT TEMPERATURE	88	°F
LOAD STEP NUMBER	1	
STATION SUCTION PRESSURE	695	PSIG
STATION SUCTION TEMP.	73	°F
STATION DISCH. PRESSURE	928	PSIG
STATION DISCH. TEMP.	116	°F
COMPRESSOR FLOW RATE	112	MMSCFD
"A" COMP. EFFICIENCY	80	%
"B" COMP. EFFICIENCY	82	%
AVERAGE COMP. EFFICIENCY	81	%
"A" COMP. SUCTION TEMP.	67	°F
"B" COMP. SUCTION TEMP.	67	°F
"A" COMP. DISCHARGE TEMP.	111	°F
"B" COMP. DISCHARGE TEMP.	111	°F
FUEL TORQUE HP	1873	BHP
TORQUE	93	%
GEO. HP	1936	BHP
GEO. HP - FUEL TORQUE HP	-35	BHP
PFM 2000 BHP		
PFM 2000 %TORQUE		

M PS

1404-C-1b

1404 UNIT OPERATING DATA

3:14:58	4/27/00

TEST # 1404-C-1c

ENGINE SPEED	343	RPM
IGNITION TIMING OUTPUT	18.0	°BTDC
IGNITION TIMING w\LIGHT		
GOVERNOR SETTING		
AIR MANIFOLD PRESS.	6.5	"Hg
AIR MANIFOLD TEMP.	94	°F
TURBOCHARGER VIBRATION	0.57	IN/SEC
FUEL STATIC PRESS.	75.0	PSIG
FUEL DIFF. PRESS.	17.4	"H20
FUEL GAS HEADER PRESS.	17.3	PSIG
FUEL TEMP.	77	°F
COMPUTER FUEL FLOW SCF	13902	
AGA3 CAL. FUEL FLOW SCF		
CYLINDER #1 TEMP.	814	°F
CYLINDER #2 TEMP.	831	°F
CYLINDER #3 TEMP.	815	°F
CYLINDER #4 TEMP.	797	°F
CYLINDER #5 TEMP.	852	°F
CYLINDER #6 TEMP.	806	°F
CYLINDER #7 TEMP.	833	°F
CYLINDER #8 TEMP.	798	°F
MODE	AUTO	

AMBIENT TEMPERATURE	87	°F
LOAD STEP NUMBER	1	
STATION SUCTION PRESSURE	695	PSIG
STATION SUCTION TEMP.	73	°F
STATION DISCH. PRESSURE	927	PSIG
STATION DISCH. TEMP.	116	°F
COMPRESSOR FLOW RATE	112	MMSCFD
"A" COMP. EFFICIENCY	80	%
"B" COMP. EFFICIENCY	82	%
AVERAGE COMP. EFFICIENCY	81	%
"A" COMP. SUCTION TEMP.	67	°F
"B" COMP. SUCTION TEMP.	67	°F
"A" COMP. DISCHARGE TEMP.	111	°F
"B" COMP. DISCHARGE TEMP.	111	°F
FUEL TORQUE HP	1871	BHP
TORQUE	93	%
GEO. HP	1931	BHP
GEO. HP - FUEL TORQUE HP	-49	BHP
PFM 2000 BHP		
PFM 2000 %TORQUE		

M PS

1404-C-1c

1404 UNIT OPERATING DATA

3:31:36 | 4/27/00

TEST # 1404-C2a

ENGINE SPEED	343	RPM
IGNITION TIMING OUTPUT	18.0	°BTDC
IGNITION TIMING w\LIGHT		
GOVERNOR SETTING		
AIR MANIFOLD PRESS.	6.5	"Hg
AIR MANIFOLD TEMP.	94	°F
TURBOCHARGER VIBRATION	0.57	IN/SEC
FUEL STATIC PRESS.	75.1	PSIG
FUEL DIFF. PRESS.	17.6	"H20
FUEL GAS HEADER PRESS.	17.3	PSIG
FUEL TEMP.	78	°F
COMPUTER FUEL FLOW SCF	13913	
AGA3 CAL. FUEL FLOW SCF		
CYLINDER #1 TEMP.	815	°F
CYLINDER #2 TEMP.	834	°F
CYLINDER #3 TEMP.	818	°F
CYLINDER #4 TEMP.	795	°F
CYLINDER #5 TEMP.	852	°F
CYLINDER #6 TEMP.	804	°F
CYLINDER #7 TEMP.	832	°F
CYLINDER #8 TEMP.	798	°F
MODE	AUTO	

AMBIENT TEMPERATURE	88	°F
LOAD STEP NUMBER	1	
STATION SUCTION PRESSURE	695	PSIG
STATION SUCTION TEMP.	73	°F
STATION DISCH. PRESSURE	926	PSIG
STATION DISCH. TEMP.	116	°F
COMPRESSOR FLOW RATE	112	MMSCFD
"A" COMP. EFFICIENCY	80	%
"B" COMP. EFFICIENCY	81	%
AVERAGE COMP. EFFICIENCY	81	%
"A" COMP. SUCTION TEMP.	66	°F
"B" COMP. SUCTION TEMP.	67	°F
"A" COMP. DISCHARGE TEMP.	111	°F
"B" COMP. DISCHARGE TEMP.	111	°F
FUEL TORQUE HP	1874	BHP
TORQUE	93	%
GEO. HP	1929	BHP
GEO. HP - FUEL TORQUE HP	-47	BHP
PFM 2000 BHP		
PFM 2000 %TORQUE		

M PS

1404-C-2a

1404 UNIT OPERATING DATA

4:02:16	4/27/00

TEST # 1404-C-26

ENGINE SPEED	343	RPM
IGNITION TIMING OUTPUT	18.0	°BTDC
IGNITION TIMING w\LIGHT		
GOVERNOR SETTING		
AIR MANIFOLD PRESS.	6.5	"Hg
AIR MANIFOLD TEMP.	94	°F
TURBOCHARGER VIBRATION	0.58	IN/SEC
FUEL STATIC PRESS.	75.1	PSIG
FUEL DIFF. PRESS.	17.3	"H20
FUEL GAS HEADER PRESS.	17.2	PSIG
FUEL TEMP.	78	°F
COMPUTER FUEL FLOW SCF	13844	
AGA3 CAL. FUEL FLOW SCF		
CYLINDER #1 TEMP.	815	°F
CYLINDER #2 TEMP.	832	°F
CYLINDER #3 TEMP.	815	°F
CYLINDER #4 TEMP.	796	°F
CYLINDER #5 TEMP.	851	°F
CYLINDER #6 TEMP.	804	°F
CYLINDER #7 TEMP.	833	°F
CYLINDER #8 TEMP.	796	°F
MODE	AUTO	

AMBIENT TEMPERATURE	92	°F
LOAD STEP NUMBER	1	
STATION SUCTION PRESSURE	695	PSIG
STATION SUCTION TEMP.	73	°F
STATION DISCH. PRESSURE	926	PSIG
STATION DISCH. TEMP.	115	°F
COMPRESSOR FLOW RATE	112	MMSCFD
"A" COMP. EFFICIENCY	80	%
"B" COMP. EFFICIENCY	82	%
AVERAGE COMP. EFFICIENCY	81	%
"A" COMP. SUCTION TEMP.	67	°F
"B" COMP. SUCTION TEMP.	67	°F
"A" COMP. DISCHARGE TEMP.	111	°F
"B" COMP. DISCHARGE TEMP.	110	°F
FUEL TORQUE HP	1860	BHP
TORQUE	92	%
GEO. HP	1931	BHP
GEO. HP - FUEL TORQUE HP	-64	BHP
PFM 2000 BHP		
PFM 2000 %TORQUE		

M PS

1404-C-26

1404 UNIT OPERATING DATA

4:33:54 | 4/27/00

TEST # 1404-C-2c

ENGINE SPEED	344	RPM
IGNITION TIMING OUTPUT	18.0	°BTDC
IGNITION TIMING w\LIGHT		
GOVERNOR SETTING		
AIR MANIFOLD PRESS.	6.4	"Hg
AIR MANIFOLD TEMP.	96	°F
TURBOCHARGER VIBRATION	0.52	IN/SEC
FUEL STATIC PRESS.	75.2	PSIG
FUEL DIFF. PRESS.	17.2	"H20
FUEL GAS HEADER PRESS.	17.2	PSIG
FUEL TEMP.	78	°F
COMPUTER FUEL FLOW SCF	13812	
AGA3 CAL. FUEL FLOW SCF		
CYLINDER #1 TEMP.	817	°F
CYLINDER #2 TEMP.	834	°F
CYLINDER #3 TEMP.	815	°F
CYLINDER #4 TEMP.	798	°F
CYLINDER #5 TEMP.	853	°F
CYLINDER #6 TEMP.	806	°F
CYLINDER #7 TEMP.	833	°F
CYLINDER #8 TEMP.	800	°F
MODE	AUTO	

AMBIENT TEMPERATURE	87	°F
LOAD STEP NUMBER	1	
STATION SUCTION PRESSURE	698	PSIG
STATION SUCTION TEMP.	73	°F
STATION DISCH. PRESSURE	925	PSIG
STATION DISCH. TEMP.	115	°F
COMPRESSOR FLOW RATE	114	MMSCFD
"A" COMP. EFFICIENCY	80	%
"B" COMP. EFFICIENCY	82	%
AVERAGE COMP. EFFICIENCY	81	%
"A" COMP. SUCTION TEMP.	67	°F
"B" COMP. SUCTION TEMP.	67	°F
"A" COMP. DISCHARGE TEMP.	110	°F
"B" COMP. DISCHARGE TEMP.	110	°F
FUEL TORQUE HP	1852	BHP
TORQUE	92	%
GEO. HP	1939	BHP
GEO. HP - FUEL TORQUE HP	-56	BHP
PFM 2000 BHP		
PFM 2000 %TORQUE		

M PS

1404-C-2c

1404 UNIT OPERATING DATA

4:56:49	4/27/00		TEST #	1404-C-3a

ENGINE SPEED	343	RPM
IGNITION TIMING OUTPUT	18.0	°BTDC
IGNITION TIMING w\LIGHT		
GOVERNOR SETTING		
AIR MANIFOLD PRESS.	6.4	"Hg
AIR MANIFOLD TEMP.	94	°F
TURBOCHARGER VIBRATION	0.56	IN/SEC
FUEL STATIC PRESS.	75.2	PSIG
FUEL DIFF. PRESS.	17.3	"H20
FUEL GAS HEADER PRESS.	17.3	PSIG
FUEL TEMP.	77	°F
COMPUTER FUEL FLOW SCF	13826	
AGA3 CAL. FUEL FLOW SCF		
CYLINDER #1 TEMP.	817	°F
CYLINDER #2 TEMP.	835	°F
CYLINDER #3 TEMP.	818	°F
CYLINDER #4 TEMP.	798	°F
CYLINDER #5 TEMP.	852	°F
CYLINDER #6 TEMP.	805	°F
CYLINDER #7 TEMP.	832	°F
CYLINDER #8 TEMP.	798	°F
MODE	AUTO	

AMBIENT TEMPERATURE	88	°F
LOAD STEP NUMBER	1	
STATION SUCTION PRESSURE	697	PSIG
STATION SUCTION TEMP.	73	°F
STATION DISCH. PRESSURE	925	PSIG
STATION DISCH. TEMP.	115	°F
COMPRESSOR FLOW RATE	113	MMSCFD
"A" COMP. EFFICIENCY	80	%
"B" COMP. EFFICIENCY	82	%
AVERAGE COMP. EFFICIENCY	81	%
"A" COMP. SUCTION TEMP.	66	°F
"B" COMP. SUCTION TEMP.	67	°F
"A" COMP. DISCHARGE TEMP.	110	°F
"B" COMP. DISCHARGE TEMP.	110	°F
FUEL TORQUE HP	1859	BHP
TORQUE	92	%
GEO. HP	1929	BHP
GEO. HP - FUEL TORQUE HP	-55	BHP
PFM 2000 BHP		
PFM 2000 %TORQUE		

M PS

1404-C-3a

1404 UNIT OPERATING DATA

5:27:06	4/27/00		TEST #	1404-C-36

ENGINE SPEED	344	RPM
IGNITION TIMING OUTPUT	18.0	°BTDC
IGNITION TIMING w\LIGHT		
GOVERNOR SETTING		
AIR MANIFOLD PRESS.	6.4	"Hg
AIR MANIFOLD TEMP.	95	°F
TURBOCHARGER VIBRATION	0.60	IN/SEC
FUEL STATIC PRESS.	75.1	PSIG
FUEL DIFF. PRESS.	17.4	"H20
FUEL GAS HEADER PRESS.	17.3	PSIG
FUEL TEMP.	78	°F
COMPUTER FUEL FLOW SCF	13886	
AGA3 CAL. FUEL FLOW SCF		
CYLINDER #1 TEMP.	815	°F
CYLINDER #2 TEMP.	834	°F
CYLINDER #3 TEMP.	819	°F
CYLINDER #4 TEMP.	798	°F
CYLINDER #5 TEMP.	851	°F
CYLINDER #6 TEMP.	806	°F
CYLINDER #7 TEMP.	833	°F
CYLINDER #8 TEMP.	797	°F
MODE	AUTO	

AMBIENT TEMPERATURE	87	°F
LOAD STEP NUMBER	1	
STATION SUCTION PRESSURE	696	PSIG
STATION SUCTION TEMP.	73	°F
STATION DISCH. PRESSURE	925	PSIG
STATION DISCH. TEMP.	115	°F
COMPRESSOR FLOW RATE	114	MMSCFD
"A" COMP. EFFICIENCY	80	%
"B" COMP. EFFICIENCY	82	%
AVERAGE COMP. EFFICIENCY	81	%
"A" COMP. SUCTION TEMP.	67	°F
"B" COMP. SUCTION TEMP.	67	°F
"A" COMP. DISCHARGE TEMP.	110	°F
"B" COMP. DISCHARGE TEMP.	110	°F
FUEL TORQUE HP	1863	BHP
TORQUE	92	%
GEO. HP	1938	BHP
GEO. HP - FUEL TORQUE HP	-70	BHP
PFM 2000 BHP		
PFM 2000 %TORQUE		

M PS

1404-C-36

1404 UNIT OPERATING DATA

5:55:14	4/27/00

TEST # 1404C-3c

ENGINE SPEED	343	RPM
IGNITION TIMING OUTPUT	18.0	°BTDC
IGNITION TIMING w\LIGHT		
GOVERNOR SETTING		
AIR MANIFOLD PRESS.	6.4	"Hg
AIR MANIFOLD TEMP.	94	°F
TURBOCHARGER VIBRATION	0.60	IN/SEC
FUEL STATIC PRESS.	75.2	PSIG
FUEL DIFF. PRESS.	17.2	"H20
FUEL GAS HEADER PRESS.	17.1	PSIG
FUEL TEMP.	78	°F
COMPUTER FUEL FLOW SCF	13755	
AGA3 CAL. FUEL FLOW SCF		
CYLINDER #1 TEMP.	812	°F
CYLINDER #2 TEMP.	829	°F
CYLINDER #3 TEMP.	817	°F
CYLINDER #4 TEMP.	797	°F
CYLINDER #5 TEMP.	851	°F
CYLINDER #6 TEMP.	805	°F
CYLINDER #7 TEMP.	832	°F
CYLINDER #8 TEMP.	796	°F
MODE	AUTO	

AMBIENT TEMPERATURE	84	°F
LOAD STEP NUMBER	1	
STATION SUCTION PRESSURE	695	PSIG
STATION SUCTION TEMP.	73	°F
STATION DISCH. PRESSURE	924	PSIG
STATION DISCH. TEMP.	115	°F
COMPRESSOR FLOW RATE	113	MMSCFD
"A" COMP. EFFICIENCY	80	%
"B" COMP. EFFICIENCY	82	%
AVERAGE COMP. EFFICIENCY	81	%
"A" COMP. SUCTION TEMP.	67	°F
"B" COMP. SUCTION TEMP.	67	°F
"A" COMP. DISCHARGE TEMP.	110	°F
"B" COMP. DISCHARGE TEMP.	110	°F
FUEL TORQUE HP	1848	BHP
TORQUE	92	%
GEO. HP	1925	BHP
GEO. HP - FUEL TORQUE HP	-68	BHP
PFM 2000 BHP		
PFM 2000 %TORQUE		

M PS

1404-C-3c

14~~4~~05-C-1

Compressor Health Report
FloridaGas
Unit 1401 Worthington BDC-1

Central Time

Unit Name:	1405-C	Model:	BDC-1	Date:	4/27/00 8:43:16 AM
Location:	Quincy Compressor St	Unit Mfr:	Worthington	Serial No.:	

Mechanical Efficiency, %	95	Marker Correction Angle, deg	87.0	Periods Collected (PT)	10
Overall Efficiency, %	85	Stroke, (ins)	15.000		
Atmospheric Pressure, psia	14.7	Speed, RPM	346	Specific Gravity	0.554
Load Step	1				

Cyl End	Stg	Clr Set (%)	Bore (ins)	Rod Diam (ins)	ConRod Length (ins)	Pressure Ps (psig)	Pressure Pd (psig)	Temp. Ts	Temp. Td	Comp. Ratio	Calc. Capacity (mmscfd)	Indicated Power (ihp)	Suction Loss (ihp)	Disch. Loss (ihp)	Flow Balance	Dis T Delta (F)	Rod Load (%)	SVE (%)	DVE (%)
1H	1	160	16.500	N/A	40.000	689	923	69F	112F	1.33	31.12	442.7	22.9	27.6	1.03	10	115C	68	54
1C	1	97	16.500	4.000	40.000	690	922	69F	112F	1.33	34.33	480.7	22.3	34.9	0.99	10	45T	77	64
2H	1	155	16.500	N/A	40.000	695	921	69F	111F	1.32	31.80	443.7	30.1	30.9	1.04	10	116C	69	55
2C	1	95	16.500	4.000	40.000	692	925	69F	111F	1.33	34.54	479.6	24.9	29.8	1.01	8	44T	77	63

Notes:
1. Rod loading is based on maximum differential pressure across the rings. C - Compression, T - Tension. Forces due to inertia are not accounted for in this table.
2. Flow Balance = capacity from suction VE / capacity from discharge VE.
3. If the flow balance is much greater than 1.0 suspect leaking suction valves or rings. If the flow balance is much less than 1.0 suspect leaking discharge valves or rings.
4. Discharge Temp. Delta = actual discharge temp - theoretical.
5. If Suction or Discharge Temperatures are not found, some calculations may not be available as indicated by a "--".
6. Gas power = Total Indicated power for all cylinders / Mechanical Efficiency.
7. Compressor total brake power = Gas power + Auxiliary brake power * RPM / Rated RPM.
8. Derated power is obtained by derating the rated power to actual run speed.
9. Compressor efficiency is the total indicated power - suction and discharge losses as a percentage of the total indicated power.
10. Marker Type: Encoder (ENC) and Trap Type: 9002.
11. Channel Resonance Correction (CRC) applied: 1H 1C 2H 2C
12. Corrected VE applied, PS and PD values Corrected: None

Total Indicated Power, (ihp)	1847	@ 346	RPM	Rated Power, (bhp)	2030	@ 345	RPM
Gas Power, (ghp)	1944	@ 346	RPM	Derated Power, (bhp)	2034	@ 346	RPM
Auxiliary Power, (bhp)	0	@ 345	RPM	Percent Torque Load, %	96	%	
Compressor Total Power, (bhp)	1944	@ 346	RPM	Compressor Efficiency, %	88	%	

Observations and Recommendations	Machine Condition Notes

Analyst Signature: 4/27/00 8:55:54 AM

1405-C-1d

Cabin Time is 5min behind.

1405 UNIT OPERATING DATA

9:30:45	4/27/00

TEST # 1405-C-1a

ENGINE SPEED	345	RPM
IGNITION TIMING OUTPUT	18.0	°BTDC
IGNITION TIMING w\LIGHT		
GOVERNOR SETTING		
AIR MANIFOLD PRESS.	6.8	"Hg
AIR MANIFOLD TEMP.	93	°F
TURBOCHARGER VIBRATION	0.42	IN/SEC
FUEL STATIC PRESS.	75.7	PSIG
FUEL DIFF. PRESS.	18.5	"H20
FUEL GAS HEADER PRESS.	13.5	PSIG
FUEL TEMP.	70	°F
COMPUTER FUEL FLOW SCF	14533	
AGA3 CAL. FUEL FLOW SCF		
CYLINDER #1 TEMP.	801	°F
CYLINDER #2 TEMP.	762	°F
CYLINDER #3 TEMP.	769	°F
CYLINDER #4 TEMP.	800	°F
CYLINDER #5 TEMP.	727	°F
CYLINDER #6 TEMP.	816	°F
CYLINDER #7 TEMP.	770	°F
CYLINDER #8 TEMP.	825	°F
MODE	AUTO	

AMBIENT TEMPERATURE	70	°F
LOAD STEP NUMBER	6	
STATION SUCTION PRESSURE	698	PSIG
STATION SUCTION TEMP.	73	°F
STATION DISCH. PRESSURE	928	PSIG
STATION DISCH. TEMP.	115	°F
COMPRESSOR FLOW RATE	118	MMSCFD
"A" COMP. EFFICIENCY	82	%
"B" COMP. EFFICIENCY	84	%
AVERAGE COMP. EFFICIENCY	83	%
"A" COMP. SUCTION TEMP.	69	°F
"B" COMP. SUCTION TEMP.	69	°F
"A" COMP. DISCHARGE TEMP.	112	°F
"B" COMP. DISCHARGE TEMP.	111	°F
FUEL TORQUE HP	1953	BHP
TORQUE	96	%
GEO. HP	2001	BHP
GEO. HP - FUEL TORQUE HP	0	BHP
PFM 2000 BHP		
PFM 2000 %TORQUE		

M PS

1405-C-1a

1405 UNIT OPERATING DATA

10:01:33	4/27/00		TEST # 1405-C-16

ENGINE SPEED	345	RPM
IGNITION TIMING OUTPUT	18.0	°BTDC
IGNITION TIMING w\LIGHT		
GOVERNOR SETTING		
AIR MANIFOLD PRESS.	6.7	"Hg
AIR MANIFOLD TEMP.	96	°F
TURBOCHARGER VIBRATION	0.45	IN/SEC
FUEL STATIC PRESS.	75.3	PSIG
FUEL DIFF. PRESS.	18.5	"H20
FUEL GAS HEADER PRESS.	13.6	PSIG
FUEL TEMP.	71	°F
COMPUTER FUEL FLOW SCF	14554	
AGA3 CAL. FUEL FLOW SCF		
CYLINDER #1 TEMP.	803	°F
CYLINDER #2 TEMP.	765	°F
CYLINDER #3 TEMP.	770	°F
CYLINDER #4 TEMP.	803	°F
CYLINDER #5 TEMP.	733	°F
CYLINDER #6 TEMP.	823	°F
CYLINDER #7 TEMP.	776	°F
CYLINDER #8 TEMP.	827	°F
MODE	AUTO	

AMBIENT TEMPERATURE	73	°F
LOAD STEP NUMBER	6	
STATION SUCTION PRESSURE	698	PSIG
STATION SUCTION TEMP.	73	°F
STATION DISCH. PRESSURE	929	PSIG
STATION DISCH. TEMP.	115	°F
COMPRESSOR FLOW RATE	118	MMSCFD
"A" COMP. EFFICIENCY	81	%
"B" COMP. EFFICIENCY	83	%
AVERAGE COMP. EFFICIENCY	82	%
"A" COMP. SUCTION TEMP.	69	°F
"B" COMP. SUCTION TEMP.	69	°F
"A" COMP. DISCHARGE TEMP.	112	°F
"B" COMP. DISCHARGE TEMP.	111	°F
FUEL TORQUE HP	1960	BHP
TORQUE	97	%
GEO. HP	2000	BHP
GEO. HP - FUEL TORQUE HP	0	BHP
PFM 2000 BHP		
PFM 2000 %TORQUE		

M PS

1405-C-16

1405 UNIT OPERATING DATA

10:34:58 | 4/27/00

TEST # 1405-C-1c

ENGINE SPEED	345	RPM
IGNITION TIMING OUTPUT	18.0	°BTDC
IGNITION TIMING w\LIGHT		
GOVERNOR SETTING		
AIR MANIFOLD PRESS.	6.6	"Hg
AIR MANIFOLD TEMP.	96	°F
TURBOCHARGER VIBRATION	0.47	IN/SEC
FUEL STATIC PRESS.	75.3	PSIG
FUEL DIFF. PRESS.	18.4	"H20
FUEL GAS HEADER PRESS.	13.5	PSIG
FUEL TEMP.	72	°F
COMPUTER FUEL FLOW SCF	14511	
AGA3 CAL. FUEL FLOW SCF		
CYLINDER #1 TEMP.	806	°F
CYLINDER #2 TEMP.	770	°F
CYLINDER #3 TEMP.	775	°F
CYLINDER #4 TEMP.	803	°F
CYLINDER #5 TEMP.	735	°F
CYLINDER #6 TEMP.	825	°F
CYLINDER #7 TEMP.	779	°F
CYLINDER #8 TEMP.	831	°F
MODE	AUTO	

AMBIENT TEMPERATURE	75	°F
LOAD STEP NUMBER	6	
STATION SUCTION PRESSURE	697	PSIG
STATION SUCTION TEMP.	73	°F
STATION DISCH. PRESSURE	924	PSIG
STATION DISCH. TEMP.	115	°F
COMPRESSOR FLOW RATE	118	MMSCFD
"A" COMP. EFFICIENCY	81	%
"B" COMP. EFFICIENCY	83	%
AVERAGE COMP. EFFICIENCY	82	%
"A" COMP. SUCTION TEMP.	69	°F
"B" COMP. SUCTION TEMP.	69	°F
"A" COMP. DISCHARGE TEMP.	112	°F
"B" COMP. DISCHARGE TEMP.	111	°F
FUEL TORQUE HP	1946	BHP
TORQUE	96	%
GEO. HP	1999	BHP
GEO. HP - FUEL TORQUE HP	0	BHP
PFM 2000 BHP		
PFM 2000 %TORQUE		

M PS

1405-C-1c

Compressor Health Report
FloridaGas
Unit 1401 Worthington BDC-1

Test Run
1405-C-2

it Name: 1405-C | Model: BDC-1 | Date: 4/27/00 9:58:42 AM
ocation: Quincy Compressor St | Unit Mfr: Worthington | Serial No.:

Central Time

Mechanical Efficiency, %	95	Marker Correction Angle, deg	87.0	Periods Collected (PT)	10
Overall Efficiency, %	85	Stroke, (ins)	15.000		
Atmospheric Pressure, psia	14.7	Speed, RPM	346	Specific Gravity	0.554
Load Step	1				

Cyl End	Stg	Clr Set (%)	Bore (ins)	Rod Diam (ins)	ConRod Length (ins)	Pressure Ps (psig)	Pressure Pd (psig)	Temp. Ts	Temp. Td	Comp. Ratio	Calc. Capacity (mmscfd)	Indicated Power (ihp)	Suction Loss (ihp)	Disch. Loss (ihp)	Flow Balance	Dis T Delta (F)	Rod Load (%)	SVE (%)	DVE (%)
1H	1	160	16.500	N/A	40.000	687	918	69F	111F	1.33	31.43	433.0	19.2	21.8	1.02	9	112C	68	54
1C	1	97	16.500	4.000	40.000	689	916	69F	111F	1.32	34.52	469.9	18.7	33.4	0.99	9	43T	77	64
2H	1	155	16.500	N/A	40.000	686	912	69F	110F	1.32	31.91	440.8	19.1	32.8	1.00	8	114C	68	56
2C	1	95	16.500	4.000	40.000	688	916	69F	110F	1.32	34.64	473.9	22.7	34.7	1.00	8	44T	78	63

Notes:
1. Rod loading is based on maximum differential pressure across the rings. C - Compression, T - Tension. Forces due to inertia are not accounted for in this table.
2. Flow Balance = capacity from suction VE / capacity from discharge VE.
3. If the flow balance is much greater than 1.0 suspect leaking suction valves or rings. If the flow balance is much less than 1.0 suspect leaking discharge valves or rings.
4. Discharge Temp. Delta = actual discharge temp - theoretical.
5. If Suction or Discharge Temperatures are not found, some calculations may not be available as indicated by a "–".
6. Gas power = Total indicated power for all cylinders / Mechanical Efficiency.
7. Compressor total brake power = Gas power + Auxiliary brake power * RPM / Rated RPM.
8. Derated power is obtained by derating the rated power to actual run speed.
9. *Compressor efficiency is the total indicated power - suction and discharge losses as a percentage of the total indicated power.*
10. Marker Type: Encoder (ENC) and Trap Type: 9002.
11. Channel Resonance Correction (CRC) applied: 1C 1H 2H 2C
12. Corrected VE applied, PS and PD values Corrected: None

Total Indicated Power, (ihp)	1818	@ 346	RPM	Rated Power, (bhp)	2030	@ 345	RPM
Gas Power, (ghp)	1913	@ 346	RPM	Derated Power, (bhp)	2034	@ 346	RPM
Auxiliary Power, (bhp)	0	@ 345	RPM	Percent Torque Load, %	94	%	
Compressor Total Power, (bhp)	1913	@ 346	RPM	Compressor Efficiency, %	89	%	

Observations and Recommendations	Machine Condition Notes

Analyst Signature: 4/27/00 10:10:49 AM

~~Central~~

1405-C-2d

1405 UNIT OPERATING DATA

10:46:33 | 4/27/00

TEST # 1405C-2a

ENGINE SPEED	345	RPM
IGNITION TIMING OUTPUT	18.0	°BTDC
IGNITION TIMING w\LIGHT		
GOVERNOR SETTING		
AIR MANIFOLD PRESS.	6.7	"Hg
AIR MANIFOLD TEMP.	97	°F
TURBOCHARGER VIBRATION	0.44	IN/SEC
FUEL STATIC PRESS.	75.4	PSIG
FUEL DIFF. PRESS.	18.5	"H20
FUEL GAS HEADER PRESS.	13.6	PSIG
FUEL TEMP.	72	°F
COMPUTER FUEL FLOW SCF	14483	
AGA3 CAL. FUEL FLOW SCF		
CYLINDER #1 TEMP.	805	°F
CYLINDER #2 TEMP.	769	°F
CYLINDER #3 TEMP.	774	°F
CYLINDER #4 TEMP.	804	°F
CYLINDER #5 TEMP.	737	°F
CYLINDER #6 TEMP.	829	°F
CYLINDER #7 TEMP.	780	°F
CYLINDER #8 TEMP.	832	°F
MODE	AUTO	

AMBIENT TEMPERATURE	77	°F
LOAD STEP NUMBER	6	
STATION SUCTION PRESSURE	696	PSIG
STATION SUCTION TEMP.	73	°F
STATION DISCH. PRESSURE	923	PSIG
STATION DISCH. TEMP.	115	°F
COMPRESSOR FLOW RATE	118	MMSCFD
"A" COMP. EFFICIENCY	81	%
"B" COMP. EFFICIENCY	84	%
AVERAGE COMP. EFFICIENCY	82	%
"A" COMP. SUCTION TEMP.	69	°F
"B" COMP. SUCTION TEMP.	69	°F
"A" COMP. DISCHARGE TEMP.	111	°F
"B" COMP. DISCHARGE TEMP.	111	°F
FUEL TORQUE HP	1939	BHP
TORQUE	96	%
GEO. HP	1988	BHP
GEO. HP - FUEL TORQUE HP	0	BHP
PFM 2000 BHP		
PFM 2000 %TORQUE		

M PS

1405-C-2a

1405 UNIT OPERATING DATA

11:18:18 | 4/27/00

TEST # 1405-C2b

ENGINE SPEED	345	RPM
IGNITION TIMING OUTPUT	18.0	°BTDC
IGNITION TIMING w\LIGHT		
GOVERNOR SETTING		
AIR MANIFOLD PRESS.	6.6	"Hg
AIR MANIFOLD TEMP.	100	°F
TURBOCHARGER VIBRATION	0.44	IN/SEC
FUEL STATIC PRESS.	75.3	PSIG
FUEL DIFF. PRESS.	18.2	"H20
FUEL GAS HEADER PRESS.	13.4	PSIG
FUEL TEMP.	73	°F
COMPUTER FUEL FLOW SCF	14378	
AGA3 CAL. FUEL FLOW SCF		
CYLINDER #1 TEMP.	803	°F
CYLINDER #2 TEMP.	767	°F
CYLINDER #3 TEMP.	773	°F
CYLINDER #4 TEMP.	804	°F
CYLINDER #5 TEMP.	736	°F
CYLINDER #6 TEMP.	825	°F
CYLINDER #7 TEMP.	777	°F
CYLINDER #8 TEMP.	828	°F
MODE	AUTO	

AMBIENT TEMPERATURE	78	°F
LOAD STEP NUMBER	6	
STATION SUCTION PRESSURE	695	PSIG
STATION SUCTION TEMP.	73	°F
STATION DISCH. PRESSURE	920	PSIG
STATION DISCH. TEMP.	114	°F
COMPRESSOR FLOW RATE	118	MMSCFD
"A" COMP. EFFICIENCY	81	%
"B" COMP. EFFICIENCY	83	%
AVERAGE COMP. EFFICIENCY	82	%
"A" COMP. SUCTION TEMP.	69	°F
"B" COMP. SUCTION TEMP.	69	°F
"A" COMP. DISCHARGE TEMP.	111	°F
"B" COMP. DISCHARGE TEMP.	110	°F
FUEL TORQUE HP	1911	BHP
TORQUE	94	%
GEO. HP	1984	BHP
GEO. HP - FUEL TORQUE HP	0	BHP
PFM 2000 BHP		
PFM 2000 %TORQUE		

M PS

1405-C-26

1405 UNIT OPERATING DATA

11:45:36	4/27/00	TEST # 1405-C-2c

ENGINE SPEED	345	RPM
IGNITION TIMING OUTPUT	18.0	°BTDC
IGNITION TIMING w\LIGHT		
GOVERNOR SETTING		
AIR MANIFOLD PRESS.	6.7	"Hg
AIR MANIFOLD TEMP.	91	°F
TURBOCHARGER VIBRATION	0.47	IN/SEC
FUEL STATIC PRESS.	75.0	PSIG
FUEL DIFF. PRESS.	18.4	"H20
FUEL GAS HEADER PRESS.	13.4	PSIG
FUEL TEMP.	74	°F
COMPUTER FUEL FLOW SCF	14419	
AGA3 CAL. FUEL FLOW SCF		
CYLINDER #1 TEMP.	797	°F
CYLINDER #2 TEMP.	760	°F
CYLINDER #3 TEMP.	761	°F
CYLINDER #4 TEMP.	794	°F
CYLINDER #5 TEMP.	724	°F
CYLINDER #6 TEMP.	817	°F
CYLINDER #7 TEMP.	768	°F
CYLINDER #8 TEMP.	819	°F
MODE	AUTO	

AMBIENT TEMPERATURE	82	°F
LOAD STEP NUMBER	6	
STATION SUCTION PRESSURE	694	PSIG
STATION SUCTION TEMP.	73	°F
STATION DISCH. PRESSURE	921	PSIG
STATION DISCH. TEMP.	115	°F
COMPRESSOR FLOW RATE	117	MMSCFD
"A" COMP. EFFICIENCY	82	%
"B" COMP. EFFICIENCY	84	%
AVERAGE COMP. EFFICIENCY	83	%
"A" COMP. SUCTION TEMP.	69	°F
"B" COMP. SUCTION TEMP.	69	°F
"A" COMP. DISCHARGE TEMP.	111	°F
"B" COMP. DISCHARGE TEMP.	110	°F
FUEL TORQUE HP	1920	BHP
TORQUE	95	%
GEO. HP	1989	BHP
GEO. HP - FUEL TORQUE HP	0	BHP
PFM 2000 BHP		
PFM 2000 %TORQUE		

M PS

1405-C-2c

Test Run

1405-C-3

Compressor Health Report
FloridaGas
Unit 1401 Worthington BDC-1

it Name:	1405-C	Model:	BDC-1	Date:	4/27/00 11:02:40 AM
Location:	Quincy Compressor St	Unit Mfr:	Worthington	Serial No.:	

Mechanical Efficiency, %	95	Marker Correction Angle, deg	87.0	Periods Collected (PT)	10
Overall Efficiency, %	85	Stroke, (ins)	15.000		
Atmospheric Pressure, psia	14.7	Speed, RPM	346	Specific Gravity	0.554
Load Step	1				

Cyl End	Stg	Clr Set (%)	Bore (ins)	Rod Diam (ins)	ConRod Length (ins)	Pressure Ps (psig)	Pressure Pd (psig)	Temp. Ts	Temp. Td	Comp. Ratio	Calc. Capacity (mmscfd)	Indicated Power (ihp)	Suction Loss (ihp)	Disch. Loss (ihp)	Flow Balance	Dis T Delta (F)	Rod Load (%)	SVE (%)	DVE (%)
1H	1	160	16.500	N/A	40.000	688	924	69F	113F	1.34	30.75	439.2	23.8	23.4	1.05	11	116C	68	53
1C	1	97	16.500	4.000	40.000	687	922	69F	113F	1.34	33.88	480.7	20.5	34.5	0.99	11	45T	76	63
2H	1	155	16.500	N/A	40.000	687	922	69F	111F	1.33	31.22	439.2	19.4	27.7	1.02	8	117C	67	54
2C	1	95	16.500	4.000	40.000	687	921	69F	111F	1.33	34.01	482.2	24.5	36.0	1.01	8	44T	77	62

Notes:

1. Rod loading is based on maximum differential pressure across the rings. C - Compression, T - Tension. Forces due to inertia are not accounted for in this table.
2. Flow Balance = capacity from suction VE / capacity from discharge VE.
3. If the flow balance is much greater than 1.0 suspect leaking suction valves or rings. If the flow balance is much less than 1.0 suspect leaking discharge valves or rings.
4. Discharge Temp. Delta = actual discharge temp - theoretical.
5. If Suction or Discharge Temperatures are not found, some calculations may not be available as indicated by a "--".
6. Gas power = Total indicated power for all cylinders / Mechanical Efficiency.
7. Compressor total brake power = Gas power + Auxiliary brake power * RPM / Rated RPM.
8. Derated power is obtained by derating the rated power to actual run speed.
9. Compressor efficiency is the total indicated power - suction and discharge losses as a percentage of the total indicated power.
10. Marker Type: Encoder (ENC) and Trap Type: 9002.
11. Channel Resonance Correction (CRC) applied: 1H 1C 2H 2C
12. Corrected VE applied, PS and PD values Corrected: None

Total Indicated Power, (ihp)	1841	@	346	RPM	Rated Power, (bhp)	2030	@	345	RPM
Gas Power, (ghp)	1938	@	346	RPM	Derated Power, (bhp)	2035	@	346	RPM
Auxiliary Power, (bhp)	0	@	345	RPM	Percent Torque Load, %	95	%		
Compressor Total Power, (bhp)	1938	@	346	RPM	Compressor Efficiency, %	89	%		

Observations and Recommendations	Machine Condition Notes

Analyst Signature: 4/27/00 11:16:13 AM

1405-C-3d

1405 UNIT OPERATING DATA

12:00:32 | 4/27/00 | TEST # 1405-C-39

ENGINE SPEED	345	RPM
IGNITION TIMING OUTPUT	18.0	°BTDC
IGNITION TIMING w\LIGHT		
GOVERNOR SETTING		
AIR MANIFOLD PRESS.	6.8	"Hg
AIR MANIFOLD TEMP.	91	°F
TURBOCHARGER VIBRATION	0.46	IN/SEC
FUEL STATIC PRESS.	75.0	PSIG
FUEL DIFF. PRESS.	18.7	"H20
FUEL GAS HEADER PRESS.	13.7	PSIG
FUEL TEMP.	74	°F
COMPUTER FUEL FLOW SCF	14529	
AGA3 CAL. FUEL FLOW SCF		
CYLINDER #1 TEMP.	797	°F
CYLINDER #2 TEMP.	759	°F
CYLINDER #3 TEMP.	765	°F
CYLINDER #4 TEMP.	795	°F
CYLINDER #5 TEMP.	724	°F
CYLINDER #6 TEMP.	821	°F
CYLINDER #7 TEMP.	769	°F
CYLINDER #8 TEMP.	822	°F
MODE	AUTO	

AMBIENT TEMPERATURE	85	°F
LOAD STEP NUMBER	6	
STATION SUCTION PRESSURE	694	PSIG
STATION SUCTION TEMP.	73	°F
STATION DISCH. PRESSURE	927	PSIG
STATION DISCH. TEMP.	116	°F
COMPRESSOR FLOW RATE	116	MMSCFD
"A" COMP. EFFICIENCY	82	%
"B" COMP. EFFICIENCY	84	%
AVERAGE COMP. EFFICIENCY	83	%
"A" COMP. SUCTION TEMP.	69	°F
"B" COMP. SUCTION TEMP.	68	°F
"A" COMP. DISCHARGE TEMP.	112	°F
"B" COMP. DISCHARGE TEMP.	111	°F
FUEL TORQUE HP	1953	BHP
TORQUE	96	%
GEO. HP	1996	BHP
GEO. HP - FUEL TORQUE HP	0	BHP
PFM 2000 BHP		
PFM 2000 %TORQUE		

M PS

1405-C-39

1405 UNIT OPERATING DATA

12:30:39	4/27/00

TEST # 1405-C-36

ENGINE SPEED	345	RPM
IGNITION TIMING OUTPUT	18.0	°BTDC
IGNITION TIMING w\LIGHT		
GOVERNOR SETTING		
AIR MANIFOLD PRESS.	6.8	"Hg
AIR MANIFOLD TEMP.	91	°F
TURBOCHARGER VIBRATION	0.45	IN/SEC
FUEL STATIC PRESS.	75.0	PSIG
FUEL DIFF. PRESS.	18.6	"H20
FUEL GAS HEADER PRESS.	13.6	PSIG
FUEL TEMP.	75	°F
COMPUTER FUEL FLOW SCF	14522	
AGA3 CAL. FUEL FLOW SCF		
CYLINDER #1 TEMP.	794	°F
CYLINDER #2 TEMP.	758	°F
CYLINDER #3 TEMP.	765	°F
CYLINDER #4 TEMP.	794	°F
CYLINDER #5 TEMP.	722	°F
CYLINDER #6 TEMP.	820	°F
CYLINDER #7 TEMP.	768	°F
CYLINDER #8 TEMP.	821	°F
MODE	AUTO	

AMBIENT TEMPERATURE	84	°F
LOAD STEP NUMBER	6	
STATION SUCTION PRESSURE	694	PSIG
STATION SUCTION TEMP.	73	°F
STATION DISCH. PRESSURE	927	PSIG
STATION DISCH. TEMP.	116	°F
COMPRESSOR FLOW RATE	116	MMSCFD
"A" COMP. EFFICIENCY	82	%
"B" COMP. EFFICIENCY	84	%
AVERAGE COMP. EFFICIENCY	83	%
"A" COMP. SUCTION TEMP.	69	°F
"B" COMP. SUCTION TEMP.	69	°F
"A" COMP. DISCHARGE TEMP.	112	°F
"B" COMP. DISCHARGE TEMP.	111	°F
FUEL TORQUE HP	1950	BHP
TORQUE	96	%
GEO. HP	1999	BHP
GEO. HP - FUEL TORQUE HP	0	BHP
PFM 2000 BHP		
PFM 2000 %TORQUE		

M PS

1405-C-36

1405 UNIT OPERATING DATA

1:01:27 | 4/27/00

TEST # 1405-C-3c

ENGINE SPEED	346	RPM
IGNITION TIMING OUTPUT	18.0	°BTDC
IGNITION TIMING w\LIGHT		
GOVERNOR SETTING		
AIR MANIFOLD PRESS.	6.7	"Hg
AIR MANIFOLD TEMP.	92	°F
TURBOCHARGER VIBRATION	0.48	IN/SEC
FUEL STATIC PRESS.	75.1	PSIG
FUEL DIFF. PRESS.	18.8	"H20
FUEL GAS HEADER PRESS.	13.6	PSIG
FUEL TEMP.	76	°F
COMPUTER FUEL FLOW SCF	14574	
AGA3 CAL. FUEL FLOW SCF		
CYLINDER #1 TEMP.	797	°F
CYLINDER #2 TEMP.	758	°F
CYLINDER #3 TEMP.	765	°F
CYLINDER #4 TEMP.	795	°F
CYLINDER #5 TEMP.	726	°F
CYLINDER #6 TEMP.	819	°F
CYLINDER #7 TEMP.	770	°F
CYLINDER #8 TEMP.	822	°F
MODE	AUTO	

AMBIENT TEMPERATURE	83	°F
LOAD STEP NUMBER	6	
STATION SUCTION PRESSURE	694	PSIG
STATION SUCTION TEMP.	73	°F
STATION DISCH. PRESSURE	928	PSIG
STATION DISCH. TEMP.	116	°F
COMPRESSOR FLOW RATE	116	MMSCFD
"A" COMP. EFFICIENCY	82	%
"B" COMP. EFFICIENCY	84	%
AVERAGE COMP. EFFICIENCY	83	%
"A" COMP. SUCTION TEMP.	68	°F
"B" COMP. SUCTION TEMP.	68	°F
"A" COMP. DISCHARGE TEMP.	112	°F
"B" COMP. DISCHARGE TEMP.	111	°F
FUEL TORQUE HP	1965	BHP
TORQUE	97	%
GEO. HP	2006	BHP
GEO. HP - FUEL TORQUE HP	0	BHP
PFM 2000 BHP		
PFM 2000 %TORQUE		

M PS

1405-C-3c

APPENDIX E:
QUALITY ASSURANCE ACTIVITIES

Unit 1404, Logged QA Calibration Data

Quality Assurance Log File	3/12/1999		
Run 1404-C-1	4/27/2000	2:10:10 PM	3:10:10 PM

Initial Linearity Test	Zero	Low	Mid	Span	L-Lin	M-Lin	S-Lin
NOx (ppmv)	0	1232	1831	3484	-0.57	-0.2	0.2
CO (ppmv)	0.15	89.05	184.7	445.65	0.13	-0.62	0.27
O2 (%)	0.09	4.71	20.75	12.05	-0.7	-0.01	-0.57
CO2 (%)	0.01	4.62	12.62	8.07	0.03	-0.02	-0.44
THC (ppmv)	0	447	901	1808	0	0.55	0.15

Initial and Final Bias and Drift	I-Zero	I-Span	F-Zero	F-Span	Z-Bias	S-Bias	Z-Drift	S-Drift
NOx (ppmv)	58	3486	65	3522	1.62	0.95	-0.18	-0.9
CO (ppmv)	-0.35	432	-0.35	446.2	-0.1	0.11	0	-2.84
O2 (%)	0.2	12.05	0.22	12.17	0.5	0.48	-0.07	-0.48
CO2 (%)	0.12	7.86	0.2	7.95	1.27	-0.81	-0.48	-0.56
THC (ppmv)	-4	1794	-3	1782	-0.15	-1.3	-0.05	0.6

Run Results and Cal Gases Used	Raw	Corrected	Ranges	Low Gas	Mid Gas	Span Gas
NOx (ppmv)	2048.4	2015.5	4000	1209	1823	3492
CO (ppmv)	169.4	172.6	500	89.69	181.6	447
O2 (%)	11.26	11.06	25	4.53	20.75	11.91
CO2 (%)	5.58	5.60	15	4.62	12.62	8
THC (ppmv)	978.0	992.2	2000	447	912	1811

Unit 1404, Logged QA Calibration Data

Run 1404-C-2 4/27/2000 3:30:14 PM 4:30:14 PM

Initial Linearity Test	Zero	Low	Mid	Span	L-Lin	M-Lin	S-Lin
NOx (ppmv)	0	1232	1831	3484	-0.57	-0.2	0.2
CO (ppmv)	0.15	89.05	184.7	445.65	0.13	-0.62	0.27
O2 (%)	0.09	4.71	20.75	12.05	-0.7	-0.01	-0.57
CO2 (%)	0.01	4.62	12.62	8.07	0.03	-0.02	-0.44
THC (ppmv)	0	447	901	1808	0	0.55	0.15

Initial and Final Bias and Drift	I-Zero	I-Span	F-Zero	F-Span	Z-Bias	S-Bias	Z-Drift	S-Drift
NOx (ppmv)	65	3522	75	3562	1.88	1.95	-0.25	-1
CO (ppmv)	-0.35	446.2	-0.35	443.65	-0.1	-0.4	0	0.51
O2 (%)	0.22	12.17	0.2	12.15	0.43	0.39	0.07	0.09
CO2 (%)	0.2	7.95	0.29	8.07	1.89	-0.01	-0.62	-0.8
THC (ppmv)	-3	1782	-3	1841	-0.15	1.65	0	-2.95

Run Results and Cal Gases Used	Raw	Corrected	Ranges	Low Gas	Mid Gas	Span Gas
NOx (ppmv)	1959.6	1900.5	4000	1209	1823	3492
CO (ppmv)	176.7	177.7	500	89.69	181.6	447
O2 (%)	11.29	11.04	25	4.53	20.75	11.91
CO2 (%)	5.62	5.54	15	4.62	12.62	8
THC (ppmv)	1056.9	1057.9	2000	447	912	1811

Unit 1404, Logged QA Calibration Data

Run 1404-C-3 4/27/2000 4:48:01 PM 5:48:01 PM

Initial Linearity Test	Zero	Low	Mid	Span	L-Lin	M-Lin	S-Lin
NOx (ppmv)	0	1232	1831	3484	-0.57	-0.2	0.2
CO (ppmv)	0.15	89.05	184.7	445.65	0.13	-0.62	0.27
O2 (%)	0.09	4.71	20.75	12.05	-0.7	-0.01	-0.57
CO2 (%)	0.01	4.62	12.62	8.07	0.03	-0.02	-0.44
THC (ppmv)	0	447	901	1808	0	0.55	0.15

Initial and Final Bias and Drift	I-Zero	I-Span	F-Zero	F-Span	Z-Bias	S-Bias	Z-Drift	S-Drift
NOx (ppmv)	75	3562	71	3528	1.77	1.1	0.1	0.85
CO (ppmv)	-0.35	443.65	-0.35	444.7	-0.1	-0.19	0	-0.21
O2 (%)	0.2	12.15	0.21	12.11	0.46	0.21	-0.03	0.18
CO2 (%)	0.29	8.07	0.16	7.95	1.02	-0.78	0.87	0.77
THC (ppmv)	-3	1841	0	1817	0	0.45	-0.15	1.2

Run Results and Cal Gases Used	Raw	Corrected	Ranges	Low Gas	Mid Gas	Span Gas
NOx (ppmv)	2002.9	1941.0	4000	1209	1823	3492
CO (ppmv)	176.3	177.7	500	89.69	181.6	447
O2 (%)	11.25	11.03	25	4.53	20.75	11.91
CO2 (%)	5.64	5.56	15	4.62	12.62	8
THC (ppmv)	1074.1	1064.2	2000	447	912	1811

Unit 1405, Logged QA Calibration Data

Quality Assurance Log File	3/12/1999		
Run 1405-C-1	4/27/2000	9:21:23 AM	10:21:23 AM

Initial Linearity Test	Zero	Low	Mid	Span	L-Lin	M-Lin	S-Lin
NOx (ppmv)	0	1232	1831	3484	-0.57	-0.2	0.2
CO (ppmv)	0.15	89.05	184.7	445.65	0.13	-0.62	0.27
O2 (%)	0.09	4.71	20.75	12.05	-0.7	-0.01	-0.57
CO2 (%)	0.01	4.62	12.62	8.07	0.03	-0.02	-0.44
THC (ppmv)	0	447	901	1808	0	0.55	0.15

Initial and Final Bias and Drift	I-Zero	I-Span	F-Zero	F-Span	Z-Bias	S-Bias	Z-Drift	S-Drift
NOx (ppmv)	10	3447	40	3486	1	0.05	-0.75	-0.97
CO (ppmv)	-0.8	445.65	-0.8	437.15	-0.19	-1.7	0	1.7
O2 (%)	0.16	11.96	0.19	12	0.4	-0.21	-0.13	-0.17
CO2 (%)	0.1	8.11	-0.02	7.88	-0.16	-1.26	0.81	1.51
THC (ppmv)	-1	1786	-2	1790	-0.1	-0.9	0.05	-0.2

Run Results and Cal Gases Used	Raw	Corrected	Ranges	Low Gas	Mid Gas	Span Gas
NOx (ppmv)	1981.3	1985.0	4000	1209	1823	3492
CO (ppmv)	168.1	170.7	500	89.69	181.6	447
O2 (%)	11.12	11.04	25	4.53	20.75	11.91
CO2 (%)	5.51	5.50	15	4.62	12.62	8
THC (ppmv)	978.6	991.9	2000	447	912	1811

Unit 1405, Logged QA Calibration Data

Run 1405-C-2 4/27/2000 10:40:00 AM 11:40:00 AM

Initial Linearity Test	Zero	Low	Mid	Span	L-Lin	M-Lin	S-Lin
NOx (ppmv)	0	1232	1831	3484	-0.57	-0.2	0.2
CO (ppmv)	0.15	89.05	184.7	445.65	0.13	-0.62	0.27
O2 (%)	0.09	4.71	20.75	12.05	-0.7	-0.01	-0.57
CO2 (%)	0.01	4.62	12.62	8.07	0.03	-0.02	-0.44
THC (ppmv)	0	447	901	1808	0	0.55	0.15

Initial and Final Bias and Drift	I-Zero	I-Span	F-Zero	F-Span	Z-Bias	S-Bias	Z-Drift	S-Drift
NOx (ppmv)	40	3486	42	3437	1.05	-1.18	-0.05	1.23
CO (ppmv)	-0.8	437.15	-0.8	431.05	-0.19	-2.92	0	1.22
O2 (%)	0.19	12	0.23	12.11	0.54	0.23	-0.14	-0.44
CO2 (%)	-0.02	7.88	0.29	8.1	1.9	0.23	-2.06	-1.49
THC (ppmv)	-2	1790	-3	1752	-0.15	-2.8	0.05	1.9

Run Results and Cal Gases Used	Raw	Corrected	Ranges	Low Gas	Mid Gas	Span Gas
NOx (ppmv)	1843.1	1839.8	4000	1209	1823	3492
CO (ppmv)	172.2	177.8	500	89.69	181.6	447
O2 (%)	11.26	11.11	25	4.53	20.75	11.91
CO2 (%)	5.54	5.50	15	4.62	12.62	8
THC (ppmv)	1004.8	1028.6	2000	447	912	1811

Unit 1405, Logged QA Calibration Data

Run 1405-C-3 4/27/2000 11:57:02 AM 12:57:02 PM

Initial Linearity Test	Zero	Low	Mid	Span	L-Lin	M-Lin	S-Lin
NOx (ppmv)	0	1232	1831	3484	-0.57	-0.2	0.2
CO (ppmv)	0.15	89.05	184.7	445.65	0.13	-0.62	0.27
O2 (%)	0.09	4.71	20.75	12.05	-0.7	-0.01	-0.57
CO2 (%)	0.01	4.62	12.62	8.07	0.03	-0.02	-0.44
THC (ppmv)	0	447	901	1808	0	0.55	0.15

Initial and Final Bias and Drift	I-Zero	I-Span	F-Zero	F-Span	Z-Bias	S-Bias	Z-Drift	S-Drift
NOx (ppmv)	42	3437	58	3486	1.45	0.05	-0.4	-1.23
CO (ppmv)	-0.8	431.05	-0.35	432	-0.1	-2.73	-0.09	-0.19
O2 (%)	0.23	12.11	0.2	12.05	0.43	0	0.11	0.23
CO2 (%)	0.29	8.1	0.12	7.86	0.79	-1.37	1.11	1.6
THC (ppmv)	-3	1752	-4	1794	-0.2	-0.7	0.05	-2.1

Run Results and Cal Gases Used	Raw	Corrected	Ranges	Low Gas	Mid Gas	Span Gas
NOx (ppmv)	1887.7	1881.1	4000	1209	1823	3492
CO (ppmv)	160.9	167.0	500	89.69	181.6	447
O2 (%)	11.28	11.11	25	4.53	20.75	11.91
CO2 (%)	5.54	5.49	15	4.62	12.62	8
THC (ppmv)	1109.6	1134.7	2000	447	912	1811

Instrumental Analyses
Quality Assurance Data
April 27, 2000

Date: April 27, 2000
Company: Florida Gas Transmission Company
Location: Compressor Station No. 14 in Quincy, FL
Technicians: LJB, RPO

NO_x Analyzer: NO_2 to NO Converter Efficiency Test

NO_x Calibration Gas: 1823.0 ppmv
Diluent Gas: Air
Date: 4/27/2000

	NO_x conc. (ppmv)	% Decrease from Highest conc.	NO conc. (ppmv)
Highest NO_x Concentration:	1369		
Initial Concentration:	1351	1.31	na
10 minute Concentration:	1363	0.44	606
20 minute Concentration:	1362	0.51	410
30 minute Concentration:	1346	1.68	289
Lowest NO_x Concentration:	1343	1.90	

Converter efficiency criteria is less than 2% decrease from highest read value.

Instrumental Sample System Leak Checks

Date	Run Number	Vacuum (inches Hg)	Leak Rate (inches Hg/min)	Pass
4/27/00	pre 1405-C-1	26.7	0.2	yes
4/27/00	post 1405-C-3	26.8	0.0	yes
4/27/00	pre 1404-C-1	26.8	0.0	yes
4/27/00	post 1404-C-1	26.5	0.0	yes

Leak check criteria less than 1.0" Hg Vac. Decline at gretar than 10.0" Hg Vac.

NOx Converter Efficiency Test
April 27, 2000

Run Number	MODE	Date	Time	NOx (ppmv)
START NOx Converter	Total NOx	4/27/2000	7:53:53 AM	1351
NOx Converter	Total NOx	4/27/2000	7:54:53 AM	1349
NOx Converter	Total NOx	4/27/2000	7:55:53 AM	1352
NOx Converter	Total NOx	4/27/2000	7:56:53 AM	1351
NOx Converter	Total NOx	4/27/2000	7:57:53 AM	1358
NOx Converter	Total NOx	4/27/2000	7:58:53 AM	1356
NOx Converter	Total NOx	4/27/2000	7:59:53 AM	1361
NOx Converter	Total NOx	4/27/2000	8:00:53 AM	1359
NOx Converter	Total NOx	4/27/2000	8:01:53 AM	1369
NOx Converter	NO Only	4/27/2000	8:02:53 AM	606
NOx Converter	Total NOx	4/27/2000	8:03:53 AM	1363
NOx Converter	Total NOx	4/27/2000	8:04:53 AM	1365
NOx Converter	Total NOx	4/27/2000	8:05:53 AM	1362
NOx Converter	Total NOx	4/27/2000	8:06:53 AM	1358
NOx Converter	Total NOx	4/27/2000	8:07:53 AM	1367
NOx Converter	Total NOx	4/27/2000	8:08:53 AM	1355
NOx Converter	Total NOx	4/27/2000	8:09:53 AM	1358
NOx Converter	Total NOx	4/27/2000	8:10:53 AM	1358
NOx Converter	Total NOx	4/27/2000	8:11:53 AM	1347
NOx Converter	NO Only	4/27/2000	8:12:53 AM	410
NOx Converter	Total NOx	4/27/2000	8:13:53 AM	1362
NOx Converter	Total NOx	4/27/2000	8:14:53 AM	1360
NOx Converter	Total NOx	4/27/2000	8:15:53 AM	1357
NOx Converter	Total NOx	4/27/2000	8:16:53 AM	1352
NOx Converter	Total NOx	4/27/2000	8:17:53 AM	1357
NOx Converter	Total NOx	4/27/2000	8:18:53 AM	1354
NOx Converter	Total NOx	4/27/2000	8:19:53 AM	1347
NOx Converter	Total NOx	4/27/2000	8:20:53 AM	1348
NOx Converter	Total NOx	4/27/2000	8:21:53 AM	1343
NOx Converter	Total NOx	4/27/2000	8:22:53 AM	1345
NOx Converter	Total NOx	4/27/2000	8:23:53 AM	1346
NOx Converter	NO Only	4/27/2000	8:24:53 AM	289
END NOx Converter	Total NOx	4/27/2000	8:25:53 AM	1350

CONTINUOUS EMISSION ANALYZER
INTERFERENCE RESPONSE TESTS

Date: March 17, 1995
Technicians: LJB, CDC

Analyzer Type: Thermo Environmental Instruments, Inc.
Analyzer Model: Model 10AR Chemiluminescent NO/NOx Analyzer
Serial Number: 10A/R-51539-288
Analyzer Test Range: 0-25 ppmv

Test Gas		Analyzer Response		Response Ratio
Gas Type	Concentration	Concentration	% of Range	
CO/Methane	403.8/397.9	0.1	0.4%	0.0002/0.0003
Propane	243	0.1	0.4%	0.0004
SO_2	4048	0.2	0.8%	0.00005
CO_2/O_2	8%/8%	<0.1	<0.4%	<0.0125/<0.0125
Air	dry, instrument	<0.1	<0.4%	not applicable
Nitrogen	pre-purified	0.0	not applicable	zero gas

ppmv/p

CONTINUOUS EMISSION ANALYZER
INTERFERENCE RESPONSE TESTS

Date: March 17, 1995
Technicians: LJB, CDC

Analyzer Type: Thermo Environmental Instruments, Inc.
Analyzer Model: Model 48 GFC CO Analyzer
Serial Number: 48-51488-288
Analyzer Test Range: 0-50 ppmv

Test Gas		Analyzer Response		Response Ratio	
Gas Type	Concentration	Concentration	% of Range		
Air	UHC, CO free	0.0	not applicable	zero gas	
CO_2/O_2	4.0%/18.0%	-0.2	-0.4%	-0.05/-0.011	
CO_2/O_2	8.0%/8.0%	-0.4	-0.8%	-0.05/-0.05	ppmv/%
CO_2/O_2	12%/4.03%	-0.6	-1.2%	-0.05/-0.15	
Air	Instrument, dry	0.4	0.8%	CO impurity	
NO_x	3301 ppmv	0.4	0.8%	0.0001	
SO_2	4048 ppmv	-0.3	-0.6%	-0.0001	ppmv/pp
Propane	243 ppmv	0.4	0.8%	0.0016	

CONTINUOUS EMISSION ANALYZER INTERFERENCE RESPONSE TESTS

Date: March 17, 1995
Technicians: LJB, CDC

Analyzer Type: Teledyne Brown Engineering
Analyzer Model: Model 320 AR Micro Fuel Cell O_2 Analyzer
Serial Number: 149968
Analyzer Test Range: 0-25%

Test Gas		Analyzer Response		Response Ratio
Gas Type	Concentration	Concentration	% of Range	
Nitrogen	Pre-purified	0.0	not applicable	zero gas
NO_x	3301 ppmv	<0.025%	<0.1%	$<7.6\times10^{-6}$
SO_2	4048 ppmv	<0.025%	<0.1%	$<6.2\times10^{-6}$
CO/C1	403.8/397.9	<0.025%	<0.1%	<0.0001/<0.0001
Propane	243 ppmv	<0.025%	<0.1%	<0.0001

%/ppm

APPENDIX F:
CALIBRATION CERTIFICATIONS

SPECTRA GASES INC.
3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE
PROCEDURE # : G1

CUSTOMER: Quadline C/O Cubix Corporation
SGI ORDER # : 147054
ITEM# : 1
P.O.# : G-1273

CYLINDER # : CC94430
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 660

CERTIFICATION DATE: 10/06/99
EXPIRATION DATE: 10/06/2001

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Nitric Oxide	9/23/98	1209 ppm	1208 ppm	+/- 1%
	10/06/99	1208 ppm		
NOx			1209 ppm	Reference Value Only

BALANCE Nitrogen

PREVIOUS CERTIFICATION DATES: None

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Nitric Oxide	GMIS-1	CC55762	2976 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Nitric Oxide	Teco 10	10AR-34979-249	Cheml	9/15/99

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: FRED PIKULA

DATE: 10/06/99

T-7 T-6

BOC GASES

EPA PROTOCOL GAS
CERTIFICATE OF ANALYSIS

ORDER NO. 016819

CUSTOMER
CUBIX INTERNATIONAL
9225 HIGHWAY 183 S
AUSTIN, TX 76747

CYLINDER NO: XC003493B
EXPIRATION DATE: 05/19/01
CERTIFICATION DATE: 05/19/99
CYLINDER PRESSURE: 2000 psig

PURCHASE ORDER: CUBIX C9006

COMPONENT	CERTIFIED CONCENTRATION	TOTAL RELATIVE UNCERTAINTY	CALIBRATION STANDARDS USED IN ASSAY TYPE	LOT ID	CYLINDER	CONC.	CAS NO.
Nitric Oxide	**1816 ppm**	**+/- 1 %**	NTRM 2630	82630	CC-12776	1414 ppm	10102-43-9
Total Oxides of Nitrogen	***1823 ppm***	***+/- 1 %***					10102-43-9
Nitrogen	**Balance Gas**						7727-37-9

ANALYZER READINGS

ASSAY LABORATORY: *Port Allen*

TEST NUMBER: 105457

COMPONENT: Nitric Oxide
Analyzer: THERMO ENVIRONMENTAL Model 42C Chemiluminescence S/N 42CHL-57881-313
Last Multipoint Calibration: 05/10/99

First Triad: 05/12/99 Analyst: F P Kennedy

Zero	Ref.	Sample
0	1369	1765
.1	1384	1773
.11	1389	1779

Mean First Assay: 1819 ppm

Second Triad: 05/19/99 Analyst: F P Kennedy

Zero	Ref.	Sample
.02	1361	1747
.17	1369	1749
.5	1370	1751

Mean Second Assay: 1813 ppm

This Calibration Standard has been certified per the September, 1993 EPA Traceability Protocol, Document EPA-600/R93/224, using Procedure G1.
All values certified to be +/- 1% NIST Traceable. Do not use this cylinder below 1.0 Megapascal, i.e., 150psig

QA APPROVED R. Jernigan
A410

Scott Specialty Gases, Inc.

1290 COMBERMERE STREET, TROY, MI 48083 (810) 589-2950 FAX:(810) 589-2134

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
CUBIX CORP
ATTN: LEONARD BRENNER
2106 NW 67TH PLACE
SUITE 7
GAINESVILLE, FL 32653

Assay Laboratory
Scott Specialty Gases, Inc
1290 Combermere
Troy, MI 48083

Purchase Order : G-1134 REPLACE
Scott Project # : 514785

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards; Procedure G1; September, 1993

Cylinder Number : AAL3499 **Certificate Date :** 7/21/97 **Expiration Date :** 7/21/2000
Cylinder Pressure + : 1900 psig **Previous Certificate Date :** None

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Carbon Monoxide	89.69 ppm	±1% NIST Directly Traceable
Methane	84.27 ppm	±1% NIST Directly Traceable

Balance Gas: Air

+Do not use when cylinder presssure is below 150 psig.
*Analytical accuracy is inclusive of usual known error sources which at least include precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM1679	5/9/98	ALM059830	98.5 ppm Carbon Monoxide in Nitrogen
NTRM1659	12/17/98	ALM025286	9.82 ppm Methane in Air

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
CO: Horiba/OPE-135/565607092	7/21/97	Non-dispersive Infrared
CH4: Varian/1400/08982426	7/17/97	Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Carbon Monoxide

First Triad Analysis		
Date: 7/14/97	Response Units: mv	
Z1=0.00	R1=71.00	T1=64.90
R2=71.00	Z2=0.00	T2=64.80
Z3=0.00	T3=64.90	R3=71.00
Avg. Conc. of Cust. Cyl. 89.74 ppm		

Second Triad Analysis		
Date: 7/21/97	Response Units: mv	
Z1=0.00	R1=71.00	T1=64.80
R2=71.00	Z2=0.00	T2=64.80
Z3=0.00	T3=64.80	R3=71.00
Avg. Conc. of Cust. Cyl: 89.65 ppm		

Calibration Curve	
Concentration=$A+Bx+Cx^2+Dx^3+Ex^4$	
r=1.00000	NTRM1679
Constants:	A=0.645566300
B=1.300100000	C=0.001465446
D=-0.000005141	E=0.000000000

Methane

First Triad Analysis		
Date: 7/17/97	Response Units: mv	
Z1=0.00	R1=47.71	T1=408.50
R2=47.71	Z2=0.00	T2=409.20
Z3=0.00	T3=408.40	R3=47.71
Avg. Conc. of Cust. Cyl. 84.27 ppm		

Calibration Curve	
Concentration=$A+Bx+Cx^2+Dx^3+Ex^4$	
r=1.00000	NTRM1659
Constants:	A=-0.019798830
B=0.206241900	C=0.000000000
D=0.000000000	E=0.000000000

Special Notes

Mail

Analyst

SPECTRA GASES INC.
3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G1

CUSTOMER: Cubix Corporation
SGI ORDER # : 144068
ITEM# : 2
P.O.# : G1254

CYLINDER # : CC88348
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 590

CERTIFICATION DATE: 7/13/99
EXPIRATION DATE: 7/12/2002

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Carbon Monoxide	7/6/99 7/13/99	181.5 ppm 181.7 ppm	181.6 ppm	+/- 1%
Methane	7/12/99	181.3 ppm	181.3 ppm	+/- 1%

BALANCE Air

PREVIOUS CERTIFICATION DATES: None

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Carbon Monoxide	GMIS-1	CC88505	493.6 ppm
Methane	GMIS-1	CC53310	1000.1 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Carbon Monoxide	Horiba VIA-510	570423011	NDIR	6/14/99
Methane	H. Packard 6890	US00001434	GC - FID	7/12/99

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: FP
FRED PIKULA

DATE: 7/13/99

SPECTRA GASES INC.
3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G1

CUSTOMER: Cubix Corporation
SGI ORDER # : 145941
ITEM# : 2
P.O.# : G-1270

CYLINDER # : CC90776
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 590

CERTIFICATION DATE: 9/16/99
EXPIRATION DATE: 9/07/2002

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Carbon Monoxide	9/09/99 9/16/99	449.0 ppm 445.4 ppm	447 ppm	+/- 1%
Methane	9/07/99	455 ppm	455 ppm	+/- 1%

BALANCE Air

PREVIOUS CERTIFICATION DATES: None

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Carbon Monoxide	GMIS-1	CC88505	493.6 ppm
Methane	GMIS-1	CC52976	503.4 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Carbon Monoxide	Horiba VIA-510	570423011	NDIR	9/15/99
Methane	H. Packard 6890	US00001434	GC - FID	8/19/99

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: [signature]
FRED PIKULA

DATE: 9/16/99

SPECTRA GASES
277 Coit St. • Irvington, NJ 07111 USA Tel.: (973) 372-2060 • (800) 932-0624 • Fax: (973) 372-8551
Shipped From: 80 Industrial Drive • Alpha, N.J. 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G1

CUSTOMER: Cubix Corporation
SGI ORDER # : 129163
ITEM# : 2
P.O.# : G1179

CYLINDER # : CC85095
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 590

CERTIFICATION DATE: 12/3/97
EXPIRATION DATE: 12/2/2000

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Carbon Monoxide	11/25/97 12/2/97	911.4 ppm 910.9 ppm	911 ppm	+/- 1%
Methane	12/3/97	912.1 ppm	912 ppm	+/- 1%

BALANCE Air

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Carbon Monoxide	NTRM-81681	CC55775	994 ppm
Methane	GMIS-1	CC53310	1000.5 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Carbon Monoxide	Horiba VIA-510	570423011	NDIR	12/1/97
Methane	H. Packard 6890	US00001434	GC - FID	12/3/97

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: [signature]
TED NEEME

DATE: 12/3/97

SPECTRA GASES
277 Coit St. • Irvington, NJ 07111 USA Tel.: (973) 372-2060 • (800) 932-0624 • Fax: (973) 372-8551
Shipped From: 80 Industrial Drive • Alpha, N.J. 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G2

CUSTOMER: Cubix Corporation
SGI ORDER # : 129163
ITEM# : 4
P.O.# : G1179

CYLINDER # : CC84994
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 590

CERTIFICATION DATE: 12/3/97
EXPIRATION DATE: 12/2/2000

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Carbon Monoxide	11/25/97 12/2/97	1806 ppm 1804 ppm	1805 ppm	+/- 1%
Methane	12/3/97	1811 ppm	1811 ppm	+/- 1.5%

BALANCE Air

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Carbon Monoxide	NTRM-81681	CC55775	994 ppm
Methane	GMIS-1	CC53310	1000.5 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Carbon Monoxide	Horiba VIA-510	570423011	NDIR	12/1/97
Methane	H. Packard 6890	US00001434	GC - FID	12/3/97

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: [signature]
TED NEEME

DATE: 12/3/97

RATA CLASS

Dual-Analyzed Calibration Standard

Scott Specialty Gases

9810 BAY AREA BLVD,PASADENA,TX 77507 Phone: 281-474-5800 Fax: 281-474-5857

CERTIFICATE OF ACCURACY: Interference Free™ Multi-Component EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
9810 BAY AREA BLVD
PASADENA,TX 77507

P.O. No.: G-1291
Project No.: 04-85228-003

Customer

CUBIX CORPORATION

4536 NW 20TH DRIVE
GAINESVILLE FL 32605

WWW.SCOTTGAS.COM • ORDER ON-LINE

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: ALM013163 **Certification Date:** 4/04/00 **Exp. Date:** 4/04/2003

Cylinder Pressure*:** 1867 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ANALYTICAL ACCURACY**	TRACEABILITY
CARBON DIOXIDE	4.625 %	+/- 1%	Direct NIST and NMi
OXYGEN	20.75 %	+/- 1%	Direct NIST and NMi
NITROGEN	BALANCE		

***Do not use when cylinder pressure is below 150 psig.

**Analytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM5000	7/13/01	ALM048847	5.032 %	CO2/N2
NTRM 2658	12/19/01	ALM031738	9.680 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR System/8220A/AAB9400260	03/28/00	Scott Enhanced FTIR
MTI-A/M200/171109	03/21/00	GAS CHROMATOGRAPHY

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

First Triad Analysis | Second Triad Analysis | Calibration Curve

CARBON DIOXIDE

First Triad Analysis

Date:04/04/00	Response Unit:%	
Z1=0.0207	R1=5.0312	T1=4.6220
R2=5.0322	Z2=0.0226	T2=4.6279
Z3=0.0210	T3=4.6251	R3=5.0326
Avg. Concentration:	4.625	%

Calibration Curve

Concentration=A+Bx+Cx2+Dx3+Ex4	
r=0.999990	
Constants:	A=0.000000
B=1.000000	C=0.000000
D=0.000000	E=0.000000

OXYGEN

First Triad Analysis

Date:04/06/00	Response Unit:AREA	
Z1=114.00	R1=35455.	T1=75609.
R2=35183.	Z2=141.00	T2=75405.
Z3=118.00	T3=75356.	R3=35179.
Avg. Concentration:	20.75	%

Calibration Curve

Concentration=A+Bx+Cx2+Dx3+Ex4	
r=0.999999418	
Constants:	A=-0.03442397
B=0.000275952	C=
D=	E=

APPROVED BY: William Morgan

RATA CLASS

Dual-Analyzed Calibration Standard

Scott Specialty Gases

9810 BAY AREA BLVD,PASADENA,TX 77507 Phone: 281-474-5800 Fax: 281-474-5857

CERTIFICATE OF ACCURACY: Interference Free™ Multi-Component EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
9810 BAY AREA BLVD
PASADENA,TX 77507

P.O. No.: G-1291
Project No.: 04-85228-001

Customer

CUBIX CORPORATION

4536 NW 20TH DRIVE
GAINESVILLE FL 32605

WWW.SCOTTGAS.COM • ORDER ON-LINE •

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: AAL17665 Certification Date: 4/10/00 Exp. Date: 4/10/2003

Cylinder Pressure***: 1945 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ANALYTICAL ACCURACY**	TRACEABILITY
CARBON DIOXIDE	8.004 %	+/- 1%	Direct NIST and NMi
OXYGEN	11.91 %	+/- 1%	Direct NIST and NMi
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol procedure G1, September 1997.
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM	1/01/03	ALM016777	13.96 %	CO2/N2
NTRM 2658	1/02/01	ALM031726	9.680 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR System/8220A/AAB9400260	03/28/00	Scott Enhanced FTIR
MTI-A/M200/171109	03/21/00	GAS CHROMATOGRAPHY

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

First Triad Analysis | **Second Triad Analysis** | **Calibration Curve**

CARBON DIOXIDE

First Triad Analysis:

Date:04/10/00	Response Unit:%	
Z1=0.0142	R1=13.954	T1=8.0050
R2=13.972	Z2=0.0301	T2=8.0039
Z3=0.0231	T3=8.0034	R3=13.953
Avg. Concentration:	8.004	%

Calibration Curve:

Concentration=A+Bx+Cx2+Dx3+Ex4	
r=0.999990	
Constants:	A=0.000000
B=1.000000	C=0.000000
D=0.000000	E=0.000000

OXYGEN

First Triad Analysis:

Date:04/12/00	Response Unit:AREA	
Z1=43.000	R1=35084.	T1=43102.
R2=34965.	Z2=101.00	T2=43033.
Z3=91.000	T3=43023.	R3=35009.
Avg. Concentration:	11.91	%

Calibration Curve:

Concentration=A+Bx+Cx2+Dx3+Ex4	
r=0.999999418	
Constants:	A=-0.03442397
B=0.000275952	C=
D=	E=

APPROVED BY:

John Hunnicutt

RATA CLASS

Dual-Analyzed Calibration Standard

Scott Specialty Gases

9810 BAY AREA BLVD,PASADENA,TX 77507 Phone: 281-474-5800 Fax: 281-474-5857

CERTIFICATE OF ACCURACY: Interference Free™ Multi-Component EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
9810 BAY AREA BLVD
PASADENA,TX 77507

P.O. No.: G-1291
Project No.: 04-85228-002

Customer

CUBIX CORPORATION

4536 NW 20TH DRIVE
GAINESVILLE FL 32605

ORDER ON-LINE • WWW.SCOTTGAS.COM

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: ALM009152 **Certification Date:** 4/03/00 **Exp. Date:** 4/03/2003

Cylinder Pressure*:** 1883 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ANALYTICAL ACCURACY**	TRACEABILITY
CARBON DIOXIDE	12.62 %	+/- 1%	Direct NIST and NMi
OXYGEN	4.53 %	+/- 1%	Direct NIST and NMi
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM	1/01/03	ALM042032	13.96 %	CO2/N2
NTRM 2658	12/19/01	ALM031738	9.680 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR System/8220A/AAB9400260	03/28/00	Scott Enhanced FTIR
MTI-A/M200/171109	03/21/00	GAS CHROMATOGRAPHY

ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis | **Second Triad Analysis** | **Calibration Curve**

CARBON DIOXIDE

First Triad Analysis			Second Triad Analysis	Calibration Curve	
Date:04/03/00	Response Unit:%			Concentration = A + Bx + Cx2 + Dx3 + Ex4	
Z1 = 0.0220	R1 = 13.956	T1 = 12.629		r = 0.999990	
R2 = 13.966	Z2 = 0.0178	T2 = 12.617		Constants:	A = 0.000000
Z3 = 0.0276	T3 = 12.620	R3 = 13.959		B = 1.000000	C = 0.000000
Avg. Concentration:	12.62	%		D = 0.000000	E = 0.000000

OXYGEN

First Triad Analysis			Second Triad Analysis	Calibration Curve	
Date:04/06/00	Response Unit:AREA			Concentration = A + Bx + Cx2 + Dx3 + Ex4	
Z1 = 114.00	R1 = 35455.	T1 = 16619.		r = 0.999999418	
R2 = 35183.	Z2 = 141.00	T2 = 16552.		Constants:	A = -0.03442397
Z3 = 118.00	T3 = 16573.	R3 = 35179.		B = 0.000275952	C =
Avg. Concentration:	4.530	%		D =	E =

APPROVED BY:

John Hunnicutt

Air Products and Chemicals, Inc.
5837 W. Fifth Street
Jacksonville, FL 32254
Telephone (904) 786-2663
FAX (904) 693-9128

AIR PRODUCTS

30 March, 1995

Cubix Corporation
2106 NW 67th Place
Suite 7
Gainesville, FL 32653

CERTIFICATE OF CONFORMANCE

This document certifies that the product listed below is supplied via Air Products and Chemicals, Inc. and complies with the current minimum purity specifications of Air Products and Chemicals, Inc., Specialty Gas Department.

Product	Hydrogen
Product Code	3602
Product	Oxygen
Product Code	1602
Shipper Number	854-C-78428
Product	Compressed Air
Product Code	9197
Product	Nitrogen
Product Code	2602
Shipper Number	854-C-78440

E Edward Henderson
Authorized Signature

Dry Gas Meter Calibration		Date	3/7/2000
Austin Laboratory		Technician	KRH
Meter cleaned / repaired	Yes		

Reference Meter		**Working Meter**	
Manufacturer	Bell Prover	Manufacturer	Equimeter 275
Meter No.	# 2130	Meter No.	2962152
Previous Calibration Date	7/17/1996	Previous Calibration Date	2/5/1999
Previous Calibration Factor	1.0000	Previous Calibration Factor	1.0026
Run 1			
Start Time	10:30		10:30
Stop Time	10:38		10:38
Run Time (minutes)	8.00	Run Time (minutes)	8.00
Start Temperature °F	80	Start Temperature °F	90
Stop Temperature (°F)	80	Stop Temperature (°F)	90
Average Temperature (°F)	80	Average Temperature (°F)	90
Start Meter Reading (ft3)	54.448	Start Meter Reading (ft3)	182.631
Stop Meter Reading (ft3)	59.919	Stop Meter Reading (ft3)	188.185
Net Volume (ft3)	5.471	Net Volume (ft3)	5.554
Meter Rate (ft3/minute)	0.684	Meter Rate (ft3/minute)	0.694
Corrected Volume (ft3 @ STP)	5.349	Corrected Volume (ft3 @ STP)	5.332
Calculated Meter Factor	**1.0033**		
Run 2			
Start Time	10:42		10:42
Stop Time	10:50		10:50
Run Time (minutes)	8.00	Run Time (minutes)	8.00
Start Temperature °F	80	Start Temperature °F	90
Stop Temperature (°F)	80	Stop Temperature (°F)	90
Average Temperature (°F)	80	Average Temperature (°F)	90
Start Meter Reading (ft3)	59.957	Start Meter Reading (ft3)	188.243
Stop Meter Reading (ft3)	65.159	Stop Meter Reading (ft3)	193.502
Net Volume (ft3)	5.202	Net Volume (ft3)	5.259
Meter Rate (ft3/minute)	0.650	Meter Rate (ft3/minute)	0.657
Corrected Volume (ft3 @ STP)	5.086	Corrected Volume (ft3 @ STP)	5.049
Calculated Meter Factor	**1.0075**		
Run 3			
Start Time	10:55		10:55
Stop Time	11:03		11:03
Run Time (minutes)	8.00	Run Time (minutes)	8.00
Start Temperature °F	80	Start Temperature °F	90
Stop Temperature (°F)	80	Stop Temperature (°F)	90
Average Temperature (°F)	80	Average Temperature (°F)	90
Start Meter Reading (ft3)	65.159	Start Meter Reading (ft3)	193.502
Stop Meter Reading (ft3)	70.583	Stop Meter Reading (ft3)	199.003
Net Volume (ft3)	5.424	Net Volume (ft3)	5.501
Meter Rate (ft3/minute)	0.678	Meter Rate (ft3/minute)	0.688
Corrected Volume (ft3 @ STP)	5.303	Corrected Volume (ft3 @ STP)	5.281
Calculated Meter Factor	**1.0043**		
AVERAGE DGM FACTOR	**1.0050**		

ALTIMETER TEST RECORD

This unit was tested and inspected IAW FAR Part 43,
Appendix E, and is approved for return to service.

DATE: 1-3-00

WORK ORDER #: 8240

SCALE ERROR

-1000	-5
0	Ø
+ 500	-5
+1000	Ø
+1500	-5
+2000	Ø
+3000	Ø
+4000	-10
+6000	-10
+8000	Ø
+10,000	+10
+12,000	+10
+14,000	+10
+16,000	+5
+18,000	-5
+20,000	-15
+22,000	
+25,000	
+30,000	
+35,000	
+40,000	
+45,000	
+50,000	

START PRESSURE 30.03

FINAL PRESSURE 30.03

BAROMETRIC SCALE ERROR TEST

28.10	+10	30.50	-5
28.50	+5	30.90	Ø
29.00	Ø	30.99	-5
29.50	+5		
29.92	Ø		

FRICTION TEST

1000	25	20,000	50
2000	30	25,000	
3000	35	30,000	
5000	35	35,000	
10,000	35	40,000	
15,000	40		

CASE LEAK TEST @ 18,000 15

CASE LEAK TEST @ 1,200 Ø

HYSTERESIS TEST @ 50% 10

HYSTERESIS TEST @ 40% 10

AFTER EFFECT 5

SERIAL NUMBER 35924

INSPECTOR [signature]

TRAILER 10
ALTIMETER/BAROMETER CALIBRATION SHEET

BFG/C 9001

BFGoodrich
Aerospace

Component Overhaul & Repair

817 Dessau Road
Austin, Texas 78753
512-251-3441
FAX 512-990-1271

FAA Repair Station No. UZ2R232L

CASTLEBERRY AERCOR

Serviceable Part Tag

COMPONENT Altimeter
PART NO. 5934P-1A.83
SERIAL NO. J5924
MFG United Tastc. WORK ORDER # V7071

☒ Overhaul ☐ Repair ☐ Bench Check & Test ☐ Other ______

The Aircraft Appliance identified above was overhauled, repaired, or bench tested (as per block marked) and inspected, in accordance with current Federal Aviation Administration Regulations, and is approved for return to service. Details of this component are on file at this repair station.

AUTHORIZED SIGNATURE

JAN 16 1995
DATE

ALTIMETER SCALE ERROR					
PART NO. 5934P1A83			SERIAL NO. J5924		
ALTIMETER PRESSURE					
TEST PT (FT)	INDICATOR READINGS AT + 25 °C	TEST PT (FT)	INDICATOR READINGS AT + 25 °C	TEST PT (FT)	INDICATOR READINGS AT + 25 °C
-1000	+5	8,000	+5	30,000	
0 0	0	10,000	+10	35,000	
500	0	12,000	+15	40,000	
1000	0	14,000	+15	45,000	
1500	0	16,000	+5	50,000	
2000	0	18,000	0	55,000	
3000	-5	20,000	-5	60,000	
4000	-10	22,000		70,000	
6000	-10	25,000		80,000	

BFG/C9102

Pitot Tube Calibration Sheet

S-Type Tip Inspection (Method 2, Section 4)

Alignment Inspection

Transverse tube axis pitot-tip angle:

α_1 = 1 ° α_2 = 3 °

Each α must be less than 10° from perpendicular to the transverse tube axis

Longitudinal tube axis pitot-tip angle:

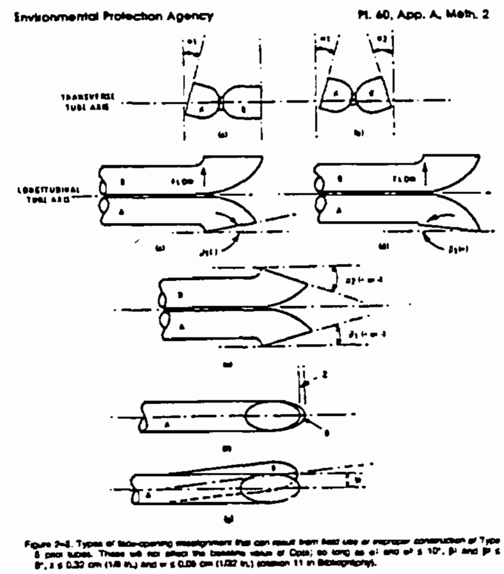
β_1 = ø ° β_1 = 2 °

Each β must be less than 5° from parrallel to the longitudinal tube axis

Pitot-tip end length alignment:

z = 0.079 (in or cm)

Z must be ≤ 0.32 cm (1/8 in)



Pitot-tip centriod alignment with respect to transverse axis:

w = 0.017 (in or cm)

W must be ≤ 0.08 cm (1/32 in)

Pitot Tip Dimension Check

External tubing diameter:

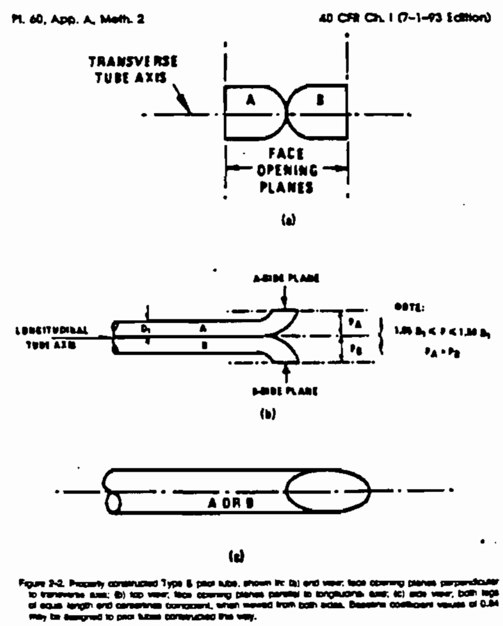
D_t = 1/4 (in or cm)

D_t must be between 0.48 and 0.95 cm (3/16 and 3/8 in)

Base to opening plane distance:

$P_A = P_B$ = 0.311 (in or cm)

P_A and P_B must be between 1.05 D_t and 1.50 D_t



Pitot Tube Coefficient

C_p = 0.84 Pitot Tube: #1010 4' pitot tube Date and Initials: April 24, 2000

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

T-10 Atkins Cal 1/00

Digital Thermocouple Thermometer Calibration

Date:	1/17/2000
Location:	Cubix Austin Lab
Technician:	KRH
Barometric Presure:	29.50" Hg
Ambient Temp:	73° F

Reference Thermometer / Calibrator	
Manufacturer	Omega
Model	CL23A
Seriel #	T-208883
Certificate Date	6/30/1999
Thermocouple Type	K Type
Tested By	RF
(complies with ANSI/Z540-1-1994)	

Working Thermometer	
Cubix ID	T-10
Manufacturer	Atkins
Model	39658-K
Thermometer:	970834542-83

Reference Thermo./Calib. (°F)	Working Thermometer (°F)	Temperature Difference (°F)	Abs. Temp. % Diff. (°R)
32.0	36.7	-4.7	-0.96
100.0	101.2	-1.2	-0.21
212.0	213	-1.0	-0.15
500.0	502	-2.0	-0.21
1000.0	998	2.0	0.14
1800.0	1798	2.0	0.09
	Average Diff.	-0.8	-0.22

Criteria:

Method 2 Sec 4.3 (in-stack thermometers):
Test within 10% of the observed absolute stack temperature °F+460). Agreement must be less than 1.5% absolute temperature difference between reference and working thermometer.

See also (EMC ALT-011) Emission Mesurement Center, Approved Alternative Method 2 Thermocouple Calibration Procedure.

Method 4 Sec 2.1.4 & M. 5 Sec. 2.1.8 (gas meter thermometers): Thermometers capable of measuring temperature within 3°C (5.4°F).

Method 4 Sec 2.1.2 (last iimpinger thermometers):
Themometer capable of measuring within 1°C (2°F).

Calibration Conducted by CUBIX CORPORATION, Austin, TX

ΩOMEGA
ENGINEERING, INC.

One Omega Drive, Box 4047, Stamford, CN 06907
(203) 359-1660 – http://www.omega.com – e-mail: info@omega.com

CERTIFICATE OF CALIBRATION

Model CL23A **Serial Number** T-208883

Omega Engineering, Inc., certifies that the above listed instrument has been calibrated using standards whose accuracy is traceable to the U.S. National Institute of Standards and Technology, and meets or exceeds its published specifications. Calibration traceability of the above listed instrument is in full compliance with ANSI/Z540-1-1994 standards and requirements.

6-30-99
DATE

RF
TESTED BY

MCK
AUTHORIZED SIGNATURE

OMEGA ENGINEERING, INC.
An OMEGA Technologies Company

Certificate of Conformance

for

CUBIX

9225 U S HIGHWAY 183 S

AUSTIN TX 78747

Cust. P.O. #: 99161 OMEGA W.O. # 906933875

#2210 7' pitottube thermocaplesoC7' and 13'

#1010 4' pitot tube thermouple

CAL-1

OMEGA Engineering, Inc. certifies that the items comprising the above order have been manufactured in accordance with all applicable instructions and specifications as published in the OMEGA TEMPERATURE MEASUREMENT HANDBOOK AND ENCYCLOPEDIA®. OMEGA Engineering Inc. further certifies that all thermocouple base and noble metal materials conform to ANSI Limits of Error (ANSI Standard MC96.1)

Certified by: Timothy J. Curri Date: 061699

Quality Assurance Inspector

Omega Engineering, Inc., One Omega Drive, Box 4047, Stamford, CT 06907
Telephone: (203) 359-1660 · FAX: (203) 359-7811
Internet Address: http://www.omega.com E-Mail: info@omega.com

APPENDIX G:
LOGGED DATA

Unit 1404, Logged Data Records

Run Number	Date	Time	NO_x (ppmv)	CO (ppmv)	O_2 (% vol)	CO_2 (% vol)	THC (ppmv)	AVE NO_x (ppmv)	AVE CO (ppmv)	AVE O_2 (% vol)	AVE CO_2 (% vol)	AVE THC (ppmv)
START Run 1404-C-1	4/27/2000	2:10:10 PM	1970	167.1	11.33	5.68	969	1970.0	167.1	11.33	5.68	969.0
Run 1404-C-1	4/27/2000	2:11:10 PM	2035	173.1	11.28	5.71	999	2002.5	170.1	11.31	5.69	984.0
Run 1404-C-1	4/27/2000	2:12:10 PM	2013	169.5	11.27	5.72	968	2006.0	169.9	11.30	5.70	978.7
Run 1404-C-1	4/27/2000	2:13:10 PM	2075	169.1	11.23	5.73	961	2023.3	169.7	11.28	5.71	974.3
Run 1404-C-1	4/27/2000	2:14:10 PM	2010	168.0	11.27	5.71	932	2020.6	169.3	11.28	5.71	965.8
Run 1404-C-1	4/27/2000	2:15:10 PM	2057	168.6	11.25	5.72	969	2026.7	169.2	11.27	5.71	966.3
Run 1404-C-1	4/27/2000	2:16:10 PM	2072	168.0	11.25	5.72	978	2033.1	169.0	11.27	5.71	968.0
Run 1404-C-1	4/27/2000	2:17:10 PM	1942	170.6	11.31	5.68	928	2021.8	169.2	11.27	5.71	963.0
Run 1404-C-1	4/27/2000	2:18:10 PM	2025	172.0	11.26	5.71	957	2022.1	169.5	11.27	5.71	962.3
Run 1404-C-1	4/27/2000	2:19:10 PM	2034	170.6	11.25	5.71	957	2023.3	169.6	11.27	5.71	961.8
Run 1404-C-1	4/27/2000	2:20:10 PM	2031	168.0	11.24	5.71	941	2024.0	169.5	11.27	5.71	959.9
Run 1404-C-1	4/27/2000	2:21:10 PM	1998	168.6	11.26	5.69	959	2021.8	169.4	11.27	5.71	959.8
Run 1404-C-1	4/27/2000	2:22:10 PM	2056	170.6	11.25	5.69	963	2024.5	169.5	11.26	5.71	960.1
Run 1404-C-1	4/27/2000	2:23:10 PM	2014	170.6	11.25	5.68	960	2023.7	169.6	11.26	5.70	960.1
Run 1404-C-1	4/27/2000	2:24:10 PM	2086	168.6	11.23	5.68	988	2027.9	169.5	11.26	5.70	961.9
Run 1404-C-1	4/27/2000	2:25:10 PM	2076	167.1	11.24	5.67	954	2030.9	169.4	11.26	5.70	961.4
Run 1404-C-1	4/27/2000	2:26:10 PM	2110	166.0	11.23	5.67	956	2035.5	169.2	11.26	5.70	961.1
Run 1404-C-1	4/27/2000	2:27:10 PM	1959	171.1	11.30	5.61	971	2031.3	169.3	11.26	5.69	961.7
Run 1404-C-1	4/27/2000	2:28:10 PM	2090	171.1	11.23	5.66	966	2034.4	169.4	11.26	5.69	961.9
Run 1404-C-1	4/27/2000	2:29:10 PM	2015	172.0	11.29	5.63	954	2033.4	169.5	11.26	5.69	961.5
Run 1404-C-1	4/27/2000	2:30:10 PM	2009	170.6	11.26	5.63	969	2032.2	169.5	11.26	5.69	961.9
Run 1404-C-1	4/27/2000	2:31:10 PM	2026	169.1	11.28	5.61	975	2032.0	169.5	11.26	5.68	962.5
Run 1404-C-1	4/27/2000	2:32:10 PM	2055	169.1	11.25	5.62	985	2033.0	169.5	11.26	5.68	963.4
Run 1404-C-1	4/27/2000	2:33:10 PM	2086	170.0	11.24	5.62	981	2035.2	169.5	11.26	5.68	964.2
Run 1404-C-1	4/27/2000	2:34:10 PM	2029	167.5	11.28	5.59	981	2034.9	169.4	11.26	5.67	964.8
Run 1404-C-1	4/27/2000	2:35:01 PM	2004	170.1	11.30	5.57	993	2033.7	169.5	11.26	5.67	965.9
Run 1404-C-1	4/27/2000	2:36:01 PM	1995	172.6	11.29	5.58	984	2032.3	169.6	11.26	5.67	966.6
Run 1404-C-1	4/27/2000	2:37:01 PM	2003	170.6	11.27	5.58	1009	2031.3	169.6	11.26	5.66	968.1
Run 1404-C-1	4/27/2000	2:38:01 PM	2058	168.0	11.27	5.57	992	2032.2	169.6	11.26	5.66	968.9
Run 1404-C-1	4/27/2000	2:39:01 PM	2050	169.1	11.27	5.57	997	2032.8	169.5	11.26	5.66	969.9
Run 1404-C-1	4/27/2000	2:40:01 PM	2063	166.6	11.27	5.56	971	2033.7	169.4	11.26	5.65	969.9
Run 1404-C-1	4/27/2000	2:41:01 PM	2123	168.6	11.22	5.59	948	2036.5	169.4	11.26	5.65	969.2
Run 1404-C-1	4/27/2000	2:42:01 PM	2169	164.6	11.20	5.59	969	2040.5	169.3	11.26	5.65	969.2
Run 1404-C-1	4/27/2000	2:43:01 PM	2129	166.6	11.25	5.55	967	2043.1	169.2	11.26	5.65	969.1
Run 1404-C-1	4/27/2000	2:44:01 PM	2126	166.6	11.25	5.55	984	2045.5	169.1	11.26	5.64	969.6
Run 1404-C-1	4/27/2000	2:45:01 PM	2071	168.6	11.27	5.52	1014	2046.2	169.1	11.26	5.64	970.8

Unit 1404, Logged Data Records

Run Number	Date	Time	NO_x (ppmv)	CO (ppmv)	O_2 (% vol)	CO_2 (% vol)	THC (ppmv)	AVE NO_x (ppmv)	AVE CO (ppmv)	AVE O_2 (% vol)	AVE CO_2 (% vol)	AVE THC (ppmv)
Run 1404-C-1	4/27/2000	2:46:01 PM	2045	170.1	11.27	5.52	1007	2046.2	169.1	11.26	5.64	971.8
Run 1404-C-1	4/27/2000	2:47:01 PM	2059	170.1	11.28	5.50	983	2046.5	169.1	11.26	5.63	972.1
Run 1404-C-1	4/27/2000	2:48:01 PM	2048	170.6	11.28	5.49	985	2046.6	169.2	11.26	5.63	972.4
Run 1404-C-1	4/27/2000	2:49:01 PM	2111	169.1	11.26	5.51	979	2048.2	169.2	11.26	5.63	972.6
Run 1404-C-1	4/27/2000	2:50:01 PM	2090	167.5	11.29	5.50	1014	2049.2	169.1	11.26	5.62	973.6
Run 1404-C-1	4/27/2000	2:51:01 PM	2056	168.0	11.27	5.49	994	2049.4	169.1	11.26	5.62	974.1
Run 1404-C-1	4/27/2000	2:52:01 PM	2042	170.6	11.29	5.48	1007	2049.2	169.1	11.26	5.62	974.8
Run 1404-C-1	4/27/2000	2:53:01 PM	2069	171.1	11.25	5.50	975	2049.6	169.2	11.26	5.61	974.8
Run 1404-C-1	4/27/2000	2:54:01 PM	2102	167.1	11.24	5.49	967	2050.8	169.1	11.26	5.61	974.7
Run 1404-C-1	4/27/2000	2:55:01 PM	2060	169.6	11.27	5.47	972	2051.0	169.2	11.26	5.61	974.6
Run 1404-C-1	4/27/2000	2:56:01 PM	2087	169.1	11.26	5.49	985	2051.8	169.1	11.26	5.61	974.8
Run 1404-C-1	4/27/2000	2:57:01 PM	2071	168.6	11.26	5.49	959	2052.2	169.1	11.26	5.60	974.5
Run 1404-C-1	4/27/2000	2:58:01 PM	2036	170.1	11.27	5.48	1011	2051.8	169.2	11.26	5.60	975.2
Run 1404-C-1	4/27/2000	2:59:01 PM	1990	170.6	11.29	5.47	996	2050.6	169.2	11.26	5.60	975.7
Run 1404-C-1	4/27/2000	3:00:01 PM	2026	171.1	11.27	5.49	993	2050.1	169.2	11.26	5.60	976.0
Run 1404-C-1	4/27/2000	3:01:01 PM	2082	167.5	11.25	5.51	993	2050.7	169.2	11.26	5.60	976.3
Run 1404-C-1	4/27/2000	3:02:01 PM	2021	168.0	11.28	5.49	1019	2050.2	169.2	11.26	5.59	977.1
Run 1404-C-1	4/27/2000	3:03:01 PM	2086	170.1	11.24	5.52	988	2050.8	169.2	11.26	5.59	977.3
Run 1404-C-1	4/27/2000	3:04:01 PM	2054	171.5	11.27	5.50	1031	2050.9	169.2	11.26	5.59	978.3
Run 1404-C-1	4/27/2000	3:05:01 PM	1998	173.1	11.32	5.48	1026	2049.9	169.3	11.26	5.59	979.2
Run 1404-C-1	4/27/2000	3:06:01 PM	1924	175.1	11.30	5.50	1026	2047.7	169.4	11.26	5.59	980.0
Run 1404-C-1	4/27/2000	3:07:01 PM	2045	172.6	11.25	5.53	1018	2047.7	169.4	11.26	5.59	980.6
Run 1404-C-1	4/27/2000	3:08:01 PM	2051	170.1	11.26	5.52	1013	2047.7	169.5	11.26	5.58	981.2
Run 1404-C-1	4/27/2000	3:09:01 PM	2089	167.1	11.24	5.55	1015	2048.4	169.4	11.26	5.58	981.8
END Run 1404-C-1	4/27/2000	3:10:01 PM	2048	167.5	11.23	5.48	751	**2048.4**	**169.4**	**11.26**	**5.58**	**978.0**

Unit 1404, Logged Data Records

Run Number	Date	Time	NO_x (ppmv)	CO (ppmv)	O_2 (% vol)	CO_2 (% vol)	THC (ppmv)	AVE NO_x (ppmv)	AVE CO (ppmv)	AVE O_2 (% vol)	AVE CO_2 (% vol)	AVE THC (ppmv)
START Run 1404-C-2	4/27/2000	3:30:14 PM	1997	171.5	11.32	5.61	1033	1997.0	171.5	11.32	5.61	1033.0
Run 1404-C-2	4/27/2000	3:31:14 PM	2051	173.1	11.27	5.64	1017	2004.8	172.1	11.31	5.61	1027.5
Run 1404-C-2	4/27/2000	3:32:14 PM	2010	170.1	11.28	5.65	1036	2024.8	171.6	11.29	5.62	1030.4
Run 1404-C-2	4/27/2000	3:33:14 PM	2008	171.5	11.29	5.64	1030	2026.2	171.4	11.28	5.63	1030.1
Run 1404-C-2	4/27/2000	3:34:14 PM	1995	175.1	11.29	5.63	964	2012.7	171.9	11.29	5.63	1019.9
Run 1404-C-2	4/27/2000	3:35:14 PM	2105	171.1	11.23	5.67	1022	2026.2	172.3	11.28	5.63	1017.0
Run 1404-C-2	4/27/2000	3:36:14 PM	2008	170.6	11.28	5.65	1048	2030.5	171.8	11.28	5.64	1019.0
Run 1404-C-2	4/27/2000	3:37:14 PM	2017	172.0	11.29	5.64	1039	2029.1	171.8	11.28	5.64	1020.2
Run 1404-C-2	4/27/2000	3:38:16 PM	1972	172.6	11.27	5.66	1057	2026.1	171.8	11.28	5.64	1021.0
Run 1404-C-2	4/27/2000	3:39:16 PM	2046	172.6	11.24	5.69	1014	2026.5	171.9	11.28	5.64	1022.2
Run 1404-C-2	4/27/2000	3:40:16 PM	2058	171.5	11.27	5.68	1028	2029.8	172.0	11.27	5.65	1022.9
Run 1404-C-2	4/27/2000	3:41:16 PM	2023	171.5	11.26	5.67	1047	2032.3	172.0	11.27	5.65	1022.9
Run 1404-C-2	4/27/2000	3:42:16 PM	1997	170.0	11.29	5.66	1025	2033.1	171.8	11.27	5.65	1023.7
Run 1404-C-2	4/27/2000	3:43:16 PM	2026	170.6	11.25	5.70	1049	2034.3	171.8	11.27	5.66	1024.5
Run 1404-C-2	4/27/2000	3:44:16 PM	2023	168.6	11.27	5.69	1049	2035.2	171.6	11.27	5.66	1025.3
Run 1404-C-2	4/27/2000	3:45:16 PM	2041	172.6	11.26	5.70	1055	2032.8	171.5	11.27	5.66	1026.6
Run 1404-C-2	4/27/2000	3:46:16 PM	2072	170.6	11.25	5.70	1080	2034.3	171.6	11.27	5.66	1028.3
Run 1404-C-2	4/27/2000	3:47:16 PM	2075	171.1	11.27	5.69	1076	2036.0	171.5	11.27	5.67	1030.4
Run 1404-C-2	4/27/2000	3:48:16 PM	1959	173.6	11.30	5.67	1074	2035.3	171.5	11.27	5.67	1031.8
Run 1404-C-2	4/27/2000	3:49:16 PM	2025	177.1	11.29	5.69	1042	2032.1	171.8	11.27	5.67	1033.7
Run 1404-C-2	4/27/2000	3:50:16 PM	1985	173.6	11.28	5.68	1038	2031.5	172.0	11.27	5.67	1034.6
Run 1404-C-2	4/27/2000	3:51:16 PM	1994	173.6	11.29	5.67	1072	2030.1	172.1	11.27	5.67	1035.5
Run 1404-C-2	4/27/2000	3:52:16 PM	1966	173.6	11.28	5.69	1066	2028.8	172.1	11.27	5.67	1036.3
Run 1404-C-2	4/27/2000	3:53:16 PM	1996	174.1	11.26	5.69	1034	2026.4	172.2	11.27	5.67	1037.1
Run 1404-C-2	4/27/2000	3:54:16 PM	1995	172.6	11.30	5.67	1032	2025.0	172.2	11.27	5.67	1037.8
Run 1404-C-2	4/27/2000	3:55:16 PM	1968	175.1	11.29	5.66	1029	2023.7	172.3	11.27	5.67	1038.5
Run 1404-C-2	4/27/2000	3:56:16 PM	2001	174.1	11.27	5.67	1047	2021.6	172.4	11.27	5.67	1039.0
Run 1404-C-2	4/27/2000	3:57:16 PM	2058	170.1	11.23	5.68	1069	2022.9	172.4	11.27	5.67	1039.4
Run 1404-C-2	4/27/2000	3:58:16 PM	2032	171.1	11.25	5.67	1080	2023.1	172.3	11.27	5.67	1039.9
Run 1404-C-2	4/27/2000	3:59:16 PM	1964	170.6	11.28	5.64	1066	2022.6	172.3	11.27	5.67	1040.0
Run 1404-C-2	4/27/2000	4:00:16 PM	2049	169.6	11.23	5.67	1069	2022.8	172.2	11.27	5.67	1040.3
Run 1404-C-2	4/27/2000	4:01:16 PM	1981	170.1	11.27	5.64	1076	2022.6	172.1	11.27	5.67	1040.7
Run 1404-C-2	4/27/2000	4:02:16 PM	2012	174.1	11.27	5.63	1034	2021.2	172.1	11.27	5.67	1041.1
Run 1404-C-2	4/27/2000	4:03:16 PM	2016	170.6	11.24	5.64	1088	2021.0	172.1	11.27	5.67	1041.6
Run 1404-C-2	4/27/2000	4:04:16 PM	1916	174.1	11.31	5.59	1055	2020.2	172.1	11.27	5.67	1042.4
Run 1404-C-2	4/27/2000	4:05:16 PM	1793	183.2	11.37	5.57	1091	2014.9	172.3	11.27	5.66	1043.6

Unit 1404, Logged Data Records

Run Number	Date	Time	NO_x (ppmv)	CO (ppmv)	O_2 (% vol)	CO_2 (% vol)	THC (ppmv)	AVE NO_x (ppmv)	AVE CO (ppmv)	AVE O_2 (% vol)	AVE CO_2 (% vol)	AVE THC (ppmv)
Run 1404-C-2	4/27/2000	4:06:15 PM	1793	186.7	11.36	5.57	1103	2008.7	172.7	11.27	5.66	1044.6
Run 1404-C-2	4/27/2000	4:07:16 PM	1671	188.2	11.43	5.52	1109	2001.7	173.1	11.28	5.66	1045.9
Run 1404-C-2	4/27/2000	4:08:16 PM	1680	192.7	11.40	5.54	1095	1993.0	173.6	11.28	5.66	1047.1
Run 1404-C-2	4/27/2000	4:09:16 PM	1699	192.7	11.40	5.54	1097	1984.8	174.1	11.28	5.65	1048.2
Run 1404-C-2	4/27/2000	4:10:16 PM	1670	189.7	11.41	5.52	1070	1978.0	174.5	11.28	5.65	1049.3
Run 1404-C-2	4/27/2000	4:11:16 PM	1609	195.2	11.43	5.51	1090	1968.9	174.9	11.29	5.65	1050.4
Run 1404-C-2	4/27/2000	4:12:16 PM	1714	195.7	11.39	5.54	1069	1961.6	175.5	11.29	5.64	1051.2
Run 1404-C-2	4/27/2000	4:13:16 PM	1798	189.7	11.32	5.56	1086	1957.5	175.8	11.29	5.64	1051.8
Run 1404-C-2	4/27/2000	4:14:16 PM	1881	185.7	11.30	5.58	1099	1954.7	176.1	11.29	5.64	1052.4
Run 1404-C-2	4/27/2000	4:15:16 PM	1870	180.7	11.31	5.56	1107	1952.9	176.2	11.29	5.64	1053.1
Run 1404-C-2	4/27/2000	4:16:16 PM	1884	181.2	11.31	5.56	1099	1951.5	176.3	11.29	5.64	1053.9
Run 1404-C-2	4/27/2000	4:17:16 PM	1874	183.7	11.33	5.53	1048	1950.1	176.5	11.29	5.63	1054.5
Run 1404-C-2	4/27/2000	4:18:16 PM	1908	181.2	11.29	5.56	996	1949.9	176.6	11.29	5.63	1055.2
Run 1404-C-2	4/27/2000	4:19:16 PM	1902	180.7	11.29	5.56	1108	1949.2	176.7	11.29	5.63	1055.7
Run 1404-C-2	4/27/2000	4:20:16 PM	1932	183.2	11.25	5.58	1081	1948.3	176.8	11.29	5.63	1056.4
Run 1404-C-2	4/27/2000	4:21:16 PM	1920	181.7	11.28	5.56	1116	1947.9	176.9	11.29	5.63	1057.3
Run 1404-C-2	4/27/2000	4:22:16 PM	2007	181.2	11.23	5.59	1088	1948.4	177.0	11.29	5.63	1057.8
Run 1404-C-2	4/27/2000	4:23:16 PM	1947	175.5	11.27	5.57	1071	1949.3	177.0	11.29	5.63	1058.4
Run 1404-C-2	4/27/2000	4:24:16 PM	2035	178.1	11.24	5.59	1042	1949.3	177.0	11.29	5.63	1058.5
Run 1404-C-2	4/27/2000	4:25:16 PM	2054	175.1	11.22	5.59	1033	1950.9	177.0	11.29	5.63	1058.2
Run 1404-C-2	4/27/2000	4:26:16 PM	2060	171.5	11.23	5.58	1025	1952.7	176.9	11.29	5.62	1057.9
Run 1404-C-2	4/27/2000	4:27:16 PM	2009	174.1	11.26	5.58	1046	1953.9	176.8	11.29	5.62	1057.6
Run 1404-C-2	4/27/2000	4:28:16 PM	2074	172.0	11.22	5.61	1040	1955.4	176.8	11.29	5.62	1057.2
END Run 1404-C-2	4/27/2000	4:29:16 PM	2027	172.1	11.26	5.60	1051	**1956.6**	**176.7**	**11.29**	**5.62**	**1056.9**

Unit 1404, Logged Data Records

Run Number	Date	Time	NO_x (ppmv)	CO (ppmv)	O_2 (% vol)	CO_2 (% vol)	THC (ppmv)	AVE NO_x (ppmv)	AVE CO (ppmv)	AVE O_2 (% vol)	AVE CO_2 (% vol)	AVE THC (ppmv)
START Run 1404-C-3	4/27/2000	4:48:01 PM	2054	180.0	11.25	5.76	1100	2054.0	180.0	11.25	5.76	1100.0
Run 1404-C-3	4/27/2000	4:49:01 PM	1960	176.6	11.27	5.75	1085	2014.8	177.0	11.26	5.76	1084.6
Run 1404-C-3	4/27/2000	4:50:01 PM	1975	181.2	11.30	5.74	1048	1982.4	177.6	11.27	5.75	1081.9
Run 1404-C-3	4/27/2000	4:51:01 PM	1994	177.6	11.26	5.78	1061	1988.3	178.2	11.27	5.76	1065.5
Run 1404-C-3	4/27/2000	4:52:01 PM	2043	174.1	11.23	5.78	1058	2004.3	177.7	11.26	5.77	1061.6
Run 1404-C-3	4/27/2000	4:53:01 PM	2011	177.1	11.27	5.77	1063	2002.2	177.1	11.26	5.77	1060.1
Run 1404-C-3	4/27/2000	4:54:01 PM	2065	172.6	11.24	5.79	1070	2013.4	176.8	11.26	5.77	1059.9
Run 1404-C-3	4/27/2000	4:55:01 PM	2030	173.6	11.28	5.76	1072	2015.9	176.1	11.26	5.77	1059.4
Run 1404-C-3	4/27/2000	4:56:01 PM	2068	176.0	11.25	5.79	1048	2017.8	176.0	11.26	5.77	1059.5
Run 1404-C-3	4/27/2000	4:57:01 PM	2051	173.6	11.24	5.77	1023	2024.2	175.8	11.26	5.77	1054.8
Run 1404-C-3	4/27/2000	4:58:01 PM	2020	176.1	11.26	5.76	1049	2021.4	175.6	11.26	5.77	1052.3
Run 1404-C-3	4/27/2000	4:59:01 PM	1972	175.1	11.28	5.74	1004	2020.6	175.6	11.26	5.77	1049.5
Run 1404-C-3	4/27/2000	5:00:01 PM	2056	177.1	11.23	5.76	1013	2017.9	175.7	11.26	5.77	1047.6
Run 1404-C-3	4/27/2000	5:01:01 PM	2019	173.1	11.25	5.75	1078	2020.3	175.6	11.26	5.77	1047.5
Run 1404-C-3	4/27/2000	5:02:01 PM	1962	176.6	11.28	5.72	1088	2017.4	175.6	11.26	5.76	1049.4
Run 1404-C-3	4/27/2000	5:03:01 PM	2082	175.5	11.23	5.74	1041	2019.5	175.7	11.26	5.76	1050.4
Run 1404-C-3	4/27/2000	5:04:01 PM	2034	175.5	11.25	5.71	1095	2021.6	175.6	11.26	5.76	1052.1
Run 1404-C-3	4/27/2000	5:05:01 PM	2071	177.6	11.23	5.72	1053	2020.8	175.7	11.26	5.76	1053.8
Run 1404-C-3	4/27/2000	5:06:01 PM	2053	175.5	11.25	5.71	1085	2022.9	175.7	11.26	5.75	1055.3
Run 1404-C-3	4/27/2000	5:07:01 PM	2017	176.1	11.26	5.69	1077	2023.1	175.7	11.26	5.75	1056.3
Run 1404-C-3	4/27/2000	5:08:01 PM	2060	176.6	11.24	5.69	1061	2022.6	175.7	11.26	5.75	1056.3
Run 1404-C-3	4/27/2000	5:09:01 PM	2044	176.6	11.24	5.68	1044	2022.2	175.7	11.26	5.74	1056.2
Run 1404-C-3	4/27/2000	5:10:01 PM	2034	172.0	11.26	5.66	1070	2023.1	175.6	11.26	5.74	1055.8
Run 1404-C-3	4/27/2000	5:11:01 PM	2046	174.1	11.25	5.66	1063	2022.4	175.5	11.26	5.74	1055.7
Run 1404-C-3	4/27/2000	5:12:01 PM	2029	173.6	11.24	5.65	1059	2021.4	175.5	11.26	5.73	1055.7
Run 1404-C-3	4/27/2000	5:13:01 PM	2000	173.6	11.29	5.62	1004	2020.7	175.4	11.26	5.73	1054.2
Run 1404-C-3	4/27/2000	5:14:01 PM	1931	178.6	11.28	5.63	1059	2018.1	175.4	11.26	5.72	1053.4
Run 1404-C-3	4/27/2000	5:15:01 PM	1979	177.6	11.28	5.63	1098	2016.2	175.5	11.26	5.72	1054.7
Run 1404-C-3	4/27/2000	5:16:01 PM	2004	178.6	11.24	5.63	1065	2014.8	175.6	11.26	5.72	1055.9
Run 1404-C-3	4/27/2000	5:17:01 PM	1964	176.0	11.26	5.63	1092	2014.1	175.6	11.26	5.71	1057.0
Run 1404-C-3	4/27/2000	5:18:01 PM	1969	175.6	11.25	5.62	1066	2013.2	175.6	11.26	5.71	1058.3
Run 1404-C-3	4/27/2000	5:19:01 PM	1917	178.1	11.29	5.60	1101	2011.4	175.7	11.26	5.71	1060.0
Run 1404-C-3	4/27/2000	5:20:01 PM	1977	177.6	11.25	5.62	1104	2009.9	175.7	11.26	5.70	1061.4
Run 1404-C-3	4/27/2000	5:21:01 PM	2053	176.6	11.23	5.63	1097	2009.0	175.8	11.26	5.70	1062.7
Run 1404-C-3	4/27/2000	5:22:01 PM	2046	176.0	11.22	5.63	1130	2009.7	175.8	11.26	5.70	1064.0
Run 1404-C-3	4/27/2000	5:23:01 PM	1997	174.6	11.25	5.61	1118	2010.0	175.8	11.26	5.70	1065.3

Unit 1404, Logged Data Records

Run Number	Date	Time	NO_x (ppmv)	CO (ppmv)	O_2 (% vol)	CO_2 (% vol)	THC (ppmv)	AVE NO_x (ppmv)	AVE CO (ppmv)	AVE O_2 (% vol)	AVE CO_2 (% vol)	AVE THC (ppmv)
Run 1404-C-3	4/27/2000	5:24:01 PM	1993	177.1	11.26	5.59	1103	2009.2	175.8	11.26	5.69	1066.5
Run 1404-C-3	4/27/2000	5:25:01 PM	1972	175.6	11.25	5.60	1089	2009.4	175.8	11.26	5.69	1067.5
Run 1404-C-3	4/27/2000	5:26:01 PM	1992	176.0	11.26	5.59	1092	2008.5	175.8	11.26	5.69	1068.5
Run 1404-C-3	4/27/2000	5:27:01 PM	2013	175.1	11.23	5.59	1100	2008.3	175.8	11.26	5.69	1069.5
Run 1404-C-3	4/27/2000	5:28:01 PM	2069	172.6	11.23	5.58	1099	2008.8	175.7	11.26	5.68	1070.3
Run 1404-C-3	4/27/2000	5:29:01 PM	2015	174.1	11.24	5.57	1104	2009.1	175.7	11.26	5.68	1071.1
Run 1404-C-3	4/27/2000	5:30:01 PM	2025	175.1	11.23	5.60	1086	2008.7	175.6	11.26	5.68	1071.6
Run 1404-C-3	4/27/2000	5:31:01 PM	2003	175.1	11.24	5.56	1082	2009.4	175.6	11.25	5.68	1072.0
Run 1404-C-3	4/27/2000	5:32:01 PM	1978	178.6	11.24	5.56	1084	2008.6	175.7	11.25	5.67	1072.5
Run 1404-C-3	4/27/2000	5:33:01 PM	2005	177.1	11.23	5.57	1107	2008.9	175.7	11.25	5.67	1072.9
Run 1404-C-3	4/27/2000	5:34:01 PM	1928	179.5	11.27	5.53	1076	2008.0	175.8	11.25	5.67	1073.4
Run 1404-C-3	4/27/2000	5:35:01 PM	1943	179.5	11.27	5.54	1082	2006.8	175.8	11.25	5.67	1073.8
Run 1404-C-3	4/27/2000	5:36:01 PM	1999	177.6	11.22	5.56	1112	2006.5	175.9	11.25	5.66	1074.0
Run 1404-C-3	4/27/2000	5:37:01 PM	1948	178.6	11.24	5.54	1064	2006.3	175.9	11.25	5.66	1074.3
Run 1404-C-3	4/27/2000	5:38:01 PM	1943	179.1	11.26	5.52	1101	2005.4	176.0	11.25	5.66	1074.5
Run 1404-C-3	4/27/2000	5:39:01 PM	2000	180.7	11.22	5.55	1061	2004.5	176.1	11.25	5.66	1074.7
Run 1404-C-3	4/27/2000	5:40:01 PM	2031	177.6	11.21	5.56	1089	2005.2	176.1	11.25	5.65	1074.9
Run 1404-C-3	4/27/2000	5:41:01 PM	2058	178.1	11.19	5.58	1076	2005.4	176.2	11.25	5.65	1074.9
Run 1404-C-3	4/27/2000	5:42:01 PM	2007	177.1	11.23	5.54	1083	2005.6	176.2	11.25	5.65	1074.9
Run 1404-C-3	4/27/2000	5:43:01 PM	1951	179.1	11.26	5.54	1066	2005.3	176.2	11.25	5.65	1075.0
Run 1404-C-3	4/27/2000	5:44:01 PM	1935	181.7	11.27	5.53	1089	2003.4	176.3	11.25	5.65	1075.0
Run 1404-C-3	4/27/2000	5:45:01 PM	2010	176.6	11.22	5.55	1042	2003.2	176.3	11.25	5.64	1074.9
Run 1404-C-3	4/27/2000	5:46:01 PM	1993	179.1	11.23	5.54	1051	2002.7	176.3	11.25	5.64	1074.7
Run 1404-C-3	4/27/2000	5:47:01 PM	1980	176.0	11.22	5.54	1051	2002.9	176.4	11.25	5.64	1074.5
END Run 1404-C-3	4/27/2000	5:48:01 PM	1986	174.6	11.24	5.52	1046	**2002.9**	**176.3**	**11.25**	**5.64**	**1074.1**

Unit 1405, Logged Data Records

Run Number	Date	Time	NO_x (ppmv)	CO (ppmv)	O_2 (% vol)	CO_2 (% vol)	THC (ppmv)	AVE NO_x (ppmv)	AVE CO (ppmv)	AVE O_2 (% vol)	AVE CO_2 (% vol)	AVE THC (ppmv)
START Run 1405-C-1	4/27/2000	9:21:23 AM	1867	174.1	11.17	5.60	1020	1867.0	174.1	11.17	5.60	1020.0
Run 1405-C-1	4/27/2000	9:22:23 AM	1890	175.1	11.17	5.60	1034	1883.8	174.6	11.16	5.61	1041.1
Run 1405-C-1	4/27/2000	9:23:23 AM	1904	176.6	11.18	5.60	1047	1877.6	175.0	11.17	5.61	1040.6
Run 1405-C-1	4/27/2000	9:24:23 AM	1891	176.6	11.19	5.59	1038	1872.8	175.4	11.17	5.60	1039.4
Run 1405-C-1	4/27/2000	9:25:23 AM	1952	175.1	11.11	5.62	1030	1883.5	175.7	11.17	5.60	1035.9
Run 1405-C-1	4/27/2000	9:26:23 AM	1922	172.0	11.13	5.61	1038	1895.8	175.0	11.16	5.60	1033.7
Run 1405-C-1	4/27/2000	9:27:23 AM	1932	173.1	11.14	5.60	1013	1900.3	174.6	11.15	5.60	1031.7
Run 1405-C-1	4/27/2000	9:28:23 AM	1875	175.1	11.17	5.56	1007	1898.1	174.5	11.15	5.60	1029.3
Run 1405-C-1	4/27/2000	9:29:23 AM	1916	175.5	11.13	5.60	1008	1898.2	174.6	11.15	5.60	1027.4
Run 1405-C-1	4/27/2000	9:30:23 AM	1852	176.0	11.17	5.56	1007	1896.8	174.7	11.15	5.60	1026.0
Run 1405-C-1	4/27/2000	9:31:23 AM	1928	173.1	11.14	5.58	1014	1897.6	174.6	11.15	5.59	1024.0
Run 1405-C-1	4/27/2000	9:32:23 AM	2002	169.5	11.07	5.61	1022	1905.0	174.4	11.15	5.59	1022.4
Run 1405-C-1	4/27/2000	9:33:23 AM	1999	169.5	11.10	5.58	1034	1910.4	173.9	11.14	5.59	1021.7
Run 1405-C-1	4/27/2000	9:34:23 AM	1880	168.6	11.17	5.52	1019	1915.2	173.5	11.14	5.59	1021.2
Run 1405-C-1	4/27/2000	9:35:23 AM	1919	172.0	11.16	5.53	999	1914.4	173.3	11.14	5.59	1020.0
Run 1405-C-1	4/27/2000	9:36:23 AM	1944	169.1	11.12	5.55	1018	1916.7	173.1	11.14	5.58	1018.7
Run 1405-C-1	4/27/2000	9:37:23 AM	1867	170.1	11.14	5.53	986	1916.7	172.9	11.14	5.58	1017.5
Run 1405-C-1	4/27/2000	9:38:23 AM	1994	170.6	11.09	5.56	972	1918.6	172.7	11.14	5.58	1016.2
Run 1405-C-1	4/27/2000	9:39:23 AM	2003	169.1	11.09	5.56	1003	1921.2	172.6	11.14	5.58	1015.0
Run 1405-C-1	4/27/2000	9:40:23 AM	1955	167.1	11.13	5.53	996	1924.8	172.3	11.13	5.58	1013.8
Run 1405-C-1	4/27/2000	9:41:23 AM	1918	169.1	11.15	5.52	987	1925.1	172.1	11.13	5.57	1012.7
Run 1405-C-1	4/27/2000	9:42:23 AM	1965	169.5	11.13	5.53	976	1926.2	172.0	11.13	5.57	1011.5
Run 1405-C-1	4/27/2000	9:43:23 AM	1992	169.1	11.10	5.55	978	1927.3	171.8	11.13	5.57	1010.2
Run 1405-C-1	4/27/2000	9:44:23 AM	1994	168.0	11.09	5.54	989	1929.9	171.7	11.13	5.57	1009.0
Run 1405-C-1	4/27/2000	9:45:23 AM	2009	169.1	11.09	5.57	988	1932.7	171.6	11.13	5.57	1007.9
Run 1405-C-1	4/27/2000	9:46:23 AM	2047	168.0	11.09	5.54	959	1935.8	171.4	11.13	5.57	1006.7
Run 1405-C-1	4/27/2000	9:47:23 AM	1997	167.5	11.12	5.52	990	1938.3	171.3	11.13	5.56	1005.4
Run 1405-C-1	4/27/2000	9:48:23 AM	2017	167.1	11.09	5.55	978	1940.4	171.1	11.13	5.56	1004.3
Run 1405-C-1	4/27/2000	9:49:23 AM	1983	165.1	11.11	5.54	945	1943.0	171.0	11.13	5.56	1002.9
Run 1405-C-1	4/27/2000	9:50:23 AM	2052	166.6	11.10	5.54	932	1945.6	170.8	11.13	5.56	1001.3
Run 1405-C-1	4/27/2000	9:51:23 AM	2109	165.5	11.06	5.55	934	1949.4	170.6	11.12	5.56	999.8
Run 1405-C-1	4/27/2000	9:52:23 AM	1974	165.1	11.12	5.53	955	1951.6	170.5	11.12	5.56	998.4
Run 1405-C-1	4/27/2000	9:53:23 AM	2016	168.6	11.12	5.51	955	1953.3	170.3	11.12	5.56	997.1
Run 1405-C-1	4/27/2000	9:54:23 AM	2048	165.6	11.10	5.52	941	1955.8	170.3	11.12	5.56	995.7
Run 1405-C-1	4/27/2000	9:55:23 AM	2067	164.1	11.09	5.50	945	1959.3	170.1	11.12	5.56	994.3
Run 1405-C-1	4/27/2000	9:56:23 AM	2075	162.6	11.10	5.51	930	1962.6	169.9	11.12	5.55	992.9

Unit 1405, Logged Data Records

Run Number	Date	Time	NO_x (ppmv)	CO (ppmv)	O_2 (% vol)	CO_2 (% vol)	THC (ppmv)	AVE NO_x (ppmv)	AVE CO (ppmv)	AVE O_2 (% vol)	AVE CO_2 (% vol)	AVE THC (ppmv)
Run 1405-C-1	4/27/2000	9:57:23 AM	2031	162.6	11.10	5.49	932	1965.6	169.7	11.12	5.55	991.5
Run 1405-C-1	4/27/2000	9:58:23 AM	2038	163.5	11.15	5.46	961	1967.4	169.5	11.12	5.55	990.2
Run 1405-C-1	4/27/2000	9:59:23 AM	2043	166.1	11.12	5.48	964	1968.7	169.4	11.12	5.55	988.9
Run 1405-C-1	4/27/2000	10:00:23 AM	2047	165.5	11.08	5.49	959	1971.1	169.3	11.12	5.55	987.6
Run 1405-C-1	4/27/2000	10:01:23 AM	2105	164.1	11.09	5.48	972	1973.7	169.2	11.12	5.55	986.4
Run 1405-C-1	4/27/2000	10:02:23 AM	2009	164.1	11.10	5.46	939	1975.5	169.1	11.12	5.54	985.0
Run 1405-C-1	4/27/2000	10:03:23 AM	2045	163.1	11.11	5.44	919	1977.7	168.9	11.12	5.54	983.8
Run 1405-C-1	4/27/2000	10:04:23 AM	2019	164.6	11.13	5.43	927	1978.5	168.8	11.12	5.54	982.6
Run 1405-C-1	4/27/2000	10:05:23 AM	2018	165.5	11.13	5.43	915	1979.5	168.8	11.12	5.54	981.3
Run 1405-C-1	4/27/2000	10:06:23 AM	2010	164.1	11.13	5.42	922	1980.6	168.7	11.12	5.54	980.0
Run 1405-C-1	4/27/2000	10:07:23 AM	2045	163.5	11.10	5.44	923	1982.2	168.6	11.12	5.53	978.8
Run 1405-C-1	4/27/2000	10:08:23 AM	2028	162.6	11.10	5.44	914	1983.5	168.4	11.12	5.53	977.5
Run 1405-C-1	4/27/2000	10:09:23 AM	2021	165.1	11.12	5.43	913	1983.9	168.4	11.12	5.53	976.3
Run 1405-C-1	4/27/2000	10:10:23 AM	2010	165.5	11.14	5.42	934	1984.1	168.3	11.12	5.53	975.1
Run 1405-C-1	4/27/2000	10:11:23 AM	2035	165.5	11.12	5.42	888	1984.8	168.2	11.12	5.53	974.0
Run 1405-C-1	4/27/2000	10:12:23 AM	1975	164.1	11.13	5.44	1018	1985.7	168.2	11.12	5.52	974.2
Run 1405-C-1	4/27/2000	10:13:23 AM	1921	166.0	11.15	5.43	1016	1984.8	168.1	11.12	5.52	975.0
Run 1405-C-1	4/27/2000	10:14:23 AM	2011	166.0	11.13	5.44	1022	1984.4	168.1	11.12	5.52	975.7
Run 1405-C-1	4/27/2000	10:15:23 AM	1973	168.6	11.15	5.42	1009	1983.7	168.0	11.12	5.52	976.4
Run 1405-C-1	4/27/2000	10:16:23 AM	1948	165.1	11.14	5.42	1010	1983.9	168.0	11.12	5.52	976.9
Run 1405-C-1	4/27/2000	10:17:23 AM	1975	166.0	11.15	5.40	995	1983.5	168.0	11.12	5.51	977.4
Run 1405-C-1	4/27/2000	10:18:23 AM	1975	167.1	11.14	5.42	987	1983.2	168.0	11.12	5.51	977.7
Run 1405-C-1	4/27/2000	10:19:23 AM	1931	169.1	11.16	5.41	1005	1982.7	168.0	11.12	5.51	978.1
Run 1405-C-1	4/27/2000	10:20:23 AM	1956	171.5	11.13	5.42	993	1981.8	168.0	11.12	5.51	978.5
END 1405-C-1	4/27/2000	10:21:23 AM	1951	171.1	11.13	5.42	966	**1981.3**	**168.1**	**11.12**	**5.51**	**978.6**

Unit 1405, Logged Data Records

Run Number	Date	Time	NO_x (ppmv)	CO (ppmv)	O_2 (% vol)	CO_2 (% vol)	THC (ppmv)	AVE NO_x (ppmv)	AVE CO (ppmv)	AVE O_2 (% vol)	AVE CO_2 (% vol)	AVE THC (ppmv)
START Run 1405-C-2	4/27/2000	10:40:01 AM	1885	168.6	11.23	5.53	1058	1885.0	168.6	11.23	5.53	1058.0
Run 1405-C-2	4/27/2000	10:41:01 AM	1872	169.1	11.26	5.51	1046	1877.8	168.6	11.24	5.51	1036.6
Run 1405-C-2	4/27/2000	10:42:01 AM	1916	169.1	11.21	5.54	1041	1891.5	168.7	11.24	5.51	1034.7
Run 1405-C-2	4/27/2000	10:43:01 AM	1905	168.6	11.23	5.53	1021	1895.8	168.6	11.23	5.52	1035.0
Run 1405-C-2	4/27/2000	10:44:01 AM	1918	169.1	11.22	5.55	1029	1899.8	168.8	11.23	5.52	1034.4
Run 1405-C-2	4/27/2000	10:45:01 AM	1935	167.5	11.19	5.55	1042	1908.5	168.6	11.22	5.53	1033.9
Run 1405-C-2	4/27/2000	10:46:01 AM	1940	167.5	11.22	5.54	1033	1910.6	168.5	11.22	5.53	1033.4
Run 1405-C-2	4/27/2000	10:47:01 AM	1887	167.5	11.24	5.53	1027	1909.6	168.3	11.22	5.53	1033.7
Run 1405-C-2	4/27/2000	10:48:01 AM	1915	168.6	11.23	5.55	1016	1909.3	168.3	11.22	5.53	1032.7
Run 1405-C-2	4/27/2000	10:49:01 AM	1871	171.5	11.24	5.53	1019	1907.1	168.5	11.22	5.53	1031.7
Run 1405-C-2	4/27/2000	10:50:01 AM	1877	169.5	11.26	5.54	1009	1905.4	168.6	11.22	5.53	1030.4
Run 1405-C-2	4/27/2000	10:51:01 AM	1875	170.5	11.26	5.54	1037	1902.3	168.8	11.23	5.53	1029.5
Run 1405-C-2	4/27/2000	10:52:01 AM	1905	171.1	11.23	5.56	1027	1900.7	169.0	11.23	5.53	1028.2
Run 1405-C-2	4/27/2000	10:53:00 AM	1959	167.5	11.17	5.59	1008	1903.9	169.0	11.23	5.54	1027.0
Run 1405-C-2	4/27/2000	10:54:01 AM	1912	167.1	11.22	5.57	1013	1906.7	168.9	11.22	5.54	1025.9
Run 1405-C-2	4/27/2000	10:55:01 AM	1904	169.1	11.24	5.55	1016	1905.5	168.8	11.22	5.54	1025.1
Run 1405-C-2	4/27/2000	10:56:01 AM	1912	168.6	11.22	5.58	998	1906.3	168.8	11.22	5.54	1023.7
Run 1405-C-2	4/27/2000	10:57:01 AM	1935	169.1	11.22	5.59	995	1906.7	168.8	11.22	5.55	1022.3
Run 1405-C-2	4/27/2000	10:58:01 AM	1947	167.1	11.21	5.59	1020	1908.2	168.8	11.22	5.55	1020.9
Run 1405-C-2	4/27/2000	10:59:01 AM	1959	168.6	11.21	5.57	977	1909.0	168.8	11.22	5.55	1019.8
Run 1405-C-2	4/27/2000	11:00:01 AM	1986	169.1	11.20	5.58	985	1911.5	168.8	11.22	5.55	1019.0
Run 1405-C-2	4/27/2000	11:01:01 AM	1948	167.0	11.21	5.59	994	1914.4	168.7	11.22	5.55	1018.0
Run 1405-C-2	4/27/2000	11:02:03 AM	1944	168.6	11.22	5.59	993	1916.3	168.7	11.22	5.56	1017.2
Run 1405-C-2	4/27/2000	11:03:03 AM	2053	169.1	11.13	5.64	966	1919.6	168.7	11.22	5.56	1016.0
Run 1405-C-2	4/27/2000	11:04:03 AM	1930	166.0	11.24	5.58	985	1922.8	168.6	11.22	5.56	1014.8
Run 1405-C-2	4/27/2000	11:05:03 AM	1968	168.0	11.22	5.59	986	1925.0	168.5	11.22	5.56	1013.7
Run 1405-C-2	4/27/2000	11:06:03 AM	2000	168.0	11.17	5.62	978	1926.6	168.5	11.22	5.56	1012.4
Run 1405-C-2	4/27/2000	11:07:03 AM	1932	169.1	11.21	5.61	980	1927.5	168.4	11.22	5.56	1011.8
Run 1405-C-2	4/27/2000	11:08:03 AM	1990	167.5	11.19	5.61	1018	1928.9	168.5	11.21	5.57	1011.3
Run 1405-C-2	4/27/2000	11:09:03 AM	1982	169.5	11.22	5.59	996	1929.8	168.4	11.21	5.57	1010.7
Run 1405-C-2	4/27/2000	11:10:03 AM	2018	168.6	11.16	5.62	1003	1931.8	168.5	11.21	5.57	1010.1
Run 1405-C-2	4/27/2000	11:11:03 AM	1996	165.5	11.18	5.61	998	1933.8	168.4	11.21	5.57	1009.4
Run 1405-C-2	4/27/2000	11:12:03 AM	1998	164.6	11.20	5.60	979	1936.3	168.3	11.21	5.57	1008.7
Run 1405-C-2	4/27/2000	11:13:03 AM	1939	165.5	11.23	5.58	966	1937.2	168.2	11.21	5.57	1007.9
Run 1405-C-2	4/27/2000	11:14:03 AM	1975	168.6	11.21	5.61	996	1937.2	168.2	11.21	5.57	1007.3
Run 1405-C-2	4/27/2000	11:15:03 AM	1869	167.1	11.24	5.58	1001	1937.4	168.2	11.21	5.57	1006.9

Unit 1405, Logged Data Records

Run Number	Date	Time	NO_X (ppmv)	CO (ppmv)	O_2 (% vol)	CO_2 (% vol)	THC (ppmv)	AVE NO_X (ppmv)	AVE CO (ppmv)	AVE O_2 (% vol)	AVE CO_2 (% vol)	AVE THC (ppmv)
Run 1405-C-2	4/27/2000	11:16:03 AM	1858	171.1	11.25	5.59	990	1934.9	168.2	11.21	5.57	1006.4
Run 1405-C-2	4/27/2000	11:17:03 AM	1814	171.5	11.28	5.56	994	1931.8	168.3	11.22	5.57	1005.9
Run 1405-C-2	4/27/2000	11:18:03 AM	1884	172.0	11.24	5.58	980	1928.9	168.4	11.22	5.57	1005.3
Run 1405-C-2	4/27/2000	11:19:03 AM	1786	171.1	11.28	5.55	970	1926.6	168.5	11.22	5.57	1004.6
Run 1405-C-2	4/27/2000	11:20:03 AM	1680	174.0	11.38	5.48	999	1922.3	168.6	11.22	5.57	1004.3
Run 1405-C-2	4/27/2000	11:21:03 AM	1720	178.0	11.33	5.51	975	1916.9	168.8	11.22	5.57	1003.9
Run 1405-C-2	4/27/2000	11:22:03 AM	1723	176.6	11.33	5.51	993	1912.2	169.0	11.23	5.57	1003.6
Run 1405-C-2	4/27/2000	11:23:03 AM	1690	180.0	11.34	5.50	989	1907.3	169.2	11.23	5.57	1003.3
Run 1405-C-2	4/27/2000	11:24:03 AM	1662	179.0	11.37	5.47	994	1902.2	169.4	11.23	5.56	1003.0
Run 1405-C-2	4/27/2000	11:25:03 AM	1735	180.0	11.33	5.49	997	1897.1	169.7	11.23	5.56	1003.4
Run 1405-C-2	4/27/2000	11:26:03 AM	1725	178.0	11.32	5.49	1003	1893.6	169.9	11.24	5.56	1003.6
Run 1405-C-2	4/27/2000	11:27:03 AM	1620	179.5	11.40	5.44	1026	1889.0	170.0	11.24	5.56	1004.1
Run 1405-C-2	4/27/2000	11:28:03 AM	1660	182.2	11.38	5.46	991	1883.8	170.3	11.24	5.56	1004.4
Run 1405-C-2	4/27/2000	11:29:03 AM	1651	182.1	11.39	5.44	1023	1878.8	170.5	11.24	5.55	1004.6
Run 1405-C-2	4/27/2000	11:30:03 AM	1620	181.2	11.38	5.45	1004	1874.1	170.8	11.25	5.55	1004.8
Run 1405-C-2	4/27/2000	11:31:03 AM	1674	181.6	11.36	5.46	1008	1869.9	171.0	11.25	5.55	1004.9
Run 1405-C-2	4/27/2000	11:32:03 AM	1679	181.6	11.36	5.47	1018	1865.9	171.2	11.25	5.55	1005.0
Run 1405-C-2	4/27/2000	11:33:03 AM	1630	179.5	11.37	5.47	1025	1862.2	171.4	11.25	5.55	1005.1
Run 1405-C-2	4/27/2000	11:34:03 AM	1647	180.7	11.38	5.47	985	1858.4	171.6	11.26	5.55	1005.1
Run 1405-C-2	4/27/2000	11:35:03 AM	1670	180.0	11.37	5.50	1009	1854.6	171.7	11.26	5.54	1005.1
Run 1405-C-2	4/27/2000	11:36:03 AM	1693	179.5	11.36	5.53	983	1851.5	171.8	11.26	5.54	1005.1
Run 1405-C-2	4/27/2000	11:37:03 AM	1654	178.6	11.35	5.54	1038	1848.4	172.0	11.26	5.54	1005.1
Run 1405-C-2	4/27/2000	11:38:03 AM	1694	178.5	11.35	5.55	1001	1845.3	172.1	11.26	5.54	1005.1
END Run 1405-C-2	4/27/2000	11:39:03 AM	1688	177.1	11.35	5.57	998	**1843.1**	**172.2**	**11.26**	**5.54**	**1004.8**

Unit 1405, Logged Data Records

Run Number	Date	Time	NO_x (ppmv)	CO (ppmv)	O_2 (% vol)	CO_2 (% vol)	THC (ppmv)	AVE NO_x (ppmv)	AVE CO (ppmv)	AVE O_2 (% vol)	AVE CO_2 (% vol)	AVE THC (ppmv)
START Run 1405-C-3	4/27/2000	11:57:02 AM	1810	171.0	11.38	5.61	1048	1810.0	171.0	11.38	5.61	1048.0
Run 1405-C-3	4/27/2000	11:58:02 AM	1872	163.1	11.32	5.65	1031	1863.4	166.8	11.33	5.64	1030.3
Run 1405-C-3	4/27/2000	11:59:02 AM	1850	162.1	11.37	5.60	1035	1872.3	164.6	11.32	5.64	1048.3
Run 1405-C-3	4/27/2000	12:00:02 PM	1904	163.5	11.34	5.61	1066	1864.1	164.1	11.34	5.63	1053.2
Run 1405-C-3	4/27/2000	12:01:02 PM	1925	161.6	11.30	5.62	1048	1874.6	163.8	11.33	5.63	1057.6
Run 1405-C-3	4/27/2000	12:02:02 PM	1876	159.1	11.34	5.59	1061	1882.3	163.1	11.33	5.62	1061.2
Run 1405-C-3	4/27/2000	12:03:02 PM	1870	164.0	11.34	5.58	1116	1873.7	162.7	11.34	5.61	1065.3
Run 1405-C-3	4/27/2000	12:04:02 PM	1919	160.6	11.27	5.60	1098	1879.4	162.7	11.33	5.61	1067.5
Run 1405-C-3	4/27/2000	12:05:02 PM	1845	162.6	11.36	5.53	1090	1878.2	162.4	11.33	5.60	1071.5
Run 1405-C-3	4/27/2000	12:06:02 PM	1862	165.5	11.34	5.55	1097	1875.0	162.7	11.33	5.60	1075.1
Run 1405-C-3	4/27/2000	12:07:02 PM	1792	164.6	11.38	5.52	1081	1870.3	162.9	11.33	5.59	1076.8
Run 1405-C-3	4/27/2000	12:08:02 PM	1898	164.6	11.30	5.56	1077	1868.9	163.1	11.33	5.59	1077.7
Run 1405-C-3	4/27/2000	12:09:02 PM	1872	164.0	11.32	5.53	1107	1868.4	163.2	11.33	5.58	1079.5
Run 1405-C-3	4/27/2000	12:10:02 PM	1846	162.1	11.35	5.52	1127	1867.7	163.1	11.33	5.58	1082.1
Run 1405-C-3	4/27/2000	12:11:02 PM	1873	163.1	11.32	5.53	1124	1866.4	163.1	11.33	5.58	1084.7
Run 1405-C-3	4/27/2000	12:12:02 PM	1856	164.0	11.33	5.52	1116	1866.6	163.1	11.33	5.57	1086.9
Run 1405-C-3	4/27/2000	12:13:02 PM	1873	163.5	11.33	5.51	1129	1864.6	163.1	11.33	5.57	1088.3
Run 1405-C-3	4/27/2000	12:14:02 PM	1849	162.0	11.33	5.51	1109	1865.0	163.1	11.33	5.56	1088.9
Run 1405-C-3	4/27/2000	12:15:02 PM	1896	162.6	11.30	5.52	1115	1866.0	163.1	11.33	5.56	1089.8
Run 1405-C-3	4/27/2000	12:16:02 PM	1874	160.6	11.31	5.52	1116	1866.6	163.0	11.33	5.56	1090.2
Run 1405-C-3	4/27/2000	12:17:02 PM	1871	163.1	11.32	5.51	1078	1866.5	162.9	11.33	5.56	1090.9
Run 1405-C-3	4/27/2000	12:18:02 PM	1936	160.6	11.25	5.55	1151	1868.9	162.9	11.33	5.56	1091.9
Run 1405-C-3	4/27/2000	12:19:02 PM	1896	159.1	11.29	5.54	1117	1872.2	162.7	11.32	5.56	1093.2
Run 1405-C-3	4/27/2000	12:20:02 PM	1801	162.1	11.39	5.49	1155	1870.9	162.6	11.32	5.55	1095.0
Run 1405-C-3	4/27/2000	12:21:02 PM	1844	164.6	11.33	5.52	1148	1868.6	162.7	11.32	5.55	1096.7
Run 1405-C-3	4/27/2000	12:22:02 PM	1933	161.6	11.24	5.60	1120	1869.3	162.7	11.32	5.55	1098.2
Run 1405-C-3	4/27/2000	12:23:02 PM	1881	159.1	11.27	5.58	1126	1871.7	162.6	11.32	5.55	1099.5
Run 1405-C-3	4/27/2000	12:24:02 PM	1841	161.1	11.32	5.56	1083	1871.4	162.5	11.32	5.55	1100.6
Run 1405-C-3	4/27/2000	12:25:02 PM	1884	161.6	11.30	5.59	1120	1871.0	162.4	11.32	5.56	1100.5
Run 1405-C-3	4/27/2000	12:26:02 PM	1870	161.6	11.30	5.58	1104	1871.3	162.4	11.32	5.56	1100.1
Run 1405-C-3	4/27/2000	12:27:02 PM	1903	160.6	11.26	5.60	1115	1872.0	162.4	11.32	5.56	1100.0
Run 1405-C-3	4/27/2000	12:28:02 PM	1898	161.1	11.26	5.61	1065	1872.6	162.3	11.31	5.56	1100.0
Run 1405-C-3	4/27/2000	12:29:02 PM	1909	157.6	11.24	5.62	1131	1874.2	162.2	11.31	5.56	1100.0
Run 1405-C-3	4/27/2000	12:30:02 PM	1875	161.1	11.30	5.58	1116	1874.5	162.1	11.31	5.56	1100.1
Run 1405-C-3	4/27/2000	12:31:02 PM	1861	160.0	11.29	5.58	1131	1874.5	162.1	11.31	5.56	1100.0
Run 1405-C-3	4/27/2000	12:32:02 PM	1868	161.1	11.29	5.58	1101	1874.0	162.0	11.31	5.56	1100.3

Unit 1405, Logged Data Records

Run Number	Date	Time	NO_X (ppmv)	CO (ppmv)	O_2 (% vol)	CO_2 (% vol)	THC (ppmv)	AVE NO_X (ppmv)	AVE CO (ppmv)	AVE O_2 (% vol)	AVE CO_2 (% vol)	AVE THC (ppmv)
Run 1405-C-3	4/27/2000	12:33:02 PM	1888	159.5	11.27	5.60	1102	1874.5	162.0	11.31	5.56	1100.7
Run 1405-C-3	4/27/2000	12:34:02 PM	1909	161.6	11.24	5.60	1091	1875.0	161.9	11.31	5.56	1100.5
Run 1405-C-3	4/27/2000	12:35:02 PM	1918	161.6	11.25	5.59	1122	1875.5	161.9	11.31	5.57	1100.7
Run 1405-C-3	4/27/2000	12:36:02 PM	1900	159.5	11.26	5.59	1093	1876.7	161.9	11.30	5.57	1100.7
Run 1405-C-3	4/27/2000	12:37:02 PM	1894	162.1	11.28	5.57	1122	1876.5	161.8	11.30	5.57	1101.1
Run 1405-C-3	4/27/2000	12:38:02 PM	1862	161.1	11.29	5.55	1129	1876.4	161.8	11.30	5.57	1100.9
Run 1405-C-3	4/27/2000	12:39:02 PM	1928	160.6	11.23	5.58	1104	1877.0	161.8	11.30	5.57	1101.1
Run 1405-C-3	4/27/2000	12:40:02 PM	1906	159.5	11.25	5.57	1144	1877.8	161.8	11.30	5.57	1101.1
Run 1405-C-3	4/27/2000	12:41:02 PM	1950	158.6	11.22	5.57	1128	1879.1	161.7	11.30	5.57	1101.1
Run 1405-C-3	4/27/2000	12:42:02 PM	1997	156.0	11.19	5.56	1128	1881.2	161.6	11.30	5.57	1101.4
Run 1405-C-3	4/27/2000	12:43:02 PM	1889	157.1	11.28	5.52	1099	1882.7	161.5	11.30	5.57	1101.7
Run 1405-C-3	4/27/2000	12:44:02 PM	1915	160.1	11.27	5.50	1140	1883.1	161.4	11.29	5.56	1102.0
Run 1405-C-3	4/27/2000	12:45:02 PM	1843	160.1	11.30	5.48	1135	1883.1	161.4	11.29	5.56	1102.7
Run 1405-C-3	4/27/2000	12:46:02 PM	1895	159.6	11.23	5.51	1139	1883.7	161.4	11.29	5.56	1103.3
Run 1405-C-3	4/27/2000	12:47:02 PM	2008	158.1	11.17	5.52	1135	1884.5	161.3	11.29	5.56	1103.9
Run 1405-C-3	4/27/2000	12:48:02 PM	1940	155.6	11.22	5.48	1125	1886.3	161.2	11.29	5.56	1104.5
Run 1405-C-3	4/27/2000	12:49:02 PM	1954	158.1	11.23	5.47	1162	1887.1	161.1	11.29	5.56	1105.2
Run 1405-C-3	4/27/2000	12:50:02 PM	1885	159.5	11.27	5.43	1132	1887.6	161.1	11.29	5.56	1105.8
Run 1405-C-3	4/27/2000	12:51:02 PM	1900	160.6	11.24	5.43	1143	1887.5	161.1	11.29	5.55	1106.6
Run 1405-C-3	4/27/2000	12:52:02 PM	1921	159.6	11.23	5.43	1165	1887.6	161.1	11.29	5.55	1107.2
Run 1405-C-3	4/27/2000	12:53:02 PM	1922	158.6	11.20	5.44	1137	1888.0	161.0	11.29	5.55	1107.9
Run 1405-C-3	4/27/2000	12:54:02 PM	1899	158.6	11.24	5.40	1168	1888.0	161.0	11.28	5.55	1108.6
Run 1405-C-3	4/27/2000	12:55:02 PM	1873	160.6	11.25	5.40	1155	1887.9	160.9	11.28	5.54	1109.4
Run 1405-C-3	4/27/2000	12:56:02 PM	1870	158.1	11.24	5.40	1101	1888.0	160.9	11.28	5.54	1109.8
END Run 1405-C-3	4/27/2000	12:57:02 PM	1879	161.6	11.23	5.40	1104	**1887.7**	**160.9**	**11.28**	**5.54**	**1109.6**

Test Report Summary of Modified Engine 1504

Table 5: Unit 1504 Post-Modification

Florida Gas Transmission
Compressor Station No. 15
6 miles N of Perry, FL on C-361
Worthington SEHG-8 Compressor Engine **2030 bhp @ 345 rpm**
Technicians: LJB, RPO

Test Run No.	1504-CM-1	1504-CM-2	1504-CM-3	
Date	4/28/00	4/28/00	4/28/00	
Start Time	13:15	14:34	15:52	
Stop Time	14:15	15:34	16:52	
Engine/Compressor Operation				**Averages**
Engine Load (bhp, measured at the compressor)	2036	2017	2003	**2019**
Fuel Horsepower (bhp, based upon fuel torque)	2080	2064	2051	**2065**
Engine Speed (rpm)	344	345	345	**345**
Torque (%, full load = 2030 bhp at 345 rpm)	102.7	101.7	101.1	**101.8**
Ignition Timing (°BTDC)	17.0	17.0	17.0	**17.0**
Air Manifold Pressure ("Hg)	10.6	10.7	10.7	**10.7**
Air Manifold Temperature (°F)	99	99	99	**99**
Fuel Manifold Pressure (psig)	32.1	32.1	32.2	**32.1**
Station Suction Pressure (psig)	701	695	694	**697**
Station Suction Temperature (°F)	66.0	66.0	66.0	**66**
Station Discharge Pressure (psig)	947	937	936	**940**
Station Discharge Temperature (°F)	112.7	112.0	112.0	**112.2**
Compressor Flow Rate (MMSCFD)	102	102	102	**102.3**
Loading Step Number	0	0	0	**-**
Engine Fuel Data (Natural Gas)				
Fuel Heating Value (Btu/SCF, HHV)	1037.0	1037.0	1037.0	**1037.0**
Fuel Specific Gravity	0.5851	0.5851	0.5851	**0.5851**
O_2 "F-factor" (DSCFex/MMBtu @ 0% excess air)	8639	8639	8639	**8639**
CO_2 "F-factor" (DSCFex/MMBtu @ 0% excess air)	1027	1027	1027	**1027**
Fuel Flow (SCFH)	15,216	15,133	15,061	**15,137**
Heat Input (MMBtu/hr)	15.78	15.69	15.62	**15.70**
Brake-specific Fuel Consumption (Btu/bhp-hr)	7,750	7,780	7,797	**7776**
Ambient Conditions				
Atmospheric Pressure ("Hg)	29.82	29.76	29.75	**29.78**
Temperature (°F) : Dry bulb	73.1	82.3	82.3	**79.2**
(°F): Wet bulb	67.0	70.0	72.0	**69.7**
Humidity (lbs moisture/lb air)	0.0125	0.0126	0.0142	**0.0131**
Measured Emissions				
NO_x (ppmv, dry basis)	481.7	446.9	453.9	**460.8**
CO (ppmv, dry basis)	282.4	281.3	278.6	**280.8**
THC (ppmv, wet basis)	1209.5	1146.5	1222.8	**1192.9**
Fuel VOC Fraction (% non-methane/non-ethane)	2.44	2.44	2.44	**2.44**
VOC (ppmv, wet basis)	29.5	28.0	29.8	**29.1**
O_2 (% volume, dry basis)	12.12	12.17	12.19	**12.16**
CO_2 (% volume, dry basis)	5.03	5.00	4.90	**4.98**
F_o (fuel factor, range = 1.600-1.836 for NG)	1.75	1.75	1.78	**1.76**
Stack Volumetric Flow Rates				
via Pitot Tube (SCFH, dry basis)	3.36E+05	3.35E+05	3.36E+05	**3.36E+05**
via O_2 "F_d-factor" (SCFH, dry basis)	3.24E+05	3.25E+05	3.24E+05	**3.24E+05**
via CO_2 "F_c-factor" (SCFH, dry basis)	3.22E+05	3.22E+05	3.27E+05	**3.24E+05**
Calculated Emission Rates (via pitot tube)				
NO_x (lbs/hr)	19.3	17.9	18.2	**18.5**
CO (lbs/hr)	6.90	6.85	6.80	**6.85**
VOC (lbs/hr, based on THC emissions and fuel VOC)	0.459	0.435	0.466	**0.453**
NO_x (tons/yr)	84.7	78.3	79.7	**80.9**
CO (tons/yr)	30.2	30.0	29.8	**30.0**
VOC (tons/yr)	2.01	1.91	2.04	**1.99**
NO_x (g/bhp-hr)	4.22	3.93	4.03	**4.06**
CO (g/bhp-hr)	1.51	1.51	1.50	**1.51**
CO (g/bhp-hr)	0.10	0.10	0.10	**0.10**