



Farzie Shelton, chE; REM

Manager of Environmental Affairs

July 27, 2004

RECEIVED

AUG 02 2004

Ms. Trina L. Vielhauer  
Chief, Bureau of Air Regulation  
Department of Environmental Protection  
Twin Towers Office Building  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

BUREAU OF AIR REGULATION

Re: Title V Permit No.: Permit No. 1050003-011-AV  
Charles Larsen Memorial Power Plan  
Revision of Unit No. 8 Combined Cycle PSD-FL-166(D) Operating Permit

Dear Ms. Vielhauer:

In compliance with the above referenced air construction permit, we are submitting an application for modification of the Larsen power Plant Title V permit to make the necessary changes to the Unit No. 8 existing Title V Permit to enable Lakeland the operation of the Combined Cycle at peak load. The application includes the results of BACT tests.

Therefore, as required by the permit, we are enclosing four copies of this document signed and certified by a P.E and our Responsible Official respectively and will forward a copy of this application to the Department's Southwest District. As always, we appreciate all the help you have offered us in our permitting endeavors and look forward to hear from you soon.

However, if you should have any questions, please do not hesitate to contact me.

Sincerely,

Farzie Shelton

Enclosure

Cc: Mr. Gerald Kissel P.E.  
Administrator  
Department of Environmental Protection  
3804 Coconut Palm Drive  
Tampa Fl 33619

City of Lakeland • Department of Electric

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**AUG 02 2004**

**BUREAU OF AIR REGULATION**

**APPLICATION FOR TITLE V REVISION  
UNIT 8 PEAK OPERATION AND MINOR UPGRADES  
CHARLES LARSEN MEMORIAL POWER PLANT  
LAKELAND ELECTRIC  
POLK COUNTY, FLORIDA**

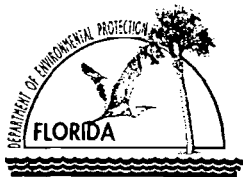
**Prepared For:  
Lakeland Electric  
City of Lakeland  
501 East Lemon Street  
Lakeland, Florida 33801**

**Prepared By:  
Golder Associates Inc.  
6241 NW 23rd Street, Suite 500  
Gainesville, Florida 32653-1500**

**July 2004  
0237637**

**DISTRIBUTION:**

**4 Copies – Florida Department of Environmental Protection  
2 Copies - Lakeland Electric – Environmental Affairs  
2 Copies - Golder Associates Inc.**



# Department of Environmental Protection

## Division of Air Resource Management

### APPLICATION FOR AIR PERMIT - LONG FORM

#### I. APPLICATION INFORMATION

**Air Construction Permit** – Use this form to apply for an air construction permit for a proposed project:

- subject to prevention of significant deterioration (PSD) review, nonattainment area (NAA) new source review, or maximum achievable control technology (MACT) review; or
- where the applicant proposes to assume a restriction on the potential emissions of one or more pollutants to escape a federal program requirement such as PSD review, NAA new source review, Title V, or MACT; or
- at an existing federally enforceable state air operation permit (FESOP) or Title V permitted facility.

**Air Operation Permit** – Use this form to apply for:

- an initial federally enforceable state air operation permit (FESOP); or
- an initial/revised/renewal Title V air operation permit.

**Air Construction Permit & Revised/Renewal Title V Air Operation Permit (Concurrent Processing Option)**

– Use this form to apply for both an air construction permit and a revised or renewal Title V air operation permit incorporating the proposed project.

To ensure accuracy, please see form instructions.

#### Identification of Facility

1. Facility Owner/Company Name: <b>Lakeland Electric</b>	
2. Site Name: <b>Charles Larsen Memorial Power Plant</b>	
3. Facility Identification Number: <b>1050003</b>	
4. Facility Location...: Street Address or Other Locator: <b>2202 East Highway 92</b> City: <b>Lakeland</b> County: <b>Polk</b> Zip Code: <b>33801</b>	
5. Relocatable Facility? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6. Existing Title V Permitted Facility? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

#### Application Contact

1. Application Contact Name: <b>Ms. Farzie Shelton, Manager of Environmental Affairs</b>	
2. Application Contact Mailing Address... Organization/Firm: <b>Lakeland Electric</b> Street Address: <b>501 East Lemon Street</b> City: <b>Lakeland</b> State: <b>FL</b> Zip Code: <b>33801-5079</b>	
3. Application Contact Telephone Numbers... Telephone: <b>(863) 834-6603</b> ext. Fax: <b>(863) 834-8187</b>	
4. Application Contact Email Address: <b>Farzie.Shelton@lakelandelectric.com</b>	

#### Application Processing Information (DEP Use)

1. Date of Receipt of Application:	
2. Project Number(s):	
3. PSD Number (if applicable):	
4. Siting Number (if applicable):	

## APPLICATION INFORMATION

### Purpose of Application

**This application for air permit is submitted to obtain: (Check one)**

#### **Air Construction Permit**

☐ Air construction permit.

#### **Air Operation Permit**

☐ Initial Title V air operation permit.

☒ Title V air operation permit revision.

☐ Title V air operation permit renewal.

☐ Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is required.

☐ Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is not required.

#### **Air Construction Permit and Revised/Renewal Title V Air Operation Permit (Concurrent Processing)**

☐ Air construction permit and Title V permit revision, incorporating the proposed project.

☐ Air construction permit and Title V permit renewal, incorporating the proposed project.

**Note: By checking one of the above two boxes, you, the applicant, are requesting concurrent processing pursuant to Rule 62-213.405, F.A.C. In such case, you must also check the following box:**

☐ I hereby request that the department waive the processing time requirements of the air construction permit to accommodate the processing time frames of the Title V air operation permit.

### Application Comment

**This application is to incorporate into the Title V permit for the Charles Larsen Memorial Power Plant (No. 1050003-011-AV) peak operation and minor upgrades for Unit 8 (EU008).**

## APPLICATION INFORMATION

### Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Proc. Fee
008	Combined Cycle Combustion Turbine	AF2A	NA

### Application Processing Fee

Check one: ☐ Attached - Amount: \$ \_\_\_\_\_ ☒ Not Applicable

## APPLICATION INFORMATION

### Owner/Authorized Representative Statement

**Complete if applying for an air construction permit or an initial FESOP.**

1. Owner/Authorized Representative Name :
2. Owner/Authorized Representative Mailing Address... Organization/Firm: Street Address: City: State: Zip Code:
3. Owner/Authorized Representative Telephone Numbers... Telephone: ( ) - ext. Fax: ( ) -
4. Owner/Authorized Representative Email Address:
5. Owner/Authorized Representative Statement:  <i>I, the undersigned, am the owner or authorized representative of the facility addressed in this air permit application. 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 and all other requirements identified in this application to which the facility is subject. 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 the facility or any permitted emissions unit.</i>  _____ Signature  _____ Date

## APPLICATION INFORMATION

### Application Responsible Official Certification

Complete if applying for an initial/revised/renewal Title V permit or concurrent processing of an air construction permit and a revised/renewal Title V permit. If there are multiple responsible officials, the "application responsible official" need not be the "primary responsible official."

1. Application Responsible Official Name: <b>Timothy Bates, Director of Energy Supply</b>
2. Application Responsible Official Qualification (Check one or more of the following options, as applicable): <input type="checkbox"/> For a corporation, the president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit under Chapter 62-213, F.A.C. <input type="checkbox"/> For a partnership or sole proprietorship, a general partner or the proprietor, respectively. <input type="checkbox"/> For a municipality, county, state, federal, or other public agency, either a principal executive officer or ranking elected official. <input checked="" type="checkbox"/> The designated representative at an Acid Rain source.
3. Application Responsible Official Mailing Address... Organization/Firm: <b>Lakeland Electric</b> Street Address: <b>501 East Lemon Street</b> City: <b>Lakeland</b> State: <b>FL</b> Zip Code: <b>33801-5079</b>
4. Application Responsible Official Telephone Numbers... Telephone: <b>(863) 834-6559</b> ext.      Fax: <b>(863) 834-6362</b>
5. Application Responsible Official Email Address:
6. Application Responsible Official Certification: <i>I, the undersigned, am a responsible official of the Title V source addressed in this air permit application. 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 and all other applicable requirements identified in this application to which the Title V source is subject. 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 the facility or any permitted emissions unit. Finally, I certify that the facility and each emissions unit are in compliance with all applicable requirements to which they are subject, except as identified in compliance plan(s) submitted with this application.</i>  <div style="display: flex; justify-content: space-between;"><div>Signature <u>Timothy Bates</u></div><div>Date <u>7/26/04</u></div></div>



## APPLICATION INFORMATION

### Professional Engineer Certification

1. Professional Engineer Name: **Kennard F. Kosky**

Registration Number: **14996**

2. Professional Engineer Mailing Address...

Organization/Firm: **Golder Associates Inc.\*\***

Street Address: **6241 NW 23<sup>rd</sup> Street, Suite 500**

City: **Gainesville**

State: **FL**

Zip Code: **32653**

3. Professional Engineer Telephone Numbers...

Telephone: **(352) 336-5600**

ext. **516**

Fax: **(352) 336-6603**

4. Professional Engineer Email Address: **kkosky@golder.com**

5. 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.*

*(3) If the purpose of this application is to obtain a Title V 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 plan and schedule is submitted with this application.*

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

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

*Kennard F. Kosky*  
Signature

*7/16/04*  
Date

(seal): **14996**

\* Attach any exception to certification statement.

\*\* Board of Professional Engineers Certificate of Authorization #00001670

## II. FACILITY INFORMATION

### A. GENERAL FACILITY INFORMATION

#### Facility Location and Type

1. Facility UTM Coordinates... Zone 17      East (km)    408.9 North (km)   3102.5		2. Facility Latitude/Longitude... Latitude (DD/MM/SS)    28 / 2 / 56 Longitude (DD/MM/SS)   81 / 55 / 25	
3. Governmental Facility Code: 4	4. Facility Status Code: A	5. Facility Major Group SIC Code: 49	6. Facility SIC(s): 4911
7. Facility Comment : The Larsen Power Plant consists of 2 fossil fuel fire-steam generators (FFFSG), 2 peaking gas turbines, and 1 combined cycle combustion turbine. FFFSG Units 6 and 7 are fired with No. 6 fuel oil and natural gas (distillate oil is used as an ignitor). Peaking Units 2 and 3 are fired with natural gas or No. 2 fuel oil having a maximum sulfur content of 0.5 percent by weight. Combined Cycle Unit 8 fires natural gas as the primary fuel with No. 2 fuel oil with a maximum sulfur content of 0.20 percent by weight as a limited auxiliary fuel.			

#### Facility Contact

1. Facility Contact Name: Ms. Farzie Shelton, Manager of Environmental Affairs
2. Facility Contact Mailing Address... Organization/Firm: Lakeland Electric Street Address: 501 East Lemon Street City: Lakeland      State: FL      Zip Code: 33801-5079
3. Facility Contact Telephone Numbers: Telephone: (863) 834-6603      ext.      Fax: (863) 834-8187
4. Facility Contact Email Address: Farzie.Shelton@lakelandelectric.com

#### Facility Primary Responsible Official

Complete if an "application responsible official" is identified in Section I. that is not the facility "primary responsible official."

1. Facility Primary Responsible Official Name:
2. Facility Primary Responsible Official Mailing Address... Organization/Firm: Street Address: City:      State:      Zip Code:
3. Facility Primary Responsible Official Telephone Numbers... Telephone: (   ) -      ext.      Fax: (   ) -
4. Facility Primary Responsible Official Email Address:

## FACILITY INFORMATION

### Facility Regulatory Classifications

Check all that would apply *following* completion of all projects and implementation of all other changes proposed in this application for air permit. Refer to instructions to distinguish between a "major source" and a "synthetic minor source."

1. <input type="checkbox"/> Small Business Stationary Source	<input type="checkbox"/> Unknown
2. <input type="checkbox"/> Synthetic Non-Title V Source	
3. <input checked="" type="checkbox"/> Title V Source	
4. <input checked="" type="checkbox"/> Major Source of Air Pollutants, Other than Hazardous Air Pollutants (HAPs)	
5. <input type="checkbox"/> Synthetic Minor Source of Air Pollutants, Other than HAPs	
6. <input type="checkbox"/> Major Source of Hazardous Air Pollutants (HAPs)	
7. <input type="checkbox"/> Synthetic Minor Source of HAPs	
8. <input checked="" type="checkbox"/> One or More Emissions Units Subject to NSPS (40 CFR Part 60)	
9. <input type="checkbox"/> One or More Emissions Units Subject to Emission Guidelines (40 CFR Part 60)	
10. <input type="checkbox"/> One or More Emissions Units Subject to NESHAP (40 CFR Part 61 or Part 63)	
11. <input type="checkbox"/> Title V Source Solely by EPA Designation (40 CFR 70.3(a)(5))	
12. Facility Regulatory Classifications Comment: <b>Unit 8 is subject to the NSPS of 40 CFR Part 60, Subpart GG.</b>	

## FACILITY INFORMATION

### List of Pollutants Emitted by Facility

1. Pollutant Emitted	2. Pollutant Classification	3. Emissions Cap [Y or N]?
Particulate Matter – Total (PM)	A	N
Sulfur Dioxide (SO <sub>2</sub> )	A	N
Nitrogen Oxides (NO <sub>x</sub> )	A	N
Carbon Monoxide (CO)	A	N
Particulate Matter (PM <sub>10</sub> )	A	N

## FACILITY INFORMATION

### B. EMISSIONS CAPS

#### Facility-Wide or Multi-Unit Emissions Caps

1. Pollutant Subject to Emissions Cap	2. Facility Wide Cap [Y or N]? (all units)	3. Emissions Unit ID No.s Under Cap (if not all units)	4. Hourly Cap (lb/hr)	5. Annual Cap (ton/yr)	6. Basis for Emissions Cap

7. Facility-Wide or Multi-Unit Emissions Cap Comment:

## FACILITY INFORMATION

### C. FACILITY ADDITIONAL INFORMATION

#### Additional Requirements for All Applications, Except as Otherwise Stated

1. Facility Plot Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Previously Submitted, Date: <b>June 2002</b>
2. Process Flow Diagram(s): (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Previously Submitted, Date: <b>June 2002</b>
3. Precautions to Prevent Emissions of Unconfined Particulate Matter: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Previously Submitted, Date: <b>June 2002</b>

#### Additional Requirements for Air Construction Permit Applications

1. Area Map Showing Facility Location: <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable (existing permitted facility)
2. Description of Proposed Construction or Modification: <input type="checkbox"/> Attached, Document ID: _____
3. Rule Applicability Analysis: <input type="checkbox"/> Attached, Document ID: _____
4. List of Exempt Emissions Units (Rule 62-210.300(3)(a) or (b)1., F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable (no exempt units at facility)
5. Fugitive Emissions Identification (Rule 62-212.400(2), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
6. Preconstruction Air Quality Monitoring and Analysis (Rule 62-212.400(5)(f), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
7. Ambient Impact Analysis (Rule 62-212.400(5)(d), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
8. Air Quality Impact since 1977 (Rule 62-212.400(5)(h)5., F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
9. Additional Impact Analyses (Rules 62-212.400(5)(e)1. and 62-212.500(4)(e), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
10. Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable



## EMISSIONS UNIT INFORMATION

Section [ 1 ] of [ 1 ]  
Combined Cycle Unit 8

### III. EMISSIONS UNIT INFORMATION

**Title V Air Operation Permit Application** - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application for air permit. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

**Air Construction Permit or FESOP Application** - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

**Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application** - Where this application is used to apply for both an air construction permit and a revised/renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air construction permitting and insignificant emissions units are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.



## EMISSIONS UNIT INFORMATION

Section [ 1 ] of [ 1 ]  
Combined Cycle Unit 8

### A. GENERAL EMISSIONS UNIT INFORMATION

#### Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)
- ☒ 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.

#### 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.
- ☐ 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. Description of Emissions Unit Addressed in this Section:  
**Combined Cycle Combustion Turbine**
3. Emissions Unit Identification Number: **008**
- |  |   |  |  |  |
|--|---|--|--|--|
| 4. Emissions Unit Status Code:<br><b>A</b> | 5. Commence Construction Date:<br><b></b> | 6. Initial Startup Date:<br><b>July 1992</b> | 7. Emissions Unit Major Group SIC Code:<br><b>49</b> | 8. Acid Rain Unit?<br><input checked="" type="checkbox"/> Yes<br><input type="checkbox"/> No |
|--|---|--|--|--|
9. Package Unit:  
Manufacturer: **General Electric** Model Number: **Frame 7EA**
10. Generator Nameplate Rating: **88 MW**
11. Emissions Unit Comment:  
**Initial startup date is Emission Unit's commercial in-service date.**  
**Emission unit is a combined cycle unit.**  
**Steam cycle is rated at a nominal 30 MW.**  
**Unit is equipped with a direct water spray fogging system to reduce turbine inlet air temperature.**

## EMISSIONS UNIT INFORMATION

Section [ 1 ] of [ 1 ]

Combined Cycle Unit 8

### Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description:  
Water Injection

2. Control Device or Method Code(s): 028

Section [ 1 ] of [ 1 ]  
Combined Cycle Unit 8

**(Optional for unregulated emissions units.)**

1. Maximum Process or Throughput Rate:	
2. Maximum Production Rate:	
3. Maximum Heat Input Rate:	<b>1,075</b> million Btu/hr
4. Maximum Incineration Rate:	pounds/hr tons/day
5. Requested Maximum Operating Schedule:	
	<b>24</b> hours/day <b>7</b> days/week
	<b>52</b> weeks/year <b>8,760</b> hours/year
6. Operating Capacity/Schedule Comment:	
	<b>Maximum heat input natural gas firing (LHV) at baseload and turbine inlet temperature of 25°F</b>
	<b>Maximum heat input for residual oil firing is 1,060 MMBtu/hr (LVH) and turbine inlet temperature of 25°F.</b>
	<b>Peak load heat input is 1,161 MMBtu/hr (LVH) for gas and 1,149 MMBtu/hr (LVH) for oil at turbine inlet temperature of 25°F.</b>
	<b>Peaking mode is authorized for 3,000 hours during any consecutive 12 months of which 500 hours can be firing fuel oil. See DEP File No. 1050003-012-AC; PSD-FL-166(D).</b>

**EMISSIONS UNIT INFORMATION**

Section [ 1 ] of [ 1 ]

Combined Cycle Unit 8

**C. EMISSION POINT (STACK/VENT) INFORMATION**

(Optional for unregulated emissions units.)

**Emission Point Description and Type**

1. Identification of Point on Plot Plan or Flow Diagram:		2. Emission Point Type Code: <b>3</b>	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: <b>Emission unit can exhaust through either a by-pass stack of heat recovery steam generator (HRSG) stack.</b>			
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:			
5. Discharge Type Code: <b>V</b>		6. Stack Height: <b>155 feet</b>	
		7. Exit Diameter: <b>16 feet</b>	
8. Exit Temperature: <b>481°F</b>		9. Actual Volumetric Flow Rate: <b>1,034,053 acfm</b>	
		10. Water Vapor: <b>%</b>	
11. Maximum Dry Standard Flow Rate: <b>dscfm</b>		12. Nonstack Emission Point Height: <b>feet</b>	
13. Emission Point UTM Coordinates... Zone: <b>17</b> East (km): <b>409.0</b> North (km): <b>3102.8</b>		14. Emission Point Latitude/Longitude... Latitude (DD/MM/SS) Longitude (DD/MM/SS)	
15. Emission Point Comment: <b>Stack parameters from Title V application.</b> <b>Stack parameters shown for HRSG stack oil firing.</b>  <b>By-pass stack parameters:</b> <b>Height: 100 ft</b> <b>Diameter: 17.6 ft (equivalent diameter-stack is rectangular 18.3 ft x 13.3 ft)</b> <b>Temperature: 950°F</b> <b>Flow: 1,549,432 acfm</b>  <b>Stack parameters will vary depending upon turbine inlet conditions and mode of operation (peak mode or base load).</b>			

**EMISSIONS UNIT INFORMATION**

Section [ 1 ] of [ 1 ]

Combined Cycle Unit 8

**D. SEGMENT (PROCESS/FUEL) INFORMATION****Segment Description and Rate:** Segment 1 of 2

1. Segment Description (Process/Fuel Type) (limit to 500 characters):  <b>Internal Combustion Engines – Electric Generation – Distillate Oil (Diesel) – Turbine</b>		
2. Source Classification Code (SCC): <b>2-01-001-01</b>		3. SCC Units: <b>1,000 Gallons Burned</b>
4. Maximum Hourly Rate: <b>9.03</b>	5. Maximum Annual Rate: <b>23,915</b>	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: <b>0.2</b>	8. Maximum % Ash:	9. Million Btu per SCC Unit: <b>127.3</b>
10. Segment Comment (limit to 200 characters):  <b>Maximum hourly rate is based on peak mode operation at 25°F based on lower heating value (LHV). Maximum annual rate based on PSD-FL-166(D).</b>		

**Segment Description and Rate:** Segment 2 of 2

1. Segment Description (Process/Fuel Type) (limit to 500 characters):  <b>Internal Combustion Engines – Electric Generation – Natural Gas – Turbine</b>		
2. Source Classification Code (SCC): <b>2-01-002-01</b>		3. SCC Units: <b>Million Cubic Feet</b>
4. Maximum Hourly Rate: <b>1.22</b>	5. Maximum Annual Rate: <b>9,880</b>	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit: <b>950</b>
10. Segment Comment (limit to 200 characters):  <b>Maximum hourly rate based on peak operation at 25°F based on lower heating value (LHV). Maximum annual rate based on baseload operation.</b>		

Section [ 1 ] of [ 1 ]  
Combined Cycle Unit 8

### List of Pollutants Emitted by Emissions Unit

DEP Form No. 62-210.900(1) – Form  
Effective: 06/16/03

**EMISSIONS UNIT INFORMATION**Section [ 1 ] of [ 1 ]  
Combined Cycle Unit 8**POLLUTANT DETAIL INFORMATION**Page [ 1 ] of [ 6 ]  
Particulate Matter - Total**F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION –  
POTENTIAL/ESTIMATED FUGITIVE EMISSIONS****(Optional for unregulated emissions units.)****Potential/Estimated Fugitive Emissions**

**Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.**

1. Pollutant Emitted: <b>PM</b>	2. Total Percent Efficiency of Control:
3. Potential Emissions: <b>29 lb/hour                      37 tons/year</b>	4. Synthetically Limited? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
5. Range of Estimated Fugitive Emissions (as applicable): to                      tons/year	
6. Emission Factor: <b>0.025 lb/MMBtu</b>  Reference: <b>PSD-FL-166</b>	7. Emissions Method Code: <b>0</b>
8. Calculation of Emissions: <b>1,149 MMBtu/hr x 0.025 lb/MMBtu = 29 lb/hr (Oil firing and peak mode at 25°F turbine inlet)</b> <b>22 TPY x 2/3 (gas) + 22 TPY (oil) = 37 TPY [Based on PSD-FL-166(D)]</b> <b>1,161 MMBtu/hr x 0.006 lb/MMBtu = 7.0 lb/hr (Gas firing and peak mode at 25°F turbine inlet)</b>	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: <b>Hourly emissions based on oil firing. Annual emissions based on 2,920 hours (1/3 of year) of oil firing and 5,840 hours (2/3 of year) of natural gas firing. PSD-FL-166(D).</b>	

**EMISSIONS UNIT INFORMATION**Section [1] of [1]  
Combined Cycle Unit 8**POLLUTANT DETAIL INFORMATION**Page [1] of [6]  
Particulate Matter - Total**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -  
ALLOWABLE EMISSIONS**

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: <b>OTHER</b>	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: <b>0.025 lb/MMBtu</b>	4. Equivalent Allowable Emissions: <b>29 lb/hour      22 tons/year</b>
5. Method of Compliance (limit to 60 characters): <b>Annual compliance test, EPA Method 5/5B or 17 if &gt; 10% and &gt; 400 hr/yr oil-firing.</b>	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): <b>Established as BACT for oil firing. Lb/hr for peak mode at 25°F. TPY from PSD-FL-166(D). Test required if oil firing &gt; 400 hr/yr. Does not include allowance for excess emissions for startup, shutdown, and malfunction [FDEP Rule 62-210.700(1)].</b>	

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: <b>OTHER</b>	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: <b>0.006 lb/MMBtu</b>	4. Equivalent Allowable Emissions: <b>7 lb/hour      22 tons/year</b>
5. Method of Compliance (limit to 60 characters): <b>None</b>	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): <b>Established as BACT for natural gas firing. Lb/hr based on peak mode operation at 25°F. TPY based on PSD-FL-166(D). Does not include allowance for excess emissions for startup, shutdown, and malfunction [FDEP Rule 62-210.700(1)].</b>	

Allowable Emissions Allowable Emissions \_\_\_\_ of \_\_\_\_

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: <b>lb/hour      tons/year</b>
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	



**EMISSIONS UNIT INFORMATION**Section [ 1 ] of [ 1 ]  
Combined Cycle Unit 8**POLLUTANT DETAIL INFORMATION**Page [ 2 ] of [ 6 ]  
Sulfur Dioxide**F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION –  
POTENTIAL/ESTIMATED FUGITIVE EMISSIONS**

(Optional for unregulated emissions units.)

**Potential/Estimated Fugitive Emissions**

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: <b>SO<sub>2</sub></b>	2. Total Percent Efficiency of Control:
3. Potential Emissions: <b>234 lb/hour                      325 tons/year</b>	4. Synthetically Limited? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
5. Range of Estimated Fugitive Emissions (as applicable): to                      tons/year	
6. Emission Factor: <b>0.2% Sulfur Fuel</b>  Reference: <b>PSD-FL-166</b>	7. Emissions Method Code: <b>0</b>
8. Calculation of Emissions: <b>58,384 lb/hr x 0.002 lb/lb fuel x 2 lb SO<sub>2</sub>/lb S = 234 lb/hr (Oil firing with 19,680 Btu/lb and peak mode at 25°F turbine inlet).</b>  <b>316 TPY (oil) + 12.9 TPY x 2/3 (gas) = 325 TPY [Based on PSD-FL-166(D)]</b>  <b>1.22 x 10<sup>6</sup> CF/hr x 1 grain/100 CF x 2 lb SO<sub>2</sub>/lb S x lb/7,000 grains = 3.5 lb/hr (Gas firing and peak mode at 25°F turbine inlet).</b>	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: <b>Hourly emissions based on oil firing and peak mode. Annual emissions based on 2,920 hours (1/3 of year) of oil firing and 5,840 hours (2/3 of year) of natural gas firing. PSD-FL-166(D).</b>	

**EMISSIONS UNIT INFORMATION**Section [1] of [1]  
Combined Cycle Unit 8**POLLUTANT DETAIL INFORMATION**Page [2] of [6]  
Sulfur Dioxide**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -  
ALLOWABLE EMISSIONS**

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

**Allowable Emissions** Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: <b>OTHER</b>	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: <b>0.2% Sulfur Fuel</b>	4. Equivalent Allowable Emissions: <b>234 lb/hour      316 tons/year</b>
5. Method of Compliance (limit to 60 characters): <b>Fuel oil analysis.</b>	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): <b>Established as BACT for oil firing. Lb/hr at 25°F and peak mode. TPY from PSD-FL-166(D).</b>	

**Allowable Emissions** Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: <b>OTHER</b>	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: <b>1 grain Sulfur/100 CF (annual)</b>	4. Equivalent Allowable Emissions: <b>3.5 lb/hour      12.9 tons/year</b>
5. Method of Compliance (limit to 60 characters): <b>Custom fuel monitoring schedule</b>	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): <b>Applicant requested limit of 1 grain Sulfur/100 CF annual average for natural gas firing lb/hr at 25°F and peak mode. TPY based on 1 grain/100 CF.</b>	

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

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: ____ lb/hour      ____ tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

## EMISSIONS UNIT INFORMATION

Section [ 1 ] of [ 1 ]  
Combined Cycle Unit 8

## POLLUTANT DETAIL INFORMATION

Page [ 3 ] of [ 6 ]  
Nitrogen OxidesF1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION –  
POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: <b>NO<sub>x</sub></b>	2. Total Percent Efficiency of Control:
3. Potential Emissions: <b>192 lb/hour                      563 tons/year</b>	4. Synthetically Limited? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
5. Range of Estimated Fugitive Emissions (as applicable): to                      tons/year	
6. Emission Factor: <b>25 ppmvd/42 ppmvd @ 15% O<sub>2</sub></b>  Reference: <b>PSD-FL-166</b>	7. Emissions Method Code: <b>0</b>
8. Calculation of Emissions: <b>Lb/hr estimated for peak mode at 25°F and oil and gas firing based on Title V application and PSD-FL-166(D).</b>  <b>Emission basis, ppmvd @ 15% O<sub>2</sub>: 42 (oil) and 25 (gas); lb/hr: 192 (oil), 115 (gas)</b> <b>425 TPY x 2/3 (gas) + 244 TPY (oil) = 563 TPY [Based on PSD-FL-166(D).</b>	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: <b>Hourly emissions based on oil firing and peak mode. Annual emissions based on 2,920 hours (1/3 of year) of oil firing and 5,840 hours (2/3 of year) of natural gas firing.</b>	

## EMISSIONS UNIT INFORMATION

Section [ 1 ] of [ 1 ]  
Combined Cycle Unit 8

## POLLUTANT DETAIL INFORMATION

Page [ 3 ] of [ 6 ]  
Nitrogen Oxides

**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -  
ALLOWABLE EMISSIONS**

**Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.**

**Allowable Emissions** Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: <b>OTHER</b>	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: <b>42 ppmvd</b>	4. Equivalent Allowable Emissions: <b>192 lb/hour      244 tons/year</b>
5. Method of Compliance (limit to 60 characters): <b>Annual Compliance Test; EPA Method 7E or 20; and oil firing &gt; 400 hr/yr.</b>	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): <b>Established as BACT for oil firing. Requested Allowable Emissions and Units corrected to 15% O<sub>2</sub>. Lb/hr for peak mode 25°F. TPY from PSD-FL-166(D).</b>	

**Allowable Emissions** Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: <b>OTHER</b>	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: <b>25 ppmvd</b>	4. Equivalent Allowable Emissions: <b>115 lb/hour      425 tons/year</b>
5. Method of Compliance (limit to 60 characters): <b>Annual Compliance Test; EPA Method 7E or 20.</b>	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): <b>Established as BACT for gas firing. Requested Allowable Emissions and Units corrected to 15% O<sub>2</sub>. Lb/hr gas estimated for peak mode and 25°F. TPY from PSD-FL-166(D).</b>	

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

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour      tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

**EMISSIONS UNIT INFORMATION**Section [ 1 ] of [ 1 ]  
Combined Cycle Unit 8**POLLUTANT DETAIL INFORMATION**Page [ 4 ] of [ 6 ]  
Carbon Monoxide**F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION –  
POTENTIAL/ESTIMATED FUGITIVE EMISSIONS**

(Optional for unregulated emissions units.)

**Potential/Estimated Fugitive Emissions**

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: <b>CO</b>	2. Total Percent Efficiency of Control:
3. Potential Emissions: <b>64 lb/hour                      254 tons/year</b>	4. Synthetically Limited? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
5. Range of Estimated Fugitive Emissions (as applicable): to                      tons/year	
6. Emission Factor: <b>25 ppmvd @ 15% O<sub>2</sub></b>  Reference: <b>PSD-FL-166</b>	7. Emissions Method Code: <b>0</b>
8. Calculation of Emissions: <b>Lb/hr estimated for peak mode at 25°F and oil and gas firing based on Title V application and PSD-FL-166(D).</b>  <b>Emission basis, ppmvd @ 15% O<sub>2</sub>: 25 (oil and gas); lb/hr: 64 (oil), 63 (gas)</b> <b>232 TPY x 2/3 (gas) + 79 TPY (oil) = 254 TPY [Based on PSD-FL-166(D).</b>	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: <b>Hourly emissions based on oil firing. Annual emissions based on 2,920 hours (1/3 of year) of oil firing and 5,840 hours (2/3 of year) of natural gas firing.</b>	

**EMISSIONS UNIT INFORMATION**Section [1] of [1]  
Combined Cycle Unit 8**POLLUTANT DETAIL INFORMATION**Page [4] of [6]  
Carbon Monoxide**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -  
ALLOWABLE EMISSIONS**

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

**Allowable Emissions** Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: <b>OTHER</b>	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: <b>79 TPY</b>	4. Equivalent Allowable Emissions: <b>64 lb/hour                      79 tons/year</b>
5. Method of Compliance (limit to 60 characters): <b>None</b>	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): <b>Established as BACT for oil firing. Lb/hr for peak mode and 25°F. TPY from PSD-FL-166(D).</b>	

**Allowable Emissions** Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: <b>OTHER</b>	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: <b>232 TPY</b>	4. Equivalent Allowable Emissions: <b>63 lb/hour                      232 tons/year</b>
5. Method of Compliance (limit to 60 characters): <b>None</b>	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): <b>Established as BACT for gas firing. Lb/hr for peak mode and 25°F. TPY from PSD-FL-166(D).</b>	

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

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: <b>lb/hour                      tons/year</b>
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

**EMISSIONS UNIT INFORMATION**Section [ 1 ] of [ 1 ]  
Combined Cycle Unit 8**POLLUTANT DETAIL INFORMATION**Page [ 5 ] of [ 6 ]  
Volatile Organic Compounds**F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION –  
POTENTIAL/ESTIMATED FUGITIVE EMISSIONS**

(Optional for unregulated emissions units.)

**Potential/Estimated Fugitive Emissions**

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: <b>VOC</b>	2. Total Percent Efficiency of Control:
3. Potential Emissions: <b>5.1 lb/hour                      12.7 tons/year</b>	4. Synthetically Limited? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
5. Range of Estimated Fugitive Emissions (as applicable): to                      tons/year	
6. Emission Factor: <b>3.5 ppmvw / 1.4 ppmvw</b>  Reference: <b>PSD Permit Application, June 1996</b>	7. Emissions Method Code: <b>0</b>
8. Calculation of Emissions: <b>Lb/hr estimated for peak mode at 25°F and oil and gas firing based on Title V application and PSD-FL-166(D).</b>  <b>Emission basis from Title V application, ppmvw: 3.5 (oil), 1.4 (gas); lb/hr: 5.1 (oil), 2.1 (gas).</b>  <b>9 TPY x 2/3 (gas) + 6.7 TPY (oil) = 12.7 TPY [Based on PSD-FL-166(D)].</b>	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: <b>Hourly emissions based on oil firing and peak mode. Annual emissions based on 2,920 hours (1/3 of year) of oil firing and 5,840 hours (2/3 of year) of natural gas firing.</b>	

**EMISSIONS UNIT INFORMATION**Section [ 1 ] of [ 1 ]  
Combined Cycle Unit 8**POLLUTANT DETAIL INFORMATION**Page [ 5 ] of [ 6 ]  
Volatile Organic Compounds**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -  
ALLOWABLE EMISSIONS**

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: <b>OTHER</b>	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: <b>None</b>	4. Equivalent Allowable Emissions: <b>5.1 lb/hour          6.7 tons/year</b>
5. Method of Compliance (limit to 60 characters): <b>None</b>	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): <b>Oil firing. Lb/hr for peak mode and 25°F. TPY from PSD-FL-166(D).</b>	

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: <b>OTHER</b>	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: <b>None</b>	4. Equivalent Allowable Emissions: <b>2.1 lb/hour          9 tons/year</b>
5. Method of Compliance (limit to 60 characters): <b>None</b>	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): <b>Gas firing. Lb/hr for peak mode and 25°F. TPY from PSD-FL-166(D).</b>	

Allowable Emissions Allowable Emissions \_\_\_\_ of \_\_\_\_

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: <b>lb/hour          tons/year</b>
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	



**EMISSIONS UNIT INFORMATION**Section [ 1 ] of [ 1 ]  
Combined Cycle Unit 8**POLLUTANT DETAIL INFORMATION**Page [ 6 ] of [ 6 ]  
Particulate Matter – PM<sub>10</sub>**F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION –  
POTENTIAL/ESTIMATED FUGITIVE EMISSIONS****(Optional for unregulated emissions units.)****Potential/Estimated Fugitive Emissions**

**Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.**

1. Pollutant Emitted: <b>PM<sub>10</sub></b>		2. Total Percent Efficiency of Control:	
3. Potential Emissions: <b>29 lb/hour                      37 tons/year</b>		4. Synthetically Limited? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
5. Range of Estimated Fugitive Emissions (as applicable): to                      tons/year			
6. Emission Factor: <b>0.025 lb/MMBtu</b>  Reference: <b>PSD-FL-166(D)</b>		7. Emissions Method Code: <b>0</b>	
8. Calculation of Emissions: <b>1,149 MMBtu/hr x 0.025 lb/MMBtu = 29 lb/hr (Oil firing and peak mode at 25°F).</b>  <b>22 TPY x 2/3 (gas) + 22 TPY (oil) = 37 TPY [Based on PSD-FL-166(D)].</b>  <b>1,161 MMBtu/hr x 0.006 lb/MMBtu = 7.0 lb/hr (Gas firing and peak mode at 25°F).</b>			
9. Pollutant Potential/Estimated Fugitive Emissions Comment: <b>Hourly emissions based on oil firing. Annual emissions based on 2,920 hours (1/3 of year) of oil firing and 5,840 hours (2/3 of year) of natural gas firing. PSD-FL-166(D).</b>			

**EMISSIONS UNIT INFORMATION**Section [ 1 ] of [ 1 ]  
Combined Cycle Unit 8**POLLUTANT DETAIL INFORMATION**Page [ 6 ] of [ 6 ]  
Particulate Matter – PM<sub>10</sub>**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -  
ALLOWABLE EMISSIONS**

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

**Allowable Emissions** Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: <b>OTHER</b>	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: <b>0.025 lb/MMBtu</b>	4. Equivalent Allowable Emissions: <b>29 lb/hour                      22 tons/year</b>
5. Method of Compliance (limit to 60 characters): <b>Annual compliance test, EPA Method 5/5B or 17 if &gt; 10% and &gt; 400 hr/yr oil-firing.</b>	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): <b>Established as BACT for oil firing. Lb/hr for peak mode at 25°F. TPY from PSD-FL-166(D). Test required if oil firing &gt; 400 hr/yr. Does not include allowance for excess emissions for startup, shutdown, and malfunction [FDEP Rule 62-210.700(1)].</b>	

**Allowable Emissions** Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: <b>OTHER</b>	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: <b>0.006 lb/MMBtu</b>	4. Equivalent Allowable Emissions: <b>7.0 lb/hour                      22 tons/year</b>
5. Method of Compliance (limit to 60 characters): <b>None</b>	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): <b>Established as BACT for natural gas firing. Lb/hr based on peak mode operation at 25°F. TPY based on PSD-FL-166(D). Does not include allowance for excess emissions for startup, shutdown, and malfunction [FDEP Rule 62-210.700(1)].</b>	

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

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: <b>lb/hour                      tons/year</b>
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

**EMISSIONS UNIT INFORMATION**

Section [ 1 ] of [ 1 ]  
Combined Cycle Unit 8

**G. VISIBLE EMISSIONS INFORMATION**

Complete if this emissions unit is or would be subject to a unit-specific visible emissions limitation.

**Visible Emissions Limitation:** Visible Emissions Limitation 1 of 2

1. Visible Emissions Subtype: <b>VE10</b>	2. Basis for Allowable Opacity: <input type="checkbox"/> Rule <input checked="" type="checkbox"/> Other
3. Requested Allowable Opacity: Normal Conditions: <b>10</b> % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: <b>Annual VE Test EPA Method 9</b>	
5. Visible Emissions Comment (limit to 200 characters): <b>Established as BACT limit.</b>  <b>PSD-FL-166(D)</b>	

**Visible Emissions Limitation:** Visible Emissions Limitation 2 of 2

1. Visible Emissions Subtype: <b>VE99</b>	2. Basis for Allowable Opacity: <input checked="" type="checkbox"/> Rule <input type="checkbox"/> Other
3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: <b>100</b> % Maximum Period of Excess Opacity Allowed: <b>60</b> min/hour	
4. Method of Compliance: <b>None</b>	
5. Visible Emissions Comment (limit to 200 characters): <b>Not to exceed 2 hr/24 hr during malfunction.</b> <b>Permit No. 1050003-009-AV Condition III.D.18</b>  <b>Excess emissions for startup, shutdown with good operating practices.</b> <b>Permit No. 1050003-009-AV Condition III.D.19</b>	

**EMISSIONS UNIT INFORMATION**

Section [ 1 ] of [ 1 ]  
Combined Cycle Unit 8

**H. CONTINUOUS MONITOR INFORMATION**

Complete if this emissions unit is or would be subject to continuous monitoring.

**Continuous Monitoring System:** Continuous Monitor 1 of 4

1. Parameter Code: <b>EM</b>	2. Pollutant(s): <b>NO<sub>x</sub></b>
3. CMS Requirement:	<input checked="" type="checkbox"/> Rule <input type="checkbox"/> Other
4. Monitor Information... Manufacturer: <b>Advanced Pullution Inst.</b> Model Number: <b>252</b> Serial Number: <b>132</b>	
5. Installation Date: <b>28 NOV 1994</b>	6. Performance Specification Test Date: <b>12 DEC 1995</b>
7. Continuous Monitor Comment: <b>CEM required pursuant to 40 CFR Part 75.</b>	

**Continuous Monitoring System:** Continuous Monitor 2 of 4

1. Parameter Code: <b>EM</b>	2. Pollutant(s): <b>NO<sub>x</sub></b>
3. CMS Requirement:	<input type="checkbox"/> Rule <input checked="" type="checkbox"/> Other
4. Monitor Information... Manufacturer: <b>Advanced Pollution Inst.</b> Model Number: <b>252</b> Serial Number: <b>120</b>	
5. Installation Date: <b>28 NOV 1994</b>	6. Performance Specification Test Date: <b>12 DEC 1995</b>
7. Continuous Monitor Comment: <b>Redundant backup.</b>	

**EMISSIONS UNIT INFORMATION**

Section [ 1 ] of [ 1 ]  
Combined Cycle Unit 8

**H. CONTINUOUS MONITOR INFORMATION**

Complete if this emissions unit is or would be subject to continuous monitoring.

**Continuous Monitoring System:** Continuous Monitor 3 of 4

1. Parameter Code: <b>O<sub>2</sub></b>	2. Pollutant(s):
3. CMS Requirement:	<input checked="" type="checkbox"/> Rule <input type="checkbox"/> Other
4. Monitor Information... Manufacturer: <b>Graseby STI</b> Model Number: <b>DP0802</b> Serial Number: <b>1511-1-8</b>	
5. Installation Date: <b>28 NOV 1994</b>	6. Performance Specification Test Date: <b>12 DEC 1995</b>
7. Continuous Monitor Comment: <b>Required pursuant to 40 CFR Part 75 for dilution with NO<sub>x</sub> monitors.</b>	

**Continuous Monitoring System:** Continuous Monitor 4 of 4

1. Parameter Code: <b>WTF</b>	2. Pollutant(s):
3. CMS Requirement:	<input checked="" type="checkbox"/> Rule <input type="checkbox"/> Other
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date: <b>07 JULY 1992</b>	6. Performance Specification Test Date:
7. Continuous Monitor Comment: <b>Required by 40 CFR 60.334, WTF ratio monitored by CT control system as part of DCS. Pollutant emitted: NO<sub>x</sub></b>	

## EMISSIONS UNIT INFORMATION

Section [ 1 ] of [ 1 ]

Combined Cycle Unit 8

### I. EMISSIONS UNIT ADDITIONAL INFORMATION

#### Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date _____
2. Fuel Analysis or Specification (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date _____
3. Detailed Description of Control Equipment (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date _____
4. Procedures for Startup and Shutdown (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date _____ <input checked="" type="checkbox"/> Not Applicable (construction application)
5. Operation and Maintenance Plan (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date _____ <input checked="" type="checkbox"/> Not Applicable
6. Compliance Demonstration Reports/Records <input checked="" type="checkbox"/> Attached, Document ID: <b>EU8-16</b> Test Date(s)/Pollutant(s) Tested: <b>December 2, 2003 (gas)</b> <input type="checkbox"/> Previously Submitted, Date: _____ Test Date(s)/Pollutant(s) Tested: _____ <input type="checkbox"/> To be Submitted, Date (if known): _____ Test Date(s)/Pollutant(s) Tested: _____ <input type="checkbox"/> Not Applicable Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.
7. Other Information Required by Rule or Statute <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable

## EMISSIONS UNIT INFORMATION

Section [ 1 ] of [ 1 ]

Combined Cycle Unit 8

### Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
3. Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable

### Additional Requirements for Title V Air Operation Permit Applications

1. Identification of Applicable Requirements <input checked="" type="checkbox"/> Attached, Document ID: <b>EU8-CV1</b> <input type="checkbox"/> Not Applicable
2. Compliance Assurance Monitoring <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
3. Alternative Methods of Operation <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
4. Alternative Modes of Operation (Emissions Trading) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
5. Acid Rain Part Application <input type="checkbox"/> Certificate of Representation (EPA Form No. 7610-1) <input type="checkbox"/> Copy Attached, Document ID: _____ <input type="checkbox"/> Acid Rain Part (Form No. 62-210.900(1)(a)) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date: _____ <input type="checkbox"/> Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date: _____ <input type="checkbox"/> New Unit Exemption (Form No. 62-210.900(1)(a)2.) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date: _____ <input type="checkbox"/> Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date: _____ <input type="checkbox"/> Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date: _____ <input type="checkbox"/> Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date: _____ <input checked="" type="checkbox"/> Not Applicable

**EMISSIONS UNIT INFORMATION**

Section [ 1 ] of [ 1 ]

Combined Cycle Unit 8

**Additional Requirements Comment**

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**ATTACHMENT EU8-I6**

**COMPLIANCE DEMONSTRATION REPORTS**

**(NOTE: Compliance demonstrated for the primary fuel – natural  
gas firing. Compliance tests for oil firing will be conducted  
when distilled oil firing is scheduled.)**

GOLDER ASSOCIATES INC.

APR 29 2004

GAINESVILLE



## AIR QUALITY TESTING SERVICES

LAKELAND ELECTRIC  
CHARLES LARSEN POWER PLANT  
UNIT 8

### NO<sub>x</sub> EMISSIONS TEST REPORT

Catalyst Air Management, Inc.  
Report Number 138-077

DECEMBER 29, 2003  
Test Date: December 2, 2003

2505 Byington-Solway Road  
Knoxville, TN 37931  
(865) 531-0075 • Fax (865) 531-0750

29541 Morningmist Drive  
Wesley Chapel, FL 33543  
(813) 994-5880 • Fax (813) 994-5571

6 Unionville Road  
Douglassville, PA 19518  
(610) 326-7888 • Fax (610) 326-3323



**LAKELAND ELECTRIC  
CHARLES LARSEN POWER PLANT  
UNIT 8**

**NO<sub>x</sub> EMISSIONS TEST REPORT**

**CATALYST AIR MANAGEMENT, INC.  
REPORT NUMBER 138-077**

**DECEMBER 29, 2003**  
Test Date: December 2, 2003

Prepared for  
Lakeland Electric  
Charles Larsen Power Plant  
2002 E. Highway 92  
Lakeland, FL 33805



## STATEMENT OF VALIDITY

Lakeland Electric – Charles Larsen Unit 8  
Catalyst Report 138-077  
December 29, 2003

To the extent practical, information and data provided in this test report has been verified as true and correct.

A handwritten signature in cursive script that reads 'Margaret S. Cangro'.

Margaret S. Cangro  
Manager

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LETTER OF TRANSMITTAL

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## PROJECT FACT SHEET

NAME OF SOURCE OWNER:	Lakeland Electric
SOURCE IDENTIFICATION:	Charles Larsen Unit 8 FDEP ID# 1050003 EU 008
LOCATION OF SOURCE:	2002 E. Highway 92 Lakeland, Florida
TYPE OF OPERATION:	Combustion Turbine Generating Unit
TYPES OF TESTS PERFORMED:	Oxygen/Carbon Dioxide-EPA Method 3A Nitrogen Oxide-EPA Method 7E Visible Emissions-EPA Method 9
SOURCE ANALYZERS:	Advanced Pollution Industries NOx – 132/112 Grasby STI O <sub>2</sub> – 1511-1-8
TEST COMPANY:	Catalyst Air Management, Inc. 2505 Byington-Solway Road Knoxville, TN 37931
SITE SUPERVISOR:	Mike Taylor - Principal
TEST PERSONNEL:	Margaret Cangro - Manager Josh Nicely - Testing Supervisor Huedon Love - Technician
REPORT PREPARATION:	Mike Taylor - Principal
TEST DATES:	December 2, 2003
OWNERS REPRESENTATIVE:	Christine More Laura Jackson
TEST OBSERVER:	William Schroeder - FDEP

## 1.0 Introduction

Catalyst Air Management, Inc. (Catalyst) was contracted by the Lakeland Electric to perform the NOx compliance and visual emissions testing for the Charles Larsen Power Plant Unit 8 in Lakeland, FL.

The sampling program was conducted December 2, 2003. The testing was performed by Mike Taylor, Margaret Cangro, Josh Nicely and Huedon Love of Catalyst, with the assistance of personnel assigned by the Lakeland Electric. Ms. Christine More coordinated plant operation during the testing. Mr. William Schroeder of the Florida Department of Environmental Protection (FDEP) was present to observe a portion of the testing.

## 2.0 Summary of Test Results

A summary of test results developed by this source-sampling program is presented in Tables 1 through 3. The summary tables are presented as follows:

<u>Table</u>	<u>Description</u>	<u>Page</u>
1	Summary of NOx Emissions	1
2	Summary of Test Results - Natural Gas	2
3	Visible Emissions Summary	3

## 3.0 Results of Testing

The individual test run results are shown in Table 2, and are tabulated in Appendices 1 and 2. The results indicate that the emissions are within the emission limits of the referenced operating permits.

**TABLE 1**  
Summary of NOx Emissions  
Charles Larsen Power Plant  
Unit 8

FUEL	NOx ppm @ 15% O <sub>2</sub>	Permit ppm @ 15% O <sub>2</sub>	NOx lb/mmBtu	NOx lb/hr	Opacity %	Permit %
Gas	18.1	25	0.07	74.9	0.0	20

**TABLE 2**  
**SUMMARY OF TEST RESULTS**  
**Individual Test Runs**

CLIENT: Lakeland Electric  
PLANT: Larsen  
UNIT: 8  
TEST: NOx - Method 3A/7E

	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6
Date	12/2/2003	12/2/2003	12/2/2003	12/2/2003	12/2/2003	12/2/2003
Start Time	11:03	11:40	12:18	12:56	13:34	14:12
End Time	11:33	12:10	12:48	13:26	14:04	14:42
Measured CO2 (%)	3.8	3.9	3.8	3.8	3.9	3.9
Measured O2 (%)	13.6	13.7	13.7	13.6	13.7	13.6
Measured NOx Concentration (ppm)	21.44	22.15	22.26	21.71	22.07	22.07
Avg Zero Bias Check (ppm)	0.56	0.635	0.66	0.605	0.53	0.55
Upscale Calibration Gas (ppm)	22.10	22.10	22.10	22.10	22.10	22.10
Avg Upscale Bias Check (ppm)	21.815	21.93	21.99	21.755	21.565	21.71
Corrected NOx Concentration (ppm)	21.7	22.3	22.4	22.0	22.6	22.5
NOx ppm @ 15% O2	17.5	18.3 17.9	18.4	17.8 18.1	18.5	18.2 18.4
F factor	8710	8710	8710	8710	8710	8710
Heat Input (mmBtu/hr)	1133.8	1126.7	1120.0	1117.4	1114.2	1113.4
NOx Emissions (lb/hr)	73.70	75.49 74.59	76.16	73.75 74.95	75.77	74.60 75.18
NOx Emissions (lb/mmBtu)	0.065	0.067 0.066	0.068	0.066 0.067	0.068	0.067 0.068
Average NOx (ppm @ 15% O2)				18.1		
Average NOx (lb/hr)				74.9		
Average NOx (lb/MMBtu)				0.07		



**TABLE 3**  
**VISIBLE EMISSIONS SUMMARY**

Client: **Lakeland Electric**  
Plant: **Larsen**  
Location: **8**

Fuel: Natural Gas

Date: 12/2/2003  
Run Times: 1103-1203

Opacity 1 hr average: 0  
Opacity highest 6 minute average: 0

#### 4.0 Description of Combustion Units

Larsen Unit 8 is a General Electric Model PG7111 Frame 7 combustion turbine (CT) with a heat recovery steam generator (HRSG). The CT can be fired with natural gas and No.2 distillate fuel oil. The maximum heat input of the unit is 1055 MMBtu/hr based on the lower heating value (MMBtu/hr, LHV) while firing natural gas, and 1040 (MMBtu/hr) while firing fuel oil. The rated combined capacity of the CT/HRSG is approximately 120 MW gross.

A separate stack is required for each of the two operating modes. A damper allows the flue gas from the turbine exhaust to be diverted for simple cycle or combined cycle operations. A schematic of the process and stack sampling location is included.

#### 5.0 Description of CEMS

The Unit 8 CEMS is an extraction system that measures NO<sub>x</sub> and O<sub>2</sub> concentrations at the sampling location. The CEMS includes an Advanced Pollution Industries Model 252 NO<sub>x</sub> analyzer and a Graseby STI Model DP0802 O<sub>2</sub> analyzer. The recording and reporting requirements are performed by a computerized data acquisition and handling system (DAHS).

Unit 8 CEMS

- (1) Advanced Pollution Industries NO<sub>x</sub> – 252 - Serial No. 132/112
- (1) Graseby STI O<sub>2</sub> – DP0802 - Serial No. 1511-1-8

The data acquisition and handling system utilizes an Fc factor of 8710 scf/mmBtu (natural gas) and 9190 scf/mmBtu (fuel oil) to calculate NO<sub>x</sub> emissions in lbs/mmBtu. The SO<sub>2</sub> and CO<sub>2</sub> emissions are calculated and reported in accordance with procedures in 40 CFR Part 75, Appendices D and G.

#### 6.0 Sampling Program Procedures

The following test methods were utilized during the test program:

EPA Method 3A	Gas Analysis for CO <sub>2</sub> , O <sub>2</sub> , Excess Air and Dry Molecular Weight
EPA Method 7E	Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Method)
EPA Method 9	Visual Determination of the Opacity Emissions from Stationary Sources
EPA Method 19	Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide, and Nitrogen Oxides Emission Rates

## 6.1 NO<sub>x</sub> and O<sub>2</sub> – EPA Methods 3A and 7E

Catalyst conducted three (3) compliance test runs using EPA Methods 3A and 7E. These runs were each sixty (60) minutes in duration. The testing was performed while firing natural gas.

A sample was continuously extracted and introduced into a Thermo Environmental Model 10, Chemiluminescent NO<sub>x</sub> analyzer and Servomex 1400 O<sub>2</sub>/CO<sub>2</sub> analyzer for determination of gas concentrations. The sample was extracted through a heated stainless steel probe, heated sample line and sample conditioner to dry the sample before it enters the analyzers. A sample flow control system was used to control the flow into the analyzers. The analyzers were calibrated prior to starting the testing with EPA Protocol 1, calibration gases. A system bias check was performed before each run by introducing the zero and upscale gas at the back end of the sample probe. The system bias check was repeated at the end of each test run to determine the analyzer zero and calibration drift.

The NO<sub>x</sub> analyzer span was 0-25. The calibration gases that were utilized were zero, 40-60% (13.4 ppm) and 80-100% (22.10 ppm) of span. The O<sub>2</sub>/CO<sub>2</sub> analyzer spans were 0-25% and 0-20%, respectively. The O<sub>2</sub> calibration gases utilized were 12.35% and 22.41%. The CO<sub>2</sub> calibration gases were 10.11% and 17.95%.

### Reference Method Analyzers:

<u>Manufacturer</u>	<u>Model</u>	<u>Pollutant</u>	<u>Span</u>
TECO	10A	NO <sub>x</sub>	0-25
Servomex	1400B	CO <sub>2</sub> /O <sub>2</sub>	0-20%/0-25%

## 6.2 Visible Emissions – EPA Method 9

A one hour, EPA Method 9, visible emission evaluation was performed during the testing.

All the procedures used for the test program were performed in accordance with the Code of Federal Regulations, Title 40, Part 60, Appendix A, and Appendix B, Performance Specifications 2, 3 and 6, and Part 75.

## 7.0 Operating Conditions

Lakeland Electric personnel monitored operating conditions throughout the duration of the sampling program. The plant data was provided by Christine Moore of Lakeland Electric. The testing was performed while the plant was operating at the following conditions:

Run	Fuel Flow KSCF	Heat Value Btu	Heat Input mmBtu/hr	Maximum Heat Input mmBtu/hr @ Temp (°F)	% @ Temp (°F)
1	1062.0	1031.2	995.5	1044.8	95
2	1051.1	1031.2	985.4	1040.8	95
3	1046.2	1031.2	981.1	1038.2	95

Run	Load (MW)	Inlet Temp (°F)
1	92	71.6
2	91	73.1
3	90	74.1

## 8.0 Quality Assurance Procedures

The quality assurance procedures followed during the testing activities followed the guidelines set forth by the previously mentioned methods and the EPA Quality Assurance Handbook for Source Sampling. The specific procedures for this test program are listed below.

### 8.1 Instrumental Methods

Analyzer calibrations, system bias check and drift checks were completed before and after each sample run utilizing EPA Protocol 1 calibration gases.

The analyzer interference responses were determined in accordance with Section 5.4 of Method 20 and Section 7.2 through 7.6 of Method 6C.

The NO<sub>x</sub> analyzer NO<sub>2</sub> to NO converter efficiency is determined in accordance with Section 5.6 of Method 20.

## 9.0 Discussion

During the execution of the testing, no interruptions or delays occurred.

**APPENDIX 1**  
**TEST RESULTS**

CATALYST AIR MANAGEMENT Inc.  
CALIBRATION DATA

CLIENT: Lakeland Electric  
PLANT: Larsen  
UNIT: 8  
TEST: NOx - Method 3A/7E  
LOCATION: Stack

RUN #: 1-9  
LOAD LEVEL: Base/Peak  
DATE: 12/2/2003

GAS UNITS	ANALYZER SCALE	CYLINDER VALUE	ANALYZER VALUE	DIFF PPM	% SPAN	Pass Yes\No
O2, %		0.00	0.00	0.00	0.00	YES
O2, %	25	12.35	12.42	0.07	0.28	YES
O2, %		22.41	22.28	0.13	0.52	YES
CO2, %		0.00	0.00	0.00	0.00	YES
CO2, %	20	10.11	10.24	0.13	0.65	YES
CO2, %		17.95	17.81	0.14	0.70	YES
NOx ppm:		0.0	0.32	0.32	1.28	YES
NOx ppm:	25	13.40	13.51	0.11	0.44	YES
NOx ppm:		22.10	22.06	0.04	0.16	YES

CATALYST AIR MANAGEMENT, Inc.  
REFERENCE DATA

CLIENT: Lakeland Electric  
PLANT: Larsen  
UNIT: 8  
TEST: NOx - Method 3A/7E  
LOCATION: Stack

RUN #: 1  
OPERATING LEVEL: Base  
START DATE: 12/2/2003  
END DATE: 12/2/2003  
START: 8:45  
END: 9:06

DATE	TIME	O2	CO2	NOx
12/2/2003	8:45	13.94	3.56	19.34
12/2/2003	8:46	13.94	3.57	19.07
12/2/2003	8:47	13.98	3.47	19.08
12/2/2003	8:48	13.98	3.48	19.08
12/2/2003	8:49	13.96	3.55	19.07
12/2/2003	8:50	13.96	3.57	19.09
12/2/2003	8:51	13.96	3.55	19.01
12/2/2003	8:52	13.97	3.56	19.06
12/2/2003	8:53	13.98	3.54	18.99
12/2/2003	8:54	13.99	3.54	19.01
12/2/2003	8:55	13.98	3.51	19.18
12/2/2003	8:56	13.98	3.53	19.12
12/2/2003	8:57	13.98	3.54	19.16
12/2/2003	8:58	13.98	3.55	19.17
12/2/2003	8:59	13.95	3.53	19.07
12/2/2003	9:00	13.96	3.54	19.14
12/2/2003	9:01	13.98	3.54	19.35
12/2/2003	9:02	13.99	3.56	19.32
12/2/2003	9:03	14	3.54	19.19
12/2/2003	9:04	14	3.54	19.12
12/2/2003	9:05	13.97	3.55	19.12
12/2/2003	9:06	13.97	3.56	19.15
		O2	CO2	NOx
		13.97	3.54	19.13
		%	%	ppm

Analyzer Readings not corrected  
for Post-Test Calibrations.

SYSTEM CALIBRATION BIAS AND DRIFT DATA

GAS UNITS	ANALYZER VALUE	PRE-TEST CHECK	% SPAN	Pass YES/NO	POST-TEST CHECK	% SPAN	% DRIFT	Pass YES/NO
O2, %	0.00	0.00	0.00	YES	0.00	0.00	0.00	YES
O2, %	22.28	22.11	0.68	YES	22.03	1.00	0.32	YES
CO2, %	0.00	0.00	0.00	YES	0.00	0.00	0.00	YES
CO2, %	17.81	17.82	0.05	YES	17.78	0.15	0.20	YES
NOx ppm:	0.32	0.54	0.88	YES	0.65	1.32	0.44	YES
NOx ppm:	22.06	22.09	0.12	YES	21.77	1.16	1.28	YES

UNCORRECTED ANALYZER VALUES

DRY  
O2, % 14.0  
CO2, % 3.5  
NOx ppm: 19.1

ANALYZER VALUES CORRECTED FOR DRIFT

DRY @15% O2  
O2, % 14.2  
CO2, % 3.6  
NOx ppm: 19.2 16.9

F- FACTOR (scf/mmBtu) = 8710  
Heat Input (mmBtu/hr) = 1089.1

EMISSION RATES  
NOx, lbs/mmBtu = 0.062  
NOx, lbs/hr = 67.52

CATALYST AIR MANAGEMENT, Inc.  
REFERENCE DATA

CLIENT: Lakeland Electric  
PLANT: Larsen  
UNIT: 8  
TEST: NOx - Method 3A/7E  
LOCATION: Stack

RUN #: 2  
OPERATING LEVEL: Base  
START DATE: 12/2/2003  
END DATE: 12/2/2003  
START: 9:14  
END: 9:35

DATE	TIME	O2	CO2	NOx
12/2/2003	9:14	14.52	4.46	18.95
12/2/2003	9:15	14.02	3.68	19.71
12/2/2003	9:16	14	3.6	19.62
12/2/2003	9:17	14	3.56	19.5
12/2/2003	9:18	14	3.54	19.44
12/2/2003	9:19	13.97	3.52	19.39
12/2/2003	9:20	13.97	3.53	19.38
12/2/2003	9:21	13.99	3.53	19.38
12/2/2003	9:22	13.99	3.54	19.36
12/2/2003	9:23	13.98	3.5	19.37
12/2/2003	9:24	13.98	3.52	19.32
12/2/2003	9:25	13.96	3.55	19.27
12/2/2003	9:26	13.96	3.56	19.25
12/2/2003	9:27	13.97	3.53	19.18
12/2/2003	9:28	13.98	3.53	19.28
12/2/2003	9:29	13.99	3.5	19.25
12/2/2003	9:30	13.99	3.5	19.37
12/2/2003	9:31	13.98	3.51	19.3
12/2/2003	9:32	13.98	3.5	19.13
12/2/2003	9:33	13.99	3.51	19.09
12/2/2003	9:34	13.99	3.52	19.11
12/2/2003	9:35	13.99	3.56	19.14

O2	CO2	NOx
14.01	3.58	19.31
%	%	ppm

Analyzer Readings not corrected  
for Post-Test Calibrations.

SYSTEM CALIBRATION BIAS AND DRIFT DATA

GAS	ANALYZER	PRE-TEST	%	Pass	POST-TEST	%	%	Pass
UNITS	VALUE	CHECK	SPAN	YES/NO	CHECK	SPAN	DRIFT	YES/NO
O2, %	0.00	0.00	0.00	YES	0.00	0.00	0.00	YES
O2, %	22.28	22.03	1.00	YES	21.97	1.24	0.24	YES
CO2, %	0.00	0.00	0.00	YES	0.00	0.00	0.00	YES
CO2, %	17.81	17.78	0.15	YES	17.81	0.00	0.15	YES
NOx ppm:	0.32	0.65	1.32	YES	0.52	0.80	0.52	YES
NOx ppm:	22.06	21.77	1.16	YES	21.75	1.24	0.08	YES

UNCORRECTED ANALYZER VALUES

	DRY
O2, %	14.0
CO2, %	3.6
NOx ppm:	19.3

ANALYZER VALUES CORRECTED FOR DRIFT

	DRY	@15% O2
O2, %	14.3	
CO2, %	3.6	
NOx ppm:	19.5	17.4

F- FACTOR (scf/mmBtu) = 8710  
Heat Input (mmBtu/hr) = 1078.8

EMISSION RATES  
NOx, lbs/mmBtu = 0.064  
NOx, lbs/hr = 69.04



CATALYST AIR MANAGEMENT, Inc.  
REFERENCE DATA

CLIENT: Lakeland Electric  
PLANT: Larsen  
UNIT: 8  
TEST: NOx - Method 3A/7E  
LOCATION: Stack

RUN #: 3  
OPERATING LEVEL: Base  
START DATE: 12/2/2003  
END DATE: 12/2/2003  
START: 9:43  
END: 10:04

DATE	TIME	O2	CO2	NOx
12/2/2003	9:43	14.08	3.76	18.94
12/2/2003	9:44	14.01	3.56	19.02
12/2/2003	9:45	14	3.55	19.13
12/2/2003	9:46	14.01	3.52	19.06
12/2/2003	9:47	14	3.53	19.03
12/2/2003	9:48	13.99	3.53	18.98
12/2/2003	9:49	13.99	3.53	18.93
12/2/2003	9:50	13.99	3.53	18.91
12/2/2003	9:51	13.99	3.53	18.93
12/2/2003	9:52	13.98	3.5	18.88
12/2/2003	9:53	13.98	3.51	18.87
12/2/2003	9:54	13.97	3.5	18.85
12/2/2003	9:55	13.97	3.51	18.89
12/2/2003	9:56	13.98	3.51	18.85
12/2/2003	9:57	13.99	3.51	19.02
12/2/2003	9:58	14	3.52	19.2
12/2/2003	9:59	13.99	3.52	18.97
12/2/2003	10:00	13.97	3.5	18.93
12/2/2003	10:01	13.98	3.5	18.9
12/2/2003	10:02	14	3.5	18.91
12/2/2003	10:03	14	3.5	18.89
12/2/2003	10:04	13.98	3.51	18.92

O2	CO2	NOx
13.99	3.53	18.96
%	%	ppm

Analyzer Readings not corrected  
for Post-Test Calibrations.

SYSTEM CALIBRATION BIAS AND DRIFT DATA

GAS UNITS	ANALYZER VALUE	PRE-TEST CHECK	% SPAN	Pass YES/NO	POST-TEST CHECK	% SPAN	% DRIFT	Pass YES/NO
O2, %	0.00	0.00	0.00	YES	0.00	0.00	0.00	YES
O2, %	22.28	21.97	1.24	YES	21.95	1.32	0.08	YES
CO2, %	0.00	0.00	0.00	YES	0.13	0.65	0.65	YES
CO2, %	17.81	17.81	0.00	YES	17.53	1.40	1.40	YES
NOx ppm:	0.32	0.52	0.80	YES	0.50	0.72	0.08	YES
NOx ppm:	22.06	21.75	1.24	YES	21.79	1.08	0.16	YES

UNCORRECTED ANALYZER VALUES

	DRY
O2, %	14.0
CO2, %	3.5
NOx ppm:	19.0

ANALYZER VALUES CORRECTED FOR DRIFT

	DRY	@15% O2
O2, %	14.3	
CO2, %	3.5	
NOx ppm:	19.2	17.2

F- FACTOR (scf/mmBtu) = 8710  
Heat Input (mmBtu/hr) = 1066.1

EMISSION RATES  
NOx, lbs/mmBtu = 0.063  
NOx, lbs/hr = 67.16

CATALYST AIR MANAGEMENT, Inc.  
REFERENCE DATA

CLIENT: Lakeland Electric  
PLANT: Larsen  
UNIT: 8  
TEST: NOx - Method 3A/7E  
LOCATION: Stack

RUN #: 4  
OPERATING LEVEL: Peak  
START DATE: 12/2/2003  
END DATE: 12/2/2003  
START: 11:03  
END: 11:33

DATE	TIME	O2	CO2	NOx
12/2/2003	11:03	13.37	3.81	20.51
12/2/2003	11:04	13.38	3.81	21.35
12/2/2003	11:05	13.38	3.8	21.32
12/2/2003	11:06	13.36	3.83	21.37
12/2/2003	11:07	13.36	3.82	21.31
12/2/2003	11:08	13.36	3.85	21.44
12/2/2003	11:09	13.36	3.83	21.41
12/2/2003	11:10	13.36	3.83	21.35
12/2/2003	11:11	13.36	3.82	21.29
12/2/2003	11:12	13.38	3.84	21.43
12/2/2003	11:13	13.38	3.83	21.5
12/2/2003	11:14	13.38	3.8	21.44
12/2/2003	11:15	13.38	3.8	21.39
12/2/2003	11:16	13.39	3.82	21.47
12/2/2003	11:17	13.39	3.82	21.45
12/2/2003	11:18	13.39	3.84	21.47
12/2/2003	11:19	13.39	3.85	21.47
12/2/2003	11:20	13.38	3.82	21.48
12/2/2003	11:21	13.39	3.83	21.47
12/2/2003	11:22	13.36	3.85	21.56
12/2/2003	11:23	13.37	3.86	21.61
12/2/2003	11:24	13.38	3.86	21.59
12/2/2003	11:25	13.39	3.86	21.63
12/2/2003	11:26	13.38	3.85	21.61
12/2/2003	11:27	13.38	3.86	21.52
12/2/2003	11:28	13.37	3.84	21.5
12/2/2003	11:29	13.37	3.85	21.55
12/2/2003	11:30	13.38	3.83	21.54
12/2/2003	11:31	13.38	3.83	21.52
12/2/2003	11:32	13.39	3.83	21.5
12/2/2003	11:33	13.38	3.83	21.58

O2	CO2	NOx
13.38	3.83	21.44
%	%	ppm

Analyzer Readings not corrected  
for Post-Test Calibrations.

SYSTEM CALIBRATION BIAS AND DRIFT DATA

GAS	ANALYZER	PRE-TEST	%	Pass	POST-TEST	%	%	Pass
UNITS	VALUE	CHECK	SPAN	YES/NO	CHECK	SPAN	DRIFT	YES/NO
O2, %	0.00	0.00	0.00	YES	0.00	0.00	0.00	YES
O2, %	22.28	21.95	1.32	YES	21.98	1.20	0.12	YES
CO2, %	0.00	0.13	0.65	YES	0.07	0.35	0.30	YES
CO2, %	17.81	17.53	1.40	YES	17.51	1.50	0.10	YES
NOx ppm:	0.32	0.50	0.72	YES	0.62	1.20	0.48	YES
NOx ppm:	22.06	21.79	1.08	YES	21.84	0.88	0.20	YES

UNCORRECTED ANALYZER VALUES

	DRY
O2, %	13.4
CO2, %	3.8
NOx ppm:	21.4

ANALYZER VALUES CORRECTED FOR DRIFT

	DRY	@15% O2
O2, %	13.6	
CO2, %	3.8	
NOx ppm:	21.7	17.5

F- FACTOR (scf/mmBtu) = 8710  
Heat Input (mmBtu/hr) = 1133.8

EMISSION RATES  
NOx, lbs/mmBtu = 0.065  
NOx, lbs/hr = 73.70

CATALYST AIR MANAGEMENT, Inc.  
REFERENCE DATA

CLIENT: Lakeland Electric  
PLANT: Larsen  
UNIT: 8  
TEST: NOx - Method 3A/7E  
LOCATION: Stack

RUN #: 5  
OPERATING LEVEL: Peak  
START DATE: 12/2/2003  
END DATE: 12/2/2003  
START: 11:40  
END: 12:10

DATE	TIME	O2	CO2	NOx
12/2/2003	11:40	13.87	4.62	21.33
12/2/2003	11:41	13.42	4	22.04
12/2/2003	11:42	13.4	3.9	22.04
12/2/2003	11:43	13.39	3.86	22.09
12/2/2003	11:44	13.4	3.94	22.08
12/2/2003	11:45	13.39	3.84	22.22
12/2/2003	11:46	13.4	3.84	22.22
12/2/2003	11:47	13.4	3.88	22.22
12/2/2003	11:48	13.41	3.78	22.04
12/2/2003	11:49	13.41	3.85	22.08
12/2/2003	11:50	13.41	3.85	22.04
12/2/2003	11:51	13.39	3.88	21.99
12/2/2003	11:52	13.42	3.88	22.21
12/2/2003	11:53	13.41	3.85	22.12
12/2/2003	11:54	13.41	3.85	22.12
12/2/2003	11:55	13.39	3.85	22.12
12/2/2003	11:56	13.4	3.85	22.29
12/2/2003	11:57	13.39	3.81	22.17
12/2/2003	11:58	13.4	3.88	22.3
12/2/2003	11:59	13.4	3.85	22.17
12/2/2003	12:00	13.4	3.85	22.25
12/2/2003	12:01	13.42	3.88	22.12
12/2/2003	12:02	13.42	3.82	22.21
12/2/2003	12:03	13.42	3.85	22.29
12/2/2003	12:04	13.42	3.78	22.38
12/2/2003	12:05	13.43	3.87	22.37
12/2/2003	12:06	13.42	3.92	22.29
12/2/2003	12:07	13.4	3.84	22.14
12/2/2003	12:08	13.41	3.82	22.29
12/2/2003	12:09	13.41	3.82	22.2
12/2/2003	12:10	13.44	3.82	22.29

O2	CO2	NOx
13.42	3.88	22.15
%	%	ppm

Analyzer Readings not corrected  
for Post-Test Calibrations.

SYSTEM CALIBRATION BIAS AND DRIFT DATA

GAS	ANALYZER	PRE-TEST	%	Pass	POST-TEST	%	%	Pass
UNITS	VALUE	CHECK	SPAN	YES/NO	CHECK	SPAN	DRIFT	YES/NO
O2, %	0.00	0.00	0.00	YES	0.00	0.00	0.00	YES
O2, %	22.28	21.98	1.20	YES	21.97	1.24	0.04	YES
CO2, %	0.00	0.07	0.35	YES	0.16	0.80	0.45	YES
CO2, %	17.81	17.51	1.50	YES	17.56	1.25	0.25	YES
NOx ppm:	0.32	0.62	1.20	YES	0.65	1.32	0.12	YES
NOx ppm:	22.06	21.84	0.88	YES	22.02	0.16	0.72	YES

UNCORRECTED ANALYZER VALUES

	DRY
O2, %	13.4
CO2, %	3.9
NOx ppm:	22.2

ANALYZER VALUES CORRECTED FOR DRIFT

	DRY	@15% O2
O2, %	13.7	
CO2, %	3.9	
NOx ppm:	22.3	18.3

F- FACTOR (scf/mmBtu) = 8710  
Heat Input (mmBtu/hr) = 1126.7

EMISSION RATES  
NOx, lbs/mmBtu = 0.067  
NOx, lbs/hr = 75.49

CATALYST AIR MANAGEMENT, Inc.  
REFERENCE DATA

CLIENT: Lakeland Electric  
PLANT: Larsen  
UNIT: 8  
TEST: NOx - Method 3A/7E  
LOCATION: Stack

RUN #: 6  
OPERATING LEVEL: Peak  
START DATE: 12/2/2003  
END DATE: 12/2/2003  
START: 12:18  
END: 12:48

DATE	TIME	O2	CO2	NOx
12/2/2003	12:18	13.39	3.84	21.72
12/2/2003	12:19	13.45	3.91	22.22
12/2/2003	12:20	13.43	3.84	22.31
12/2/2003	12:21	13.43	3.85	22.36
12/2/2003	12:22	13.41	3.85	22.34
12/2/2003	12:23	13.44	3.8	22.24
12/2/2003	12:24	13.44	3.81	22.33
12/2/2003	12:25	13.41	3.82	22.34
12/2/2003	12:26	13.41	3.81	22.4
12/2/2003	12:27	13.41	3.84	22.46
12/2/2003	12:28	13.42	3.85	22.47
12/2/2003	12:29	13.41	3.83	22.35
12/2/2003	12:30	13.41	3.83	22.35
12/2/2003	12:31	13.43	3.84	22.4
12/2/2003	12:32	13.43	3.84	22.31
12/2/2003	12:33	13.41	3.82	22.24
12/2/2003	12:34	13.41	3.82	22.32
12/2/2003	12:35	13.42	3.83	22.29
12/2/2003	12:36	13.42	3.83	22.37
12/2/2003	12:37	13.42	3.81	22.26
12/2/2003	12:38	13.42	3.81	21.91
12/2/2003	12:39	13.4	3.82	22.36
12/2/2003	12:40	13.4	3.81	22.29
12/2/2003	12:41	13.39	3.82	22.25
12/2/2003	12:42	13.39	3.82	22.23
12/2/2003	12:43	13.39	3.84	22.21
12/2/2003	12:44	13.39	3.84	22.45
12/2/2003	12:45	13.4	3.78	22.32
12/2/2003	12:46	13.39	3.78	22.15
12/2/2003	12:47	13.38	3.81	22.02
12/2/2003	12:48	13.36	3.8	21.74

O2	CO2	NOx
13.41	3.83	22.26
%	%	ppm

Analyzer Readings not corrected  
for Post-Test Calibrations.

SYSTEM CALIBRATION BIAS AND DRIFT DATA

GAS	ANALYZER	PRE-TEST	%	Pass	POST-TEST	%	%	Pass
UNITS	VALUE	CHECK	SPAN	YES/NO	CHECK	SPAN	DRIFT	YES/NO
O2, %	0.00	0.00	0.00	YES	0.00	0.00	0.00	YES
O2, %	22.28	21.97	1.24	YES	21.95	1.32	0.08	YES
CO2, %	0.00	0.16	0.80	YES	0.21	1.05	0.25	YES
CO2, %	17.81	17.56	1.25	YES	17.51	1.50	0.25	YES
NOx ppm:	0.32	0.65	1.32	YES	0.67	1.40	0.08	YES
NOx ppm:	22.06	22.02	0.16	YES	21.96	0.40	0.24	YES

UNCORRECTED ANALYZER VALUES

DRY
O2, % 13.4
CO2, % 3.8
NOx ppm: 22.3

ANALYZER VALUES CORRECTED FOR DRIFT

DRY @15% O2
O2, % 13.7
CO2, % 3.8
NOx ppm: 22.4 18.4

F- FACTOR (scf/mmBtu) = 8710  
Heat Input (mmBtu/hr) = 1120.0

EMISSION RATES  
NOx, lbs/mmBtu = 0.068  
NOx, lbs/hr = 76.16

CATALYST AIR MANAGEMENT, Inc.  
REFERENCE DATA

CLIENT: Lakeland Electric  
PLANT: Larsen  
UNIT: 8  
TEST: NOx - Method 3A/7E  
LOCATION: Stack

RUN #: 7  
OPERATING LEVEL: Peak  
START DATE: 12/2/2003  
END DATE: 12/2/2003  
START: 12:56  
END: 13:26

DATE	TIME	O2	CO2	NOx
12/2/2003	12:56	13.39	3.92	21.85
12/2/2003	12:57	13.36	3.82	21.91
12/2/2003	12:58	13.36	3.82	22.02
12/2/2003	12:59	13.35	3.8	21.86
12/2/2003	13:00	13.36	3.8	21.88
12/2/2003	13:01	13.34	3.78	21.81
12/2/2003	13:02	13.35	3.78	21.78
12/2/2003	13:03	13.34	3.78	21.68
12/2/2003	13:04	13.36	3.81	21.73
12/2/2003	13:05	13.35	3.8	21.71
12/2/2003	13:06	13.35	3.81	21.71
12/2/2003	13:07	13.34	3.78	21.65
12/2/2003	13:08	13.36	3.8	21.73
12/2/2003	13:09	13.35	3.78	21.73
12/2/2003	13:10	13.35	3.79	21.77
12/2/2003	13:11	13.34	3.78	21.69
12/2/2003	13:12	13.34	3.8	21.71
12/2/2003	13:13	13.34	3.79	21.71
12/2/2003	13:14	13.35	3.78	21.61
12/2/2003	13:15	13.34	3.77	21.66
12/2/2003	13:16	13.37	3.77	21.62
12/2/2003	13:17	13.37	3.76	21.55
12/2/2003	13:18	13.35	3.8	21.66
12/2/2003	13:19	13.35	3.81	21.71
12/2/2003	13:20	13.34	3.78	21.68
12/2/2003	13:21	13.34	3.77	21.64
12/2/2003	13:22	13.35	3.81	21.64
12/2/2003	13:23	13.34	3.81	21.64
12/2/2003	13:24	13.34	3.76	21.52
12/2/2003	13:25	13.34	3.76	21.56
12/2/2003	13:26	13.33	3.8	21.63

O2	CO2	NOx
13.35	3.79	21.71
%	%	ppm

Analyzer Readings not corrected  
for Post-Test Calibrations.

SYSTEM CALIBRATION BIAS AND DRIFT DATA

GAS	ANALYZER	PRE-TEST	%	Pass	POST-TEST	%	%	Pass
UNITS	VALUE	CHECK	SPAN	YES/NO	CHECK	SPAN	DRIFT	YES/NO
O2, %	0.00	0.00	0.00	YES	0.00	0.00	0.00	YES
O2, %	22.28	21.95	1.32	YES	21.92	1.44	0.12	YES
CO2, %	0.00	0.21	1.05	YES	0.00	0.00	1.05	YES
CO2, %	17.81	17.51	1.50	YES	17.53	1.40	0.10	YES
NOx ppm:	0.32	0.67	1.40	YES	0.54	0.88	0.52	YES
NOx ppm:	22.06	21.96	0.40	YES	21.59	1.88	1.48	YES

UNCORRECTED ANALYZER VALUES

DRY  
O2, % 13.3  
CO2, % 3.8  
NOx ppm: 21.7

ANALYZER VALUES CORRECTED FOR DRIFT

DRY @15% O2  
O2, % 13.6  
CO2, % 3.8  
NOx ppm: 22.0 17.8

F- FACTOR (scf/mmBtu) = 8710  
Heat Input (mmBtu/hr) = 1117.4

EMISSION RATES  
NOx, lbs/mmBtu = 0.066  
NOx, lbs/hr = 73.75

CATALYST AIR MANAGEMENT, Inc.  
REFERENCE DATA

CLIENT: Lakeland Electric  
PLANT: Larsen  
UNIT: 8  
TEST: NOx - Method 3A/7E  
LOCATION: Stack

RUN #: 8  
OPERATING LEVEL: Peak  
START DATE: 12/2/2003  
END DATE: 12/2/2003  
START: 13:34  
END: 14:04

DATE	TIME	O2	CO2	NOx
12/2/2003	13:34	13.34	3.85	21.77
12/2/2003	13:35	13.38	3.88	21.88
12/2/2003	13:36	13.34	3.8	21.76
12/2/2003	13:37	13.35	3.8	21.84
12/2/2003	13:38	13.35	3.79	21.96
12/2/2003	13:39	13.37	3.8	22.09
12/2/2003	13:40	13.35	3.82	22.09
12/2/2003	13:41	13.36	3.81	22.23
12/2/2003	13:42	13.36	3.8	22.33
12/2/2003	13:43	13.36	3.82	22.32
12/2/2003	13:44	13.36	3.8	22.16
12/2/2003	13:45	13.36	3.83	22.17
12/2/2003	13:46	13.35	3.77	22.18
12/2/2003	13:47	13.35	3.78	22.18
12/2/2003	13:48	13.37	3.8	22.15
12/2/2003	13:49	13.38	3.81	22.12
12/2/2003	13:50	13.34	3.78	22.04
12/2/2003	13:51	13.34	3.81	22.08
12/2/2003	13:52	13.36	3.81	22.09
12/2/2003	13:53	13.37	3.82	22.11
12/2/2003	13:54	13.35	3.81	22.03
12/2/2003	13:55	13.35	3.81	22.04
12/2/2003	13:56	13.36	3.79	22.11
12/2/2003	13:57	13.36	3.81	22
12/2/2003	13:58	13.36	3.81	21.94
12/2/2003	13:59	13.37	3.82	21.95
12/2/2003	14:00	13.35	3.79	22.1
12/2/2003	14:01	13.36	3.8	22.11
12/2/2003	14:02	13.36	3.77	22.07
12/2/2003	14:03	13.37	3.79	22.09
12/2/2003	14:04	13.36	3.82	22.24

O2	CO2	NOx
13.36	3.81	22.07
%	%	ppm

Analyzer Readings not corrected  
for Post-Test Calibrations.

SYSTEM CALIBRATION BIAS AND DRIFT DATA

GAS	ANALYZER	PRE-TEST	%	Pass	POST-TEST	%	%	Pass
UNITS	VALUE	CHECK	SPAN	YES/NO	CHECK	SPAN	DRIFT	YES/NO
O2, %	0.00	0.00	0.00	YES	0.00	0.00	0.00	YES
O2, %	22.28	21.92	1.44	YES	21.89	1.56	0.12	YES
CO2, %	0.00	0.00	0.00	YES	0.00	0.00	0.00	YES
CO2, %	17.81	17.53	1.40	YES	17.50	1.55	0.15	YES
NOx ppm:	0.32	0.54	0.88	YES	0.52	0.80	0.08	YES
NOx ppm:	22.06	21.59	1.88	YES	21.54	2.08	0.20	YES

UNCORRECTED ANALYZER VALUES

	DRY
O2, %	13.4
CO2, %	3.8
NOx ppm:	22.1

ANALYZER VALUES CORRECTED FOR DRIFT

	DRY	@15% O2
O2, %	13.7	
CO2, %	3.9	
NOx ppm:	22.6	18.5

F- FACTOR (scf/mmBtu) = 8710  
Heat Input (mmBtu/hr) = 1114.2

EMISSION RATES  
NOx, lbs/mmBtu = 0.068  
NOx, lbs/hr = 75.77

CATALYST AIR MANAGEMENT, Inc.  
REFERENCE DATA

CLIENT: Lakeland Electric  
PLANT: Larsen  
UNIT: 8  
TEST: NOx - Method 3A/7E  
LOCATION: Stack

RUN #: 9  
OPERATING LEVEL: Peak  
START DATE: 12/2/2003  
END DATE: 12/2/2003  
START: 14:12  
END: 14:42

DATE	TIME	O2	CO2	NOx
12/2/2003	14:12	13.38	3.82	21.71
12/2/2003	14:13	13.4	3.89	22.03
12/2/2003	14:14	13.39	3.83	22.06
12/2/2003	14:15	13.37	3.77	22.16
12/2/2003	14:16	13.37	3.78	22.14
12/2/2003	14:17	13.36	3.81	22.13
12/2/2003	14:18	13.36	3.82	22.11
12/2/2003	14:19	13.36	3.8	22.08
12/2/2003	14:20	13.36	3.79	22.02
12/2/2003	14:21	13.35	3.8	22.02
12/2/2003	14:22	13.35	3.81	22.07
12/2/2003	14:23	13.36	3.8	22.06
12/2/2003	14:24	13.36	3.82	22.02
12/2/2003	14:25	13.36	3.79	22.05
12/2/2003	14:26	13.36	3.77	22.04
12/2/2003	14:27	13.36	3.8	22.07
12/2/2003	14:28	13.37	3.79	22.03
12/2/2003	14:29	13.36	3.79	22.05
12/2/2003	14:30	13.36	3.79	22.01
12/2/2003	14:31	13.36	3.8	22.09
12/2/2003	14:32	13.36	3.81	22.1
12/2/2003	14:33	13.35	3.81	22.08
12/2/2003	14:34	13.35	3.81	22.08
12/2/2003	14:35	13.36	3.79	22.11
12/2/2003	14:36	13.36	3.79	22.15
12/2/2003	14:37	13.36	3.79	22.17
12/2/2003	14:38	13.36	3.79	22.16
12/2/2003	14:39	13.36	3.75	22.14
12/2/2003	14:40	13.36	3.76	22.11
12/2/2003	14:41	13.34	3.81	22.08
12/2/2003	14:42	13.34	3.8	22.09

O2 CO2 NOx  
13.36 3.80 22.07  
% % ppm

Analyzer Readings not corrected  
for Post-Test Calibrations.

SYSTEM CALIBRATION BIAS AND DRIFT DATA

GAS	ANALYZER	PRE-TEST	%	Pass	POST-TEST	%	%	Pass
UNITS	VALUE	CHECK	SPAN	YES/NO	CHECK	SPAN	DRIFT	YES/NO
O2, %	0.00	0.00	0.00	YES	0.00	0.00	0.00	YES
O2, %	22.28	21.89	1.56	YES	22.05	0.92	0.64	YES
CO2, %	0.00	0.00	0.00	YES	0.00	0.00	0.00	YES
CO2, %	17.81	17.50	1.55	YES	17.58	1.15	0.40	YES
NOx ppm:	0.3	0.52	0.80	YES	0.58	1.04	0.24	YES
NOx ppm:	22.1	21.54	2.08	YES	21.88	0.72	1.36	YES

UNCORRECTED ANALYZER VALUES




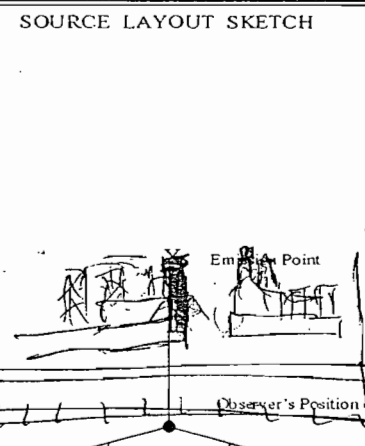
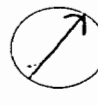
DRY  
O2, % 13.4  
CO2, % 3.8  
NOx ppm: 22.1

ANALYZER VALUES CORRECTED FOR DRIFT

DRY @15% O2  
O2, % 13.6  
CO2, % 3.9  
NOx ppm: 22.5 18.2

F- FACTOR (scf/mmBtu) = 8710  
Heat Input (mmBtu/hr) = 1113.4

EMISSION RATES  
NOx, lbs/mmBtu = 0.067  
NOx, lbs/hr = 74.60

COMPANY NAME <b>Lakeland Electric</b>		
STREET ADDRESS <b>Carson #8</b>		
2002 E. Hwy 92		
CITY <b>Lakeland</b>	STATE <b>FL</b>	ZIP <b>33805</b>
PHONE (KEY CONTACT) <b>863.834-6684</b>	SOURCE I.D. NUMBER <b>1050003 EU 008</b>	
PROCESS EQUIPMENT <b>Combustion Turbine</b>	OPERATING MODE <b>Peak - 92 MW</b>	
CONTROL EQUIPMENT <b>Water Injection</b>	OPERATING MODE <b>Normal</b>	
DESCRIBE EMISSION POINT <b>Square black stack just west of main drive / entrance</b>		
HEIGHT ABOVE GROUND LEVEL <b>105'</b>	HEIGHT RELATIVE TO OBSERVER Start <b>105'</b> End <b>Same</b>	
DISTANCE FROM OBSERVER <b>150 yds</b>	DIRECTION FROM OBSERVER Start <b>W NW</b> End <b>Same</b>	
DESCRIBE EMISSIONS		
Start <b>none</b>	End <b>none</b>	
EMISSION COLOR		
Start <b>none</b> End <b>none</b>	IF WATER DROPLET PLUME Attached <b>N/A</b> Detached <b>---</b>	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED		
Start <b>top of stack</b>	End <b>Same</b>	
DESCRIBE PLUME BACKGROUND		
Start <b>Sky</b>	End <b>Sky</b>	
SKY COLOR		
Start <b>blue</b> End <b>Same</b>	SKY CONDITIONS Start <b>clear</b> End <b>Same</b>	
WIND SPEED		
Start <b>15-20 mph</b> End <b>Same</b>	WIND DIRECTION Start <b>Variable E/NE</b> End <b>Same</b>	
AMBIENT TEMP		
Start <b>68°F</b> End <b>72°F</b>	WET BULB TEMP <b>---</b>	RH, percent <b>68%</b>
<div style="border: 1px solid black; padding: 5px;">           Stack              Plume            Start              Wind   </div>	SOURCE LOCATION SKETCH 	Draw North Arrow 

OBSERVATION DATE					START TIME	END TIME
12-02-03					11:03 CEN	12:03 CEN
	0	15	30	45	COMMENTS	
1	0	0	0	0		
2	0	0	0	0		
3	0	0	0	0		
4	0	0	0	0		
5	0	0	0	0		
6	0	0	0	0		
7	0	0	0	0		
8	0	0	0	0		
9	0	0	0	0		
10	0	0	0	0		
11	0	0	0	0		
12	0	0	0	0		
13	0	0	0	0		
14	0	0	0	0		
15	0	0	0	0		
16	0	0	0	0		
17	0	0	0	0		
18	0	0	0	0		
19	0	0	0	0		
20	0	0	0	0		
21	0	0	0	0		
22	0	0	0	0		
23	0	0	0	0		
24	0	0	0	0		
25	0	0	0	0		
26	0	0	0	0		
27	0	0	0	0		
28	0	0	0	0		
29	0	0	0	0		
30	0	0	0	0		

OBSERVER'S NAME (PRINT) Margaret Cangro		DATE 12/2/03
OBSERVER'S SIGNATURE Margaret Cangro		
ORGANIZATION Catalyst Air Mgmt.		
CERTIFIED BY ETA		DATE 07/03
PAGE 1 OF 2		



## VISIBLE EMISSION OBSERVATION FORM

(CONTINUED)

COMPANY NAME <u>Lakeland Electric</u>		FACILITY <u>Electric Power Generating</u>	
CITY <u>Lakeland, FL</u>		EMISSION POINT <u>Larson 8</u>	
TEST NO. <u>Run 4 - Peak</u>	PAGE <u>2</u> OF <u>2</u>	OBSERVER <u>Margaret Cangro</u>	

OBSERVATION DATE <u>12-02-03</u>					START TIME <u>11:03 am</u>		END TIME <u>12:03 pm</u>							START TIME		END TIME	
	0	15	30	45	COMMENTS				0	15	30	45	COMMENTS				
31	0	0	0	0			61										
32	0	0	0	0			62										
33	0	0	0	0			63										
34	0	0	0	0			64										
35	0	0	0	0			65										
36	0	0	0	0			66										
37	0	0	0	0			67										
38	0	0	0	0			68										
39	0	0	0	0			69										
40	0	0	0	0			70										
41	0	0	0	0			71										
42	0	0	0	0			72										
43	0	0	0	0			73										
44	0	0	0	0			74										
45	0	0	0	0			75										
46	0	0	0	0			76										
47	0	0	0	0			77										
48	0	0	0	0			78										
49	0	0	0	0			79										
50	0	0	0	0			80										
51	0	0	0	0			81										
52	0	0	0	0			82										
53	0	0	0	0			83										
54	0	0	0	0			84										
55	0	0	0	0			85										
56	0	0	0	0			86										
57	0	0	0	0			87										
58	0	0	0	0			88										
59	0	0	0	0			89										
60	0	0	0	0			90										

APPENDIX 2  
PLANT DATA

## Fuel Data Table

City of Lakeland, Charles Larsen Power Plant Unit-8

Sample ID: Florida Gas Transmission Stream #1 @ 85.1% & Gulf Stream @ 14.9%

Date: December 2, 2003

Test Run Number	Run-1	Run-2	Run-3	
Date	Dec. 2, 2003	Dec. 2, 2003	Dec. 2, 2003	
Start Time	11:03	12:18	13:34	
Stop Time	12:10	13:26	14:42	
<b>Turbine Fuel Data (Pipeline Grade Natural Gas)</b>				<b>Average</b>
Fuel Heating value (Btu/lb, HHV)	1031.2	1031.2	1031.2	1031.2
Fuel Specific Gravity	0.5822	0.5822	0.5822	0.5822
O <sub>2</sub> "F-factor" (DSCFex/MMBtu @ 0% excess air, published)	8638	8638	8638	8638
CO <sub>2</sub> "F-factor" (DSCFex/MMBtu @ 0% excess air, published)	1026	1026	1026	1026
Average Fuel Flow KSCF	1062.0	1051.1	1046.2	1053.1
Heat Input (MMBtu/Hr, HHV from fuel analysis and fuel flow)	1095.1	1083.9	1079.2	1086.1
Heat Input (MMBtu/Hr, LHV from fuel analysis and fuel flow)	995.5	985.4	981.1	987.3
Calculated H <sub>CAP(LHV)</sub> (MMBtu/Hr from GE Curve)	1044.8	1040.8	1038.2	1041.3
	Calculated % Heat Input	95%	95%	95%

### Calculated Turbine Capacity (from GE Curves)

Refers to test Run-1

$T_{inlet}$  = turbine (or compressor) air inlet temperature  
1241 = turbine heat input at 0° F (y-intercept), MMBtu/hr, LHV

$H_{CAP(LHV)}$  = maximum heat input at turbine air inlet temperature  
=  $1241 + [T_{inlet} \times (-3.0648)] + [(T_{inlet})^2 \times (0.0090997)] + [(T_{inlet})^3 \times (-8.2556E-05)] + [(T_{inlet})^4 \times (2.6224E-07)]$   
=  $1241 + [71.6 \times (-3.0648)] + [(71.6)^2 \times (0.0090997)] + [(71.6)^3 \times (-8.2556E-05)] + [(71.6)^4 \times (2.6224E-07)]$

$H_{CAP(LHV)}$  1044.8 MMBtu/hr, based on Lower Heat Value

Refers to test Run-2

$T_{inlet}$  = turbine (or compressor) air inlet temperature  
1241 = turbine heat input at 0° F (y-intercept), MMBtu/hr, LHV

$H_{CAP(LHV)}$  = maximum heat input at turbine air inlet temperature  
=  $1241 + [T_{inlet} \times (-3.0648)] + [(T_{inlet})^2 \times (0.0090997)] + [(T_{inlet})^3 \times (-8.2556E-05)] + [(T_{inlet})^4 \times (2.6224E-07)]$   
=  $1241 + [73.1 \times (-3.0648)] + [(73.1)^2 \times (0.0090997)] + [(73.1)^3 \times (-8.2556E-05)] + [(73.1)^4 \times (2.6224E-07)]$

$H_{CAP(LHV)}$  1040.8 MMBtu/hr, based on Lower Heat Value

Refers to test Run-3

$T_{inlet}$  = turbine (or compressor) air inlet temperature  
1241 = turbine heat input at 0° F (y-intercept), MMBtu/hr, LHV

$H_{CAP(LHV)}$  = maximum heat input at turbine air inlet temperature  
=  $1241 + [T_{inlet} \times (-3.0648)] + [(T_{inlet})^2 \times (0.0090997)] + [(T_{inlet})^3 \times (-8.2556E-05)] + [(T_{inlet})^4 \times (2.6224E-07)]$   
=  $1241 + [74.1 \times (-3.0648)] + [(74.1)^2 \times (0.0090997)] + [(74.1)^3 \times (-8.2556E-05)] + [(74.1)^4 \times (2.6224E-07)]$

$H_{CAP(LHV)}$  1038.2 MMBtu/hr, based on Lower Heat Value

RUN#	TIME	MW	KSCFH	Inlet Air Temp.	*Calculated HHV	**Calculated LHV
1	11:03 - 12:10	92	1061.95	71.6	1095.1	995.5
2	12:18 - 13:26	91	1051.115	73.1	1083.9	985.4
3	13:34 - 14:42	90	1046.525	74.1	1079.2	981.1

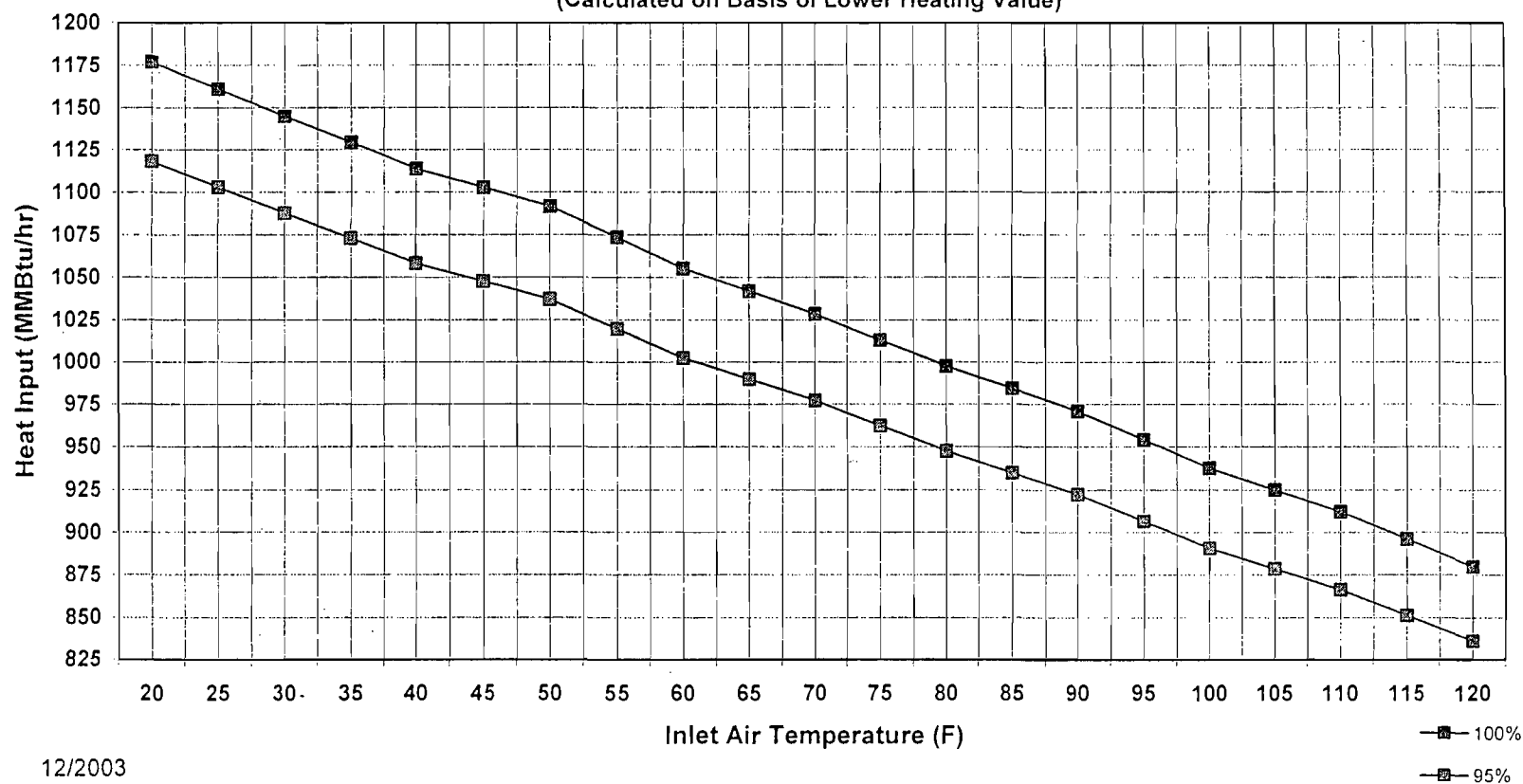
\*(based on fuel analysis and fuel flow)

\*\* (based on calculated HHV minus 10%)

760

# Larsen U8 Operating Curve PEAK OPERATION - GAS FUEL

Fuel Heat Input -vs- Inlet Air Temperature  
(Calculated on Basis of Lower Heating Value)



12/2003

## PERMITTED PEAK - GAS

F	100%	95%
0	1241	1179
5	1225	1164
10	1209	1149
15	1193	1133
20	1177	1118
25	1161	1103
30	1145	1088
35	1129	1073
40	1114	1058
45	1103	1048
50	1092	1037
55	1073	1020
60	1055	1002
65	1042	990
70	1029	977
75	1013	962
80	998	948
85	984	935
90	971	922
95	954	907
100	938	891
105	925	879
110	912	867
115	896	851
120	880	836

APPENDIX 3  
FUEL ANALYSIS

# Gas Fuel F Factor & Heating Value Calculation

City of Lakeland, Charles Larsen Power Plant

Sample ID: Florida Gas Transmission Stream #1 @ 85.1% & Gulf Stream @ 14.9%

Date: December 2, 2003

## CALCULATION OF DENSITY AND HEATING VALUE @ 60°F and 30 in Hg

Component	% Volume	Molecular Wt.	Density (lb/ft <sup>3</sup> )	% volume x		Component Gross Btu/lb	Weight Fract. Btu	Gross Heat Value (Btu/SCF)	Volume Fract. Btu
				Density	weight %				
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	0.3445	28.016	0.0744	0.00026	0.5754	0	0.00	0.0	0
Carbon dioxide	0.7778	44.010	0.1170	0.00091	2.0434	0	0.00	0.0	0
Carbon monoxide		28.010	0.0740	0.00000	0.0000	4347	0.00	322.0	0
Methane	96.0981	16.041	0.0424	0.04075	91.4883	23879	21846.48	1013.0	973.474
Ethane	2.1470	30.067	0.0803	0.00172	3.8711	22320	864.03	1792.0	38.4742
Ethylene		28.051	0.0746	0.00000	0.0000	21644	0.00	1614.0	0
Propane	0.3766	44.092	0.1196	0.00045	1.0114	21661	219.08	2590.0	9.75472
propylene		42.077	0.1110	0.00000	0.0000	21041	0.00	2336.0	0
Isobutane	0.0863	58.118	0.1582	0.00014	0.3064	21308	65.28	3363.0	2.90065
n-butane	0.0787	58.118	0.1582	0.00012	0.2796	21257	59.42	3370.0	2.65216
Isobutene		56.102	0.1480	0.00000	0.0000	20840	0.00	3068.0	0
Isopentane	0.0283	72.144	0.1904	0.00005	0.1209	21091	25.49	4008.0	1.13326
n-pentane	0.0185	72.144	0.1904	0.00004	0.0789	21052	16.62	4016.0	0.74163
n-hexane	0.0440	86.169	0.2274	0.00010	0.2246	20940	47.04	4762.0	2.09514
Hydrogen sulfide		34.076	0.0911	0.00000	0.0000	7100	0.00	647.0	0

total	100.00	Average Density	0.04454	100.0000	Gross Heating Value		Gross Heating Value	
		Specific Gravity	0.58218		Btu/lb	23143	Btu/SCF	1031.2

## CALCULATION OF F FACTORS

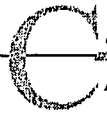
Component	Mol. Wt.	C Factor	H Factor	% volume	Fract. Wt.	Weight Percents			
						Carbon	Hydrogen	Nitrogen	Oxygen
Hydrogen	2.016	0	1	0.00	0.0000		0		
Oxygen	32.000	0	0	0.00	0.0000				0
Nitrogen	28.016	0	0	0.34	9.6505			0.573307876	
Carbon dioxide	44.010	0.272273	0	0.78	34.2318	0.553697333			1.47844
Carbon monoxide	28.010	0.42587	0	0.00	0.0000	0			0
Methane	16.041	0.75	0.25	96.10	1541.5096	68.68239683	22.8941323		
Ethane	30.067	0.8	0.2	2.15	64.5538	3.067961221	0.76699031		
Ethylene	28.051	0.85714	0.14286	0.00	0.0000	0	0		
Propane	44.092	0.81818	0.181818	0.38	16.6064	0.807163486	0.17936988		
Propene	42.077	0.85714	0.14286	0.00	0.0000	0	0		
Isobutane	58.118	0.82759	0.17247	0.09	5.0128	0.246452375	0.05136075		
n-butane	58.118	0.82759	0.17247	0.08	4.5738	0.224870791	0.04686314		
Isobutene	56.102	0.85714	0.14286	0.00	0.0000	0	0		
Isopentane	72.144	0.83333	0.16667	0.03	2.0399	0.100985213	0.02019753		
n-pentane	72.144	0.83333	0.16667	0.02	1.3323	0.065955577	0.01319143		
n-hexane	86.169	0.83721	0.16279	0.04	3.7912	0.188558652	0.03666399		
Hydrogen sulfide	34.076	0	0.0586923	0.00	0.0000	0	0		
Totals				99.99970	1683.3021	73.93804148	24.01	0.573307876	1.47844

CALCULATED VALUES		
O <sub>2</sub> F Factor (dry)	8638	DSCF of Exhaust/MM Btu of Fuel Burned @ 0% excess air
O <sub>2</sub> F Factor (wet)	10640	SCF of Exhaust/MM Btu of Fuel Burned @ 0% excess air
Moisture F Factor	2002	SCF of Water/MM Btu of Fuel Burned @ 0% excess air
Combust. Moisture	18.82	volume % water in flue gas @ 0% excess air
CO <sub>2</sub> F Factor	1026	DSCF of CO <sub>2</sub> /MM Btu of Fuel Burned @ 0% excess air
Fuel VOC % (non-C1)	5.98%	
Fuel VOC % (non-C1,C2)	2.11%	

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



APPENDIX 4  
FIGURES

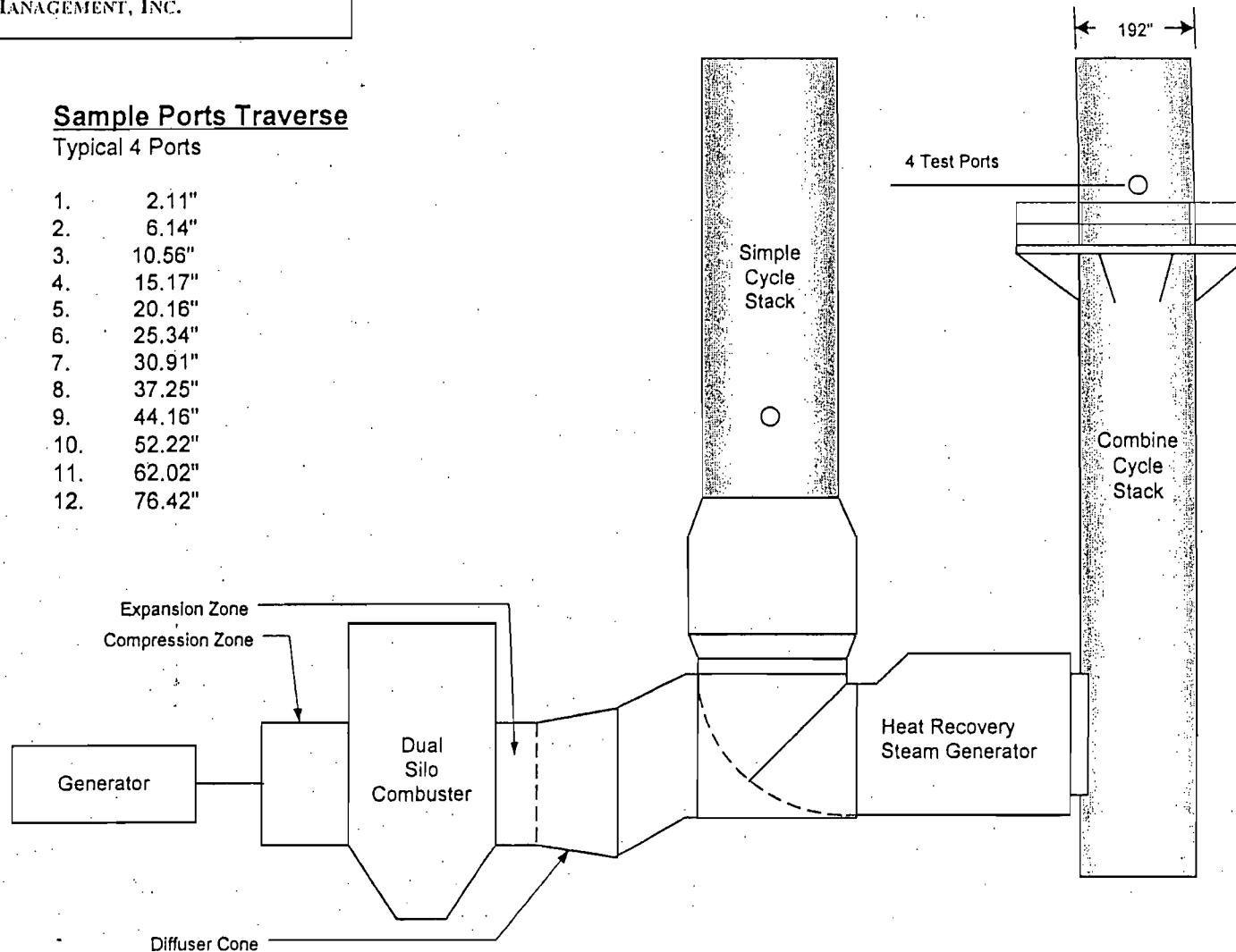


CATALYST  
AIR MANAGEMENT, INC.

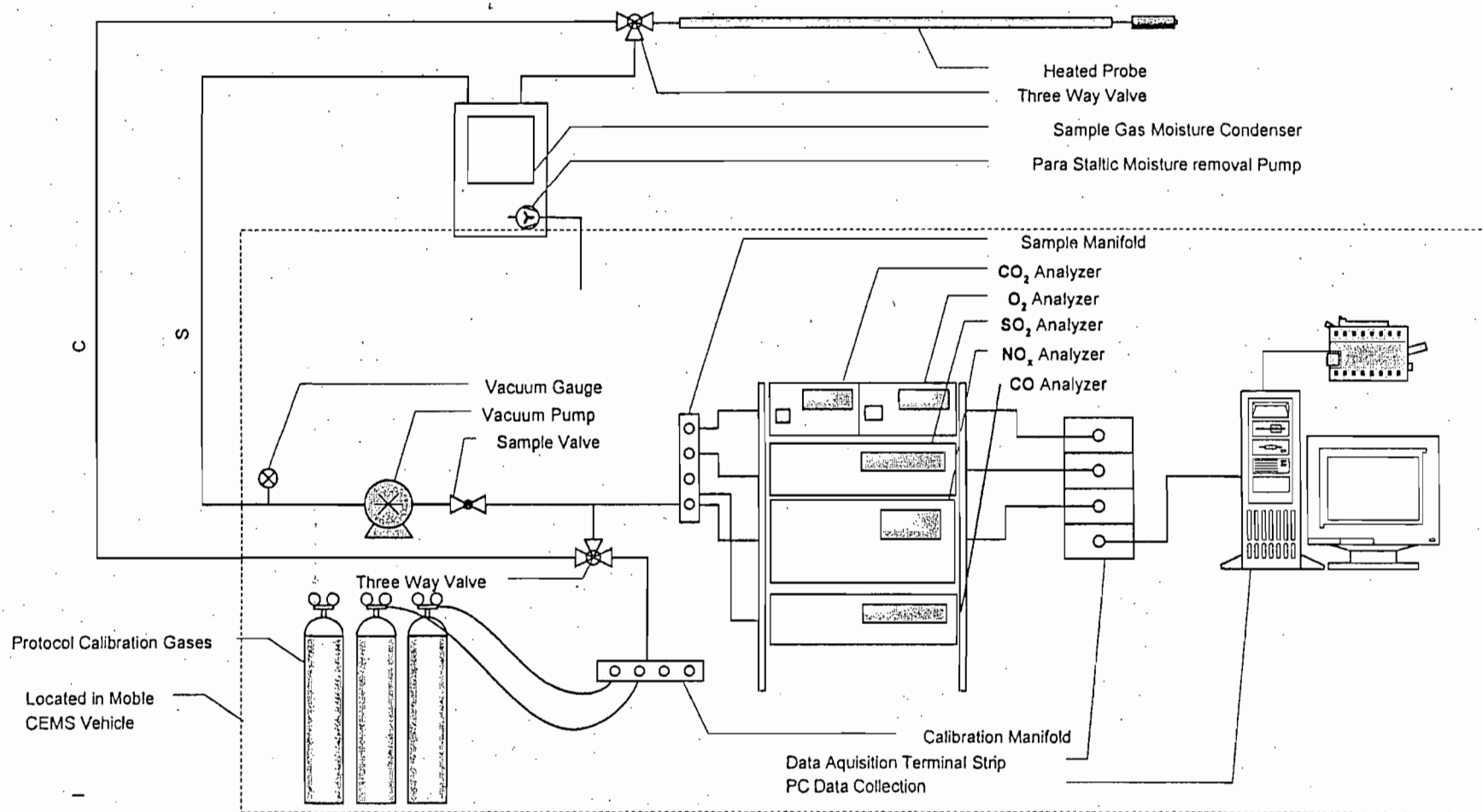
### Sample Ports Traverse

Typical 4 Ports

1. 2.11"
2. 6.14"
3. 10.56"
4. 15.17"
5. 20.16"
6. 25.34"
7. 30.91"
8. 37.25"
9. 44.16"
10. 52.22"
11. 62.02"
12. 76.42"



TITLE		
CITY of LAKELAND - CHARLES LARSEN POWER PLANT UNIT 8		
DESCRIPTION		DATE
UNIT 8 LAYOUT AND STACK DIAGRAM		01-11-99
SCALE	DRAWN BY	REVISED
NONE	MJ Taylor	



TITLE		
EPA INSTRUMENTAL SAMPLE TRAIN		
DESCRIPTION		DATE
SAMPLE TRAIN SCHEMATIC		01-26-98
SCALE	DRAWN BY	REVISED
NONE	RF COBB	

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**APPENDIX 5**  
REFERENCE METHOD QUALITY ASSURANCE

Calibration Gas Specification Sheets

ASSAY LABORATORY

BOC Gases  
2009 Bellaire  
Royal Oak, MI 48067  
(248) 399-9150

**CERTIFICATE OF ANALYSIS**  
EPA Protocol Gas

**CUSTOMER**

KNOXVILLE GAS & GEAR  
2300 SYCAMORE DR.  
KNOXVILLE, TN 37911773

Cylinder No : CC30380  
Expiration Date : 21/JUL/05  
Certification Date : 22/JUL/02  
Cylinder Pressure : 2200 psig  
Product ID No : 24014833  
Lot Number : 512512

Customer PO Number:

**ANALYTICAL INFORMATION**

This calibration standard has been certified per the 1997 EPA Traceability Protocol, Document EPA-600/97/121, Using Procedure G1. All values certified to be +/- 1% NIST Traceable.

Do not use this cylinder below 150psig, i.e. 1.0 Megapascal.

		Analytical Results		Total Relative Uncertainty VS NIST	Assay Dates
Components	Requested Mixture	Certified Concentration			
CARBON DIOXIDE	10.00%	10.11%		+/-1.00% NIST Traceable	7/22/2002
OXYGEN	12.50%	12.35%			7/22/2002
NITROGEN	Balance Gas				

**CALIBRATION STANDARDS USED IN ASSAY**

Type	LOT ID	Cylinder No	Concentration	Expiration Date
NTRM 81674	00060410	XC018798B	6.89 +/-0.04% CO2/N2	2/1/2004
SRM 2658A	72C46	CAL 014584	9.397 +/-0.05% O2/N2	7/27/2004

**ANALYTICAL INSTRUMENTATION USED IN ASSAY**

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
HORIBA E/N 1170227	NON-DISPERSIVE INFRARED	7/19/2002
ROSEMOUNT 755R L8 1000314	PARAMAGNETIC	7/22/2002

QA Approved A. F. Muhammad

**ASSAY LABORATORY**

BOC Gases  
2009 Bellaire  
Royal Oak, MI 48067  
(248) 399-9150

## CERTIFICATE OF ANALYSIS

### EPA Protocol Gas

**CUSTOMER**

KNOXVILLE GAS & GEAR  
2300 SYCAMORE DR.  
KNOXVILLE, TN 37911773

Cylinder No : CC14162  
Expiration Date : 21/JUL/05  
Certification Date : 22/JUL/02  
Cylinder Pressure : 2200 psig  
Product ID No : 24014833  
Lot Number : 512512

Customer PO Number:

### ANALYTICAL INFORMATION

This calibration standard has been certified per the 1997 EPA Traceability Protocol, Document EPA-600/97/121, Using Procedure G1. All values certified to be +/- 1% NIST Traceable.

Do not use this cylinder below 150psig, i.e. 1.0 Megapascal.

Analytical Results			Total Relative Uncertainty VS NIST	Assay Dates
Components	Requested Mixture	Certified Concentration		
CARBON DIOXIDE	10.00%	10.11%	+/- 1.00% NIST Traceable	7/22/2002
OXYGEN	12.50%	12.35%		7/22/2002
NITROGEN	Balance Gas			

### CALIBRATION STANDARDS USED IN ASSAY

Type	LOT ID	Cylinder No	Concentration	Expiration Date
NTRM 81674	00060410	XC018798B	6.89 +/- 0.04% CO <sub>2</sub> /N <sub>2</sub>	2/1/2004
SRM 2658A	72C46	CAL 014584	9.397 +/- 0.05% O <sub>2</sub> /N <sub>2</sub>	7/27/2004

### ANALYTICAL INSTRUMENTATION USED IN ASSAY

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
HORIBA E/N 1170227	NON-DISPERSIVE INFRARED	7/19/2002
ROSEMOUNT 755R L8 1000314	PARAMAGNETIC	7/22/2002

QA Approved A. F. Muhammad

**ASSAY LABORATORY**

BOC Gases  
2009 Bellaire  
Royal Oak, MI 48067  
(248) 399-9150

# **CERTIFICATE OF ANALYSIS**

EPA Protocol Gas

**CUSTOMER**  
KNOXVILLE GAS & GEAR  
2300 SYCAMORE DR.  
KNOXVILLE, TN 37911773

Cylinder No : CC40394  
Expiration Date : 21/JUL/05  
Certification Date : 22/JUL/02  
Cylinder Pressure : 2200 psig  
Product ID No : 24014833  
Lot Number : 512512

Customer PO Number:

## **ANALYTICAL INFORMATION**

This calibration standard has been certified per the 1997 EPA Traceability Protocol, Document EPA-600/97/121, Using Procedure G1. All values certified to be +/- 1% NIST Traceable.

Do not use this cylinder below 150psig, i.e. 1.0 Megapascal.

Analytical Results			Total Relative Uncertainty VS NIST	Assay Dates
Components	Requested Mixture	Certified Concentration		
CARBON DIOXIDE	10.00%	10.11%	+/-1.00% NIST Traceable	7/22/2002
OXYGEN	12.50%	12.35%		7/22/2002
NITROGEN	Balance Gas			

## **CALIBRATION STANDARDS USED IN ASSAY**

Type	LOT ID	Cylinder No	Concentration	Expiration Date
NTRM 81674	00060410	XC018798B	6.89 +/-0.04% CO2/N2	2/1/2004
SRM 2658A	72C46	CAL 014584	9.397 +/-0.05% O2/N2	7/27/2004

## **ANALYTICAL INSTRUMENTATION USED IN ASSAY**

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
HORIBA E/N 1170227	NON-DISPERSIVE INFRARED	7/19/2002
ROSEMOUNT 755R L8 1000314	PARAMAGNETIC	7/22/2002

QA Approved A. T. A. [Signature]

**ASSAY LABORATORY**

BOC Gases  
2009 Bellaire  
Royal Oak, MI 48067  
(248) 399-9150

**CERTIFICATE OF ANALYSIS**

EPA Protocol Gas

**CUSTOMER**

KNOXVILLE GAS & GEAR  
2300 SYCAMORE DR.  
KNOXVILLE, TN 37911773

Cylinder No : CC64981  
Expiration Date : 21/JUL/05  
Certification Date : 22/JUL/02  
Cylinder Pressure : 2200 psig  
Product ID No : 24014833  
Lot Number : 512512

Customer PO Number:

**ANALYTICAL INFORMATION**

This calibration standard has been certified per the 1997 EPA Traceability Protocol, Document EPA-600/97/121, Using Procedure G1. All values certified to be +/- 1% NIST Traceable.

Do not use this cylinder below 150psig, i.e. 1.0 Megapascal.

		Analytical Results		Total Relative Uncertainty VS NIST	Assay Dates
Components	Requested Mixture	Certified Concentration			
CARBON DIOXIDE	10.00%	10.11%		+/-1.00% NIST Traceable	7/22/2002
OXYGEN	12.50%	12.35%			7/22/2002
NITROGEN	Balance Gas				

**CALIBRATION STANDARDS USED IN ASSAY**

Type	LOT ID	Cylinder No	Concentration	Expiration Date
NTRM 81674	00060410	XC018798B	6.89 +/-0.04% CO <sub>2</sub> /N <sub>2</sub>	2/1/2004
SRM 2658A	72C46	CAL 014584	9.397 +/-0.05% O <sub>2</sub> /N <sub>2</sub>	7/27/2004

**ANALYTICAL INSTRUMENTATION USED IN ASSAY**

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
HORIBA E/N 1170227	NON-DISPERSIVE INFRARED	7/19/2002
ROSEMOUNT 755R I.8 1000314	PARAMAGNETIC	7/22/2002

QA Approved

*A. F. Muhammad*



## CERTIFICATE OF ANALYSIS

### EPA Protocol Gas

**CUSTOMER**  
 Knoxville Gas&Gear  
 2300 SYCAMORE DR  
 KNOXVILLE, TN 379211773

**CYLINDER NO** : XC033391B  
**EXPIRATION DATE** : 25-Nov-2005  
**CERTIFICATION DATE** : 27-Nov-2002  
**CYLINDER PRESSURE** : 2000 psig  
**PRODUCT ID NO** : 24005985  
**LOT NUMBER** : 532648

**CUSTOMER PO NO:**

**Previous Certification Date(s):**

### ANALYTICAL INFORMATION

This calibration standard has been certified per the 1997 EPA Traceability Protocol, Document EPA-600/97/121, Using Procedure G1. All Values certified to be +/-1% NIST Traceable.

Do Not Use This Cylinder below 150 psig. i.e. 1.0 Megapascal

### Analytical Results

Components	Requested Mixture	Certified Concentration	Analytical Uncertainty	Assay Dates
CARBON DIOXIDE	18.00 %	17.95 %	+/-1.00% NIST Traceable	11/27/02
GEN	22.50 %	22.41 %	+/-1.00% NIST Traceable	11/27/02
NITROGEN	BALANCE GAS			

### CALIBRATION STANDARDS USED IN ASSAY

Type	LOT ID	Cylinder No	Concentration	Expiration
NTRM 82745X	00060503	XC018957B	19.69 +/- 0.16 % CO2/N2	02/01/04
SRM 2659A	71-C-35	CAL014654	20.92 +/- 0.11 % O2/N2	07/14/04

### ANALYTICAL INSTRUMENTS USED IN ASSAY

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Siemens 5E DD721	NonDispersive Infrared	11/07/02
Siemens 5E BN805	Paramagnetic	11/07/02

**BOC GASES** Kx

Assay Laboratory  
BOC GASES  
2009 Bellaire Avenue  
Royal Oak, MI 48067  
(248) 399 9150

## CERTIFICATE OF ANALYSIS

### EPA Protocol Gas

CUSTOMER  
Knoxville Gas & Gear  
2300 SYCAMORE DR  
KNOXVILLE, TN 379211773

CYLINDER NO : XC005329B  
EXPIRATION DATE : 04-May-2005  
CERTIFICATION DATE : 05-May-2003  
CYLINDER PRESSURE : 2000 psig  
PRODUCT ID NO : 24014452  
LOT NUMBER : 556164

CUSTOMER PO NO:

Previous Certification Date(s):

### ANALYTICAL INFORMATION

This calibration standard has been certified per the 1997 EPA Traceability Protocol, Document EPA-600/97/121, Using Procedure G1. All Values certified to be +/-1% NIST Traceable.

Do Not Use This Cylinder below 150 psig. i.e. 1.0 Megapascal

### Analytical Results

Components	Requested Mixture	Certified Concentration	Analytical Uncertainty	Assay Dates
NITRIC OXIDE	13.00 ppm	12.8 ppm	+/-1.00% NIST Traceable	04/28/03 & 05/05/03
TOTAL OXIDES OF NITROGEN		13.4 ppm		
NITROGEN	BALANCE GAS			

### CALIBRATION STANDARDS USED IN ASSAY

Type	LOT ID	Cylinder No	Concentration	Expiration
SRM 1683B	45-T-13	FF20699	46.70 +/- 0.30 ppm NITRIC OXIDE	10/01/06

### ANALYTICAL INSTRUMENTS USED IN ASSAY

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Rosemount 951A L7	Chemiluminescence	04/07/03

Assay Laboratory  
BOC GASES  
2009 Bellaire Avenue  
Royal Oak, MI 48067  
(248) 399 9150

BOC GASES Kx

## CERTIFICATE OF ANALYSIS

EPA Protocol Gas

CUSTOMER  
Knoxville Gas & Gear  
2300 SYCAMORE DR  
KNOXVILLE, TN 379211773

CYLINDER NO : XC000852B  
EXPIRATION DATE : 27-Apr-2005  
CERTIFICATION DATE : 28-Apr-2003  
CYLINDER PRESSURE : 2000 psig  
PRODUCT ID NO : 24005083  
LOT NUMBER : 555413

CUSTOMER PO NO:  
Previous Certification Date(s):

### ANALYTICAL INFORMATION

This calibration standard has been certified per the 1997 EPA Traceability Protocol, Document EPA-600/97/121, Using Procedure G1. All Values certified to be +/-1% NIST Traceable.

Do Not Use This Cylinder below 150 psig. i.e. 1.0 Megapascal

### Analytical Results

Components	Requested Mixture	Certified Concentration	Analytical Uncertainty	Assay Dates
NITRIC OXIDE	22.50 ppm	21.9 ppm	+/-1.00% NIST Traceable	04/21/03 & 04/28/03
TOTAL OXIDES OF NITROGEN		22.1 ppm		
ARGON	BALANCE GAS			

### CALIBRATION STANDARDS USED IN ASSAY

Type	LOT ID	Cylinder No	Concentration	Expiration
SRM 1683B	45-T-13	FF20699	46.70 +/- 0.30 ppm NITRIC OXIDE	10/01/06

### ANALYTICAL INSTRUMENTS USED IN ASSAY

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Rosemount 951A L7	Chemiluminescence	04/07/03

NOx Converter

CATALYST AIR MANAGEMENT, INC.  
AIR QUALITY TESTING SERVICES

ANALYZER: TECO 10A  
SERIAL #: 10s-30788-239  
TIME: 13:05  
DATE: 11/19/2003  
TEST: NOx CONVERTER EFFICIENCY

DATE	TIME	NOx ppm
11/19/2003	13:05	5.66
11/19/2003	13:06	5.55
11/19/2003	13:07	5.58
11/19/2003	13:08	5.63
11/19/2003	13:09	5.62
11/19/2003	13:10	5.66
11/19/2003	13:11	5.65
11/19/2003	13:12	5.61
11/19/2003	13:13	5.63
11/19/2003	13:14	5.66
11/19/2003	13:15	5.51
11/19/2003	13:16	5.59
11/19/2003	13:17	5.59
11/19/2003	13:18	5.58
11/19/2003	13:19	5.55
11/19/2003	13:20	5.49
11/19/2003	13:21	5.49
11/19/2003	13:22	5.51
11/19/2003	13:23	5.60
11/19/2003	13:24	5.63
11/19/2003	13:25	5.65
11/19/2003	13:26	5.59
11/19/2003	13:27	5.64
11/19/2003	13:28	5.57
11/19/2003	13:29	5.52
11/19/2003	13:30	5.61
11/19/2003	13:31	5.64
11/19/2003	13:32	5.58
11/19/2003	13:33	5.53
11/19/2003	13:34	5.59
11/19/2003	13:35	5.59
		AVG
		5.59
		ppm

CALIBRATION GASES

NOx: 13.4  
O2: 12.35

ANALYZER SCALE : 25 ppm

Highest Concentration: 5.66  
Ending Concentration: 5.59  
Drift: 1.39%

VE Certification

# VISIBLE EMISSIONS EVALUATOR

This is to certify that

*Margaret Cangro*

met the specifications of Federal Reference Method 9 and qualified as a visible emissions evaluator.

Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates of Raleigh, North Carolina. This certificate is valid for six months from date of issue.

309394

Certificate Number

Tampa, Florida

Location

August 19, 2003

Date of Issue

Thomas Hore

President

Michael W. Junsford

Director of Training

APPENDIX 6  
SAMPLE CALCULATIONS



## CALCULATION FOR GAS CONCENTRATION

### GAS CONCENTRATION ( $C_{gas}$ )

$$C_{gas} = (\bar{C} - C_0) \left( \frac{C_{ma}}{C_m - C_0} \right)$$

- $C_{gas}$  = Effluent gas concentration, ppm  
 $\bar{C}$  = Average gas concentration indicated by gas analyzer, dry basis, ppm  
 $C_0$  = Average of initial and final system calibration bias check responses for the zero gas, ppm  
 $C_m$  = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm  
 $C_{ma}$  = Actual concentration of the upscale calibration gas, ppm

### GAS CONCENTRATION @ 15% O<sub>2</sub> ( $C_{gas} @ 15\% O_2$ )

$$C_{gas} @ 15\% O_2 = C_{gas} * ((20.9-15)/(20.9-\%O_2))$$

### GAS CONCENTRATION @ 7% O<sub>2</sub> ( $C_{gas} @ 7\% O_2$ )

$$C_{gas} @ 7\% O_2 = C_{gas} * ((20.9-7)/(20.9-\%O_2))$$

### GAS CONCENTRATION @ 3% O<sub>2</sub> ( $C_{gas} @ 3\% O_2$ )

$$C_{gas} @ 3\% O_2 = C_{gas} * ((20.9-3)/(20.9-\%O_2))$$

## LBS/MMBTU CALCULATIONS USING THE F-FACTOR

### 1. EMISSION RATE $E(\text{lb}/\text{mmbtu})$ , $O_2$ based

$$E(\text{lb}/\text{mmbtu}) = C \times F_d \left( \frac{20.9}{20.9 - \%O_2} \right)$$

Where:

$C(\text{lb}/\text{dscf})$  = Pollutant concentration (ppm) x conversion factor.

Conversion Factors:

$$\text{NO}_x = 1.194 \times 10^{-7}$$

$$\text{SO}_2 = 1.660 \times 10^{-7}$$

$$\text{CO} = 7.274 \times 10^{-8}$$

$$\text{C}_3\text{H}_8 = 1.145 \times 10^{-7}$$

$F_d(\text{dscf}/\text{mmbtu})$  = "F" Factor for fuel type, (Ref. EPA Method 19)

$$F_d(\text{Coal}) = 9780$$

$$F_d(\text{Gas}) = 8710$$

$$F_d(\text{Oil}) = 9190$$

### 2. EMISSION RATE $E(\text{lb}/\text{mmbtu})$ , $CO_2$ based

$$E(\text{lb}/\text{mmbtu}) = C \times F_c \left( \frac{100}{\%CO_2} \right)$$

Where:

$C(\text{lb}/\text{dscf})$  = Pollutant concentration (ppm) x conversion factor.

Conversion Factors:

$$\text{NO}_x = 1.194 \times 10^{-7}$$

$$\text{SO}_2 = 1.660 \times 10^{-7}$$

$$\text{CO} = 7.274 \times 10^{-8}$$

$$\text{C}_3\text{H}_8 = 1.145 \times 10^{-7}$$

$F_c(\text{dscf}/\text{mmbtu})$  = "F" Factor for fuel type, (Ref. EPA Method 19)

$$F_d(\text{Coal}) = 1800$$

$$F_d(\text{Gas}) = 1040$$

$$F_d(\text{Oil}) = 1420$$

# CALCULATION QUALITY ASSURANCE CHECK

Run #1

$$C_{NO_x} = (19.13 - .60) \left( \frac{22.10}{21.95 - .60} \right) = 19.2 \text{ ppm}$$

$$C_{O_2} = (13.97 - 0) \left( \frac{22.41}{22.07 - 0} \right) = 14.2 \%$$

$$C_{NO_x @ 15\% O_2} = 19.2 \left( \frac{20.9 - 15}{20.9 - 14.2} \right) = 16.9 \text{ ppm}$$

$$E_{NO_x} (\text{lb/mmBtu}) = 19.2 (8710) (1.194 \times 10^{-7}) \left( \frac{20.9}{20.9 - 14.2} \right) = 0.062$$

**ATTACHMENT EU8-CV1**

**IDENTIFICATION OF  
ADDITIONAL APPLICABLE REQUIREMENTS**

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
NOTICE OF PERMIT

DEC 11 2003

GAINESVILLE

In the Matter of an  
Application for Permit by:Mr. Timothy Bates, Director  
Energy Supply  
City of Lakeland, Electric Utilities  
501 E. Lemon Street  
Lakeland, Florida 33801-5079DEP File No. 1050003-012-AC  
PSD Permit No. PSD-FL-166D  
Charles Larsen Memorial Power Plant  
Combined Cycle Unit No. 8  
Peak Mode Operation and Turbine Upgrades  
Polk County, Florida

Enclosed is the Final Permit Number 1050003-012-AC (PSD-FL-166D) for an air construction permit to authorize peak mode operation and the installation of the high-pressure brush seals to minimize air leakage from the compressor to the combustor for the existing combined cycle combustion turbine Unit 8. This permit is issued pursuant to Chapter 403, Florida Statutes.

Any party to this order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, F.S., by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Legal Office; 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 of Appeal must be filed within 30 (thirty) days from the date this Notice is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

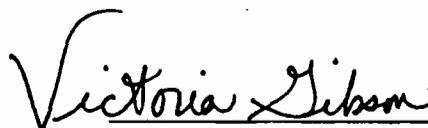
Trina L. Vielhauer, Chief  
Bureau of Air RegulationCERTIFICATE OF SERVICE

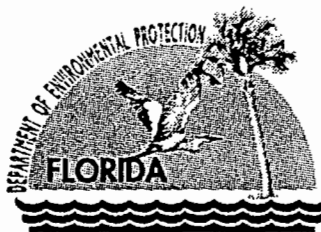
The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF FINAL PERMIT (including the FINAL permit) was sent by certified mail (\*) and copies were mailed by U.S. Mail before the close of business on

12/9/03 to the person(s) listed:Timothy Bates, Lakeland Electric\*  
Farzie Shelton, Lakeland Electric  
Ken Kosky P.E., Golder Associates  
Gerald Kissel, DEP SWD  
Jim Little, EPA Region 4 Office

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.

  
(Clerk)12/9/03  
(Date)



# Department of Environmental Protection

Jeb Bush  
Governor

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

David B. Struhs  
Secretary

## PERMITTEE:

City of Lakeland; Electric Utilities  
501 E. Lemon Street  
Lakeland, Florida 33801-5079

### Authorized Representative:

Timothy Bates, Director Energy Supply

DEP File No. 1050003-012-AC  
PSD Permit No. PSD-FL-166(D)  
Unit 8 Peak Mode/Turbine Upgrade Project  
SIC No. 4911  
Expires: June 30, 2004

## PROJECT AND LOCATION:

This permit authorizes peak mode operation and the installation of the high-pressure brush seals to minimize air leakage from the compressor to the combustor for the existing combined cycle combustion turbine. The unit is a 120 MW combined cycle General Electric PG7111EA combustion turbine-electrical generator designated as Larsen Unit No. 8. Unit 8 fires natural gas as the primary fuel and distillate oil as a limited alternate fuel. Peak mode operation is authorized for up to 3000 hours per year, of which no more than 500 hours per year may occur when firing distillate oil.

Unit 8 is installed at the City of Lakeland's existing Charles Larsen Memorial Power Plant, which is located in Lakeland at 2002 East Highway 92 East in Polk County, Florida.

The UTM coordinates are: Zone 17; 408.9 km E and 3102.5 km N.

## STATEMENT OF BASIS:

This 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.). The above named permittee is authorized to modify the facility 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 of Environmental Protection (Department).

## CONTENTS

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

Michael G. Cooke, Director  
Division of Air Resources Management

Charles Larsen Memorial Power Plant  
Unit 8 Peak Mode/Turbine Upgrade Project

DEP File No. 1050003-012-AC  
PSD Permit No. PSD-FL-166D

"More Protection, Less Process"

Printed on recycled paper.

## SECTION 1. GENERAL INFORMATION

### FACILITY AND PROJECT DESCRIPTION

This facility consists of two fossil fuel-fired steam generators, one combined (or simple) cycle combustion turbine and two simple cycle gas turbine peaking units. Natural gas and oil are the primary fuels. The existing facility includes the following regulated emissions units.

<b>Emission Unit No.</b>	<b>Brief Description</b>
-003	Fossil Fuel Fired Steam Generator #6
-004	Fossil Fuel Fired Steam Generator #7
-005	Peaking Gas Turbine #3
-006	Peaking Gas Turbine #2
-008	Combined (or Simple Cycle) Combustion Turbine 8

This permit authorizes installation of high-pressure brush seals, operation in peaking mode, and modifies emissions limits accordingly on existing Emission Unit No. 008, Combined (or Simple Cycle) Combustion Turbine 8.

### REGULATORY CLASSIFICATION

Title III: Based on the Title V Air Operation Permit Renewal application received June 19, 2002 and the Construction Application received on April 1, 2003, this facility is not a major source of hazardous air pollutants (HAPs).

Title IV: The existing facility has two units subject to the acid rain provisions of the Clean Air Act.

Title V: The existing facility is a Title V major source of air pollution in accordance with Chapter 213, F.A.C.

PSD: The existing facility is a PSD-major source of air pollution in accordance with Rule 62-212.400, F.A.C.

NSPS: The existing facility operates units subject to the New Source Performance Standards of 40 CFR 60.

### 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.

## SECTION 2. ADMINISTRATIVE REQUIREMENTS

1. Permitting Authority: All documents related to applications for permits regarding construction and operation 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. Copies of all such documents shall also be sent to the Air Resources Section of Department's Southwest District Office at 3804 Coconut Palm Drive, Tampa, Florida 33619-8218.
2. Compliance Authority: All documents related to compliance activities such as reports, tests, and notifications shall be submitted to the Air Resources Section of Air Resources Section of Department's Southwest District Office at 3804 Coconut Palm Drive, Tampa, Florida 33619-8218.
3. Citation Format: Appendix A identifies the formats used in the permit for citing applicable requirements.
4. General Conditions: Appendix B specifies the general conditions applicable to all permits.
5. 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.]
6. 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.]
7. 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.]
8. Title V Permit: This permit authorizes modification 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 appropriate Permitting Authority with copies to the Compliance Authority. [Rules 62-4.030, 62-4.050, 62-4.220, and Chapter 62-213, F.A.C.] [Chapter 62-213, F.A.C.]



### SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

#### A. EU-008 – Combined Cycle Unit 8

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

##### **Emissions Unit No. 008**

The emission unit is a 120 megawatt combined (or simple cycle) combustion turbine with a heat recovery steam generator (HRSG) designated as Larsen Unit No. 8. The combustion turbine fires natural gas as the primary fuel and No. 2 distillate oil with a maximum sulfur content of 0.20 percent by weight as a limited auxiliary fuel. The combustion turbine is a GE Model PG7111 Frame 7EA unit equipped with water injection to reduce nitrogen oxides emissions, an inlet fogger system, and will be authorized by this action to operate in peaking mode. The HRSG powers an existing steam turbine. The emissions unit can exhaust through the HRSG or through a by-pass stack. Unit 8 began commercial service in July, 1992.

*{Permitting Note: This emission unit is subject to the requirements of previous PSD Permit No. PSD-FL-166 (as amended) and current Title V air operation Permit No. 0310157-011-AV.}*

##### **PREVIOUS APPLICABLE REQUIREMENTS**

1. Other Permits: The conditions of this permit supplement all previously issued air construction and operation permits for this emissions unit. Unless otherwise specified, these conditions are in addition to all other applicable permit conditions and regulatory requirements. The permittee shall continue to comply with the conditions of these permits, which include restrictions and standards regarding capacities, production, operation, fuels, emissions, monitoring, record keeping, reporting, etc. [Rule 62-4.070, F.A.C.]

##### **AUTHORIZED WORK**

2. Installation/Upgrade: The permittee is authorized to conduct an upgrade consisting of installation of a high-pressure packing seal that regulates the flow of compressor air between various internal components.

*{Permitting Note: The new systems will minimize the amount of air required for cooling and increase the amount available for work in the cycle. This will increase the heat input and power output capacity of the unit.}*

[Applicant Request; Design; Rule 62-210.200(PTE), F.A.C.]

##### **AUTHORIZED OPERATION**

3. Base Load Heat Input: Following installation of the high-pressure seals, the maximum base load process/operation rate, at an inlet temperature of 25 degrees F, shall not exceed 1075 MMBtu per hour (lower heating value) heat input firing natural gas or 1060 MMBtu per hour (lower heating value) heat input firing No. 2 distillate oil. [Applicant Request; Design]
4. Peaking Mode Heat Input: Following installation of the high-pressure seals, the gas turbine may operate in a high-temperature peaking mode to generate additional electrical power. During any consecutive 12 months, Unit 8 shall operate in peaking mode no more than 3000 hours, of which a maximum of 500 hours can be while firing fuel oil.

During peak mode operation, the maximum base load process/operation rate, at an inlet temperature of 25 degrees F, shall not exceed 1161 MMBtu per hour (lower heating value) heat input firing natural gas or 1149 MMBtu per hour (lower heating value) heat input firing No. 2 distillate oil.

[Applicant Request; Design; Rule 62-210.200(PTE), F.A.C.]

### SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

#### A. EU-008 – Combined Cycle Unit 8

##### EMISSION LIMITATIONS

5. Emission Limitations and Standards: Unit No. 8 is subject to the following emissions limits under base load and peaking modes. Emissions limits are corrected to 15% oxygen.

Operating Mode	NO <sub>x</sub>	SO <sub>2</sub>	CO	VOC	PM	VE
Peaking (Gas)	25 ppmvd 115 lb/hr	2 gr S/100 scf 3.5 lb/hr	25 ppmvd 63 lb/hr	1.4 ppmvd 2.1 lb/hr	0.006 lb/MM Btu 7 lb/hr	10% Opacity
Base Load (Gas)	25 ppmvd 107 lb/hr	2 gr S/100 scf 3.5 lb/hr	25 ppmvd 59 lb/hr	0.0018 lb/MMBtu 1.9 lb/hr	0.006 lb/MM Btu 6.5 lb/hr	10% Opacity
Total, Gas	425 TPY	12.9 TPY	232 TPY	9 TPY	22 TPY	---
Peaking (Fuel Oil)	42 ppmvd 192 lb/hr	0.20% Sulfur 234 lb/hr	25 ppmvd 64 lb/hr	3.5 ppmvd 5.1 lb/hr	0.025 lb/MM Btu 29 lb/hr	10% Opacity
Base Load (Fuel Oil)	42 ppmvd 180 lb/hr	0.20 % Sulfur 215 lb/hr	25 ppmvd 60 lb/hr	0.0045 lb/MMBtu 4.8 lb/hr	0.025 lb/MM Btu 27 lb/hr	10% Opacity
Total, Oil	244 TPY	316 TPY	79 TPY	6.7 TPY	22 TPY	---

*{Permitting Note: The revisions of mass emission rates (lb/hour) account for additional heat input. The revision to the SO<sub>2</sub> mass emission rates also account for a maximum permitted sulfur content of natural gas not to exceed 2 grain per 100 standard cubic feet of gas. In accordance with air construction Permit 1050003-007-AC (PSD-FL-166C), no limitations or test requirements are set for beryllium, mercury, or lead.}*

##### COMPLIANCE DETERMINATION

6. Testing Requirement: Within 180 days after installation of the high-pressure brush seals, the permittee shall demonstrate initial compliance with the emissions limitations and standards specified for peaking mode operation and revised base load operation by conducting tests using the EPA reference methods provided in 40 CFR 60, Appendix A, and adopted by reference in Chapter 62-204.800, F.A.C. Tests shall be conducted on both natural gas and distillate oil. Thereafter, the testing requirements for each pollutant shall be determined in the same manner and frequency as specified in Title V air operation Permit No. 1050003-011-AV.

[Rules 62-4.070(3) and 62-297.310(7)(a)1, F.A.C.]

##### TEST METHODS AND PROCEDURES:

The following reference methods shall be used to demonstrate compliance. No other test methods may be used for compliance testing unless prior Department approval is received in writing.

7. Nitrogen Oxides (NO<sub>x</sub>): NO<sub>x</sub> emissions shall be determined by conducting EPA Reference Method 7 or 7E, "Determination of Nitrogen Oxides Emissions from Stationary Sources."

### SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

#### A. EU-008 – Combined Cycle Unit 8

8. Particulate Matter/Opacity: The stack opacity shall be determined by conducting EPA Reference Method 9, "Visual Determination of the Opacity of Emissions from Stationary Sources." This test shall serve as a surrogate for particulate matter compliance testing. If 10% opacity is exceeded, the Department may require the permittee to determine particulate matter emissions by conducting EPA Reference Methods 5, 5B or 17, "Determination of Particulate Matter Emissions from Stationary Sources."
9. Carbon Monoxide (CO): CO emissions shall be determined by conducting EPA Reference Method 10, "Determination of Carbon Monoxide Emissions from Stationary Sources."
10. Volatile Organic Compounds (VOC): VOC emissions shall be determined by conducting EPA Reference Method 25A, "Determination of Volatile Organic Emissions from Stationary Sources." The permittee may also elect to conduct EPA Reference Method 18 on a concurrent sample to determine emissions of methane and ethane, which may be excluded from the determination of VOC emissions as determined by EPA Method 25A. Otherwise, all organic compounds measured by EPA Method 25A are assumed to be regulated VOC emissions. Testing for VOCs is not required as long as the emissions of CO meet the limits in Specific Condition 5.
11. Sulfur Dioxide: Compliance with the distillate oil sulfur standard ( $\leq 0.20\%$  sulfur by weight) shall be determined by ASTM D 2880-96 or the most recently approved version (incorporated by reference; see 40 CFR 60.17).

*{Permitting Note: No. 2 distillate oil is only supplied with intermediate bulk storage. A custom fuel monitoring schedule has been established for natural gas. Refer to Specific Conditions D.22, D.24 and D.30 in Section III of Title V air operation Permit No. 1050003-011-AV.}*

[Permit No. PSD-FL-166 and Title V air operation Permit No. 1050003-011-AV]

#### RECORDS AND REPORTS

12. 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. At a minimum, the test report shall provide the information specified in Rule 62-297.310(8), F.A.C. [Rule 62-297.310(8), F.A.C.]
13. Hours of Operation: The applicant shall record the hours of operation for each fuel type and for operation in peaking mode. [Rule 62-4.070(3), F.A.C.]
14. Future Emissions: The owner or operator shall submit to the Department on an annual basis, for a period of 5 years representative of normal post-change operations of the unit, within the period not longer than 10 years following the change, information demonstrating that the physical or operational change did not result in an emissions increase. The definition of "representative actual annual emissions" found in 40 CFR 52.21(b)(33), adopted and incorporated by reference in Rule 62-204.800, F.A.C.

**SECTION 4. APPENDICES**  
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Appendix A. Citation Formats  
Appendix B. General Conditions

## SECTION 4. APPENDIX A

### CITATION FORMATS

*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 CFR 60.7]

*Means:* Title 40, Part 60, Section 7

**SECTION 4. APPENDIX B**  
**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

**SECTION 4. APPENDIX B**  
**GENERAL CONDITIONS**

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 (Not Applicable, covered in previous permits);
  - b. Determination of Prevention of Significant Deterioration (Not Applicable, covered in previous permits); and
  - c. Compliance with New Source Performance Standards (Not Applicable, covered in previous permits).
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.