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BUREAU OF AIR REGULATION

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

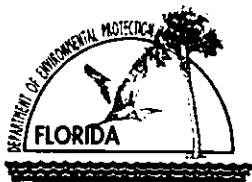
**Prepared For:
Lakeland Electric
City of Lakeland
501 East Lemon Street
Lakeland, Florida 33801**

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

**March 2003
0237637**

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**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 Resources Management

APPLICATION FOR AIR PERMIT - TITLE V SOURCE

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

I. APPLICATION INFORMATION

Identification of Facility

1. Facility Owner/Company Name: Lakeland Electric	
2. Site Name: Charles Larsen Memorial Power Plant	
3. Facility Identification Number: 1050003 [] Unknown	
4. Facility Location: Street Address or Other Locator: 2002 E. Highway 92 City: Lakeland County: Polk Zip Code: 33801	
5. Relocatable Facility? [] Yes [X] No	6. Existing Permitted Facility? [X] Yes [] No

Application Contact

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

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	4-1-03
2. Permit Number:	1050003-012-AC
3. PSD Number (if applicable):	PSD-FL-164(d)
4. Siting Number (if applicable):	

Purpose of Application

Air Operation Permit Application

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

- ☐ Initial Title V air operation permit for an existing facility which is classified as a Title V source.
- ☐ Initial Title V air operation permit for a facility which, upon start up of one or more newly constructed or modified emissions units addressed in this application, would become classified as a Title V source.

Current construction permit number: _____

- ☐ Title V air operation permit revision to address one or more newly constructed or modified emissions units addressed in this application.

Current construction permit number: _____

Operation permit number to be revised: _____

- ☐ Title V air operation permit revision or administrative correction to address one or more proposed new or modified emissions units and to be processed concurrently with the air construction permit application. (Also check Air Construction Permit Application below.)

Operation permit number to be revised/corrected: _____

- ☐ Title V air operation permit revision for reasons other than construction or modification of an emissions unit. Give reason for the revision; e.g., to comply with a new applicable requirement or to request approval of an "Early Reductions" proposal.

Operation permit number to be revised: _____

Reason for revision: _____

Air Construction Permit Application

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

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

Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official: Timothy Bates, Director of Energy Supply
2. Owner/Authorized Representative or Responsible Official Mailing Address: Organization/Firm: Lakeland Electric Street Address: 501 East Lemon Street City: Lakeland State: FL Zip Code: 33801-5079
3. Owner/Authorized Representative or Responsible Official Telephone Numbers: Telephone: (863) 834-6559 Fax: (863) 834 - 6362
4. Owner/Authorized Representative or Responsible Official Statement: <i>I, the undersigned, am the owner or authorized representative*(check here [], if so) or the responsible official (check here [X], if so) of the Title V source addressed in this application, whichever is applicable. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions unit.</i> <div style="display: flex; justify-content: space-between;"><div>Signature <u><i>Timothy C Bates</i></u></div><div>Date <u>3/28/03</u></div></div>

* Attach letter of authorization if not currently on file.

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 23rd Street, Suite 500 City: Gainesville State: FL Zip Code: 32653-1500
3. Professional Engineer Telephone Numbers: Telephone: (352) 336 - 5600 Fax: (352) 336 - 6603

* Board of Professional Engineers Certificate of Authorization #00001670

4. Professional Engineer Statement:

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


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

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

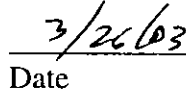
If the purpose of this application is to obtain a Title V source air operation permit (check here [], if so), I further certify that each emissions unit described in this Application for Air Permit, when properly operated and maintained, will comply with the applicable requirements identified in this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

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


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



Signature



Date

(seal) 

* Attach any exception to certification statement.

Scope of Application

Emissions Unit ID	Description of Emissions Unit	Permit Type	Processing Fee
008	Combined Cycle Combustion Turbine	AC1E	NA

Application Processing Fee

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

Construction/Modification Information

1. Description of Proposed Project or Alterations:

This application is being submitted to update the original Air Construction Permit and PSD Approval to reflect Peak Mode Operation of the combustion turbine. In addition, the application includes minor performance enhancements for the combustion turbine. (See Part II)

2. Projected or Actual Date of Commencement of Construction: **NA**

3. Projected Date of Completion of Construction: **July 1, 2003**

Application Comment

This air construction application does not trigger PSD review (see Part II).

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 (limit to 500 characters): 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. Name and Title of Facility Contact: 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 Fax: (863) 834 - 8187			

Check all that apply:

List of Applicable Regulations

DEP Form No. 62-210.900(1) - Form
Effective: 2/11/99

B. FACILITY POLLUTANTS

List of Pollutants Emitted

[illegible]

Supplemental Requirements

0237637/4/4.3/4.3.1/LE_KFK_Form1_EU1
3/25/03

Additional Supplemental Requirements for Title V Air Operation Permit Applications

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

III. EMISSIONS UNIT INFORMATION

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

A. GENERAL EMISSIONS UNIT INFORMATION
(All Emissions Units)

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in This Section: (Check one)			
<input checked="" type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).			
<input type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.			
<input type="checkbox"/> This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.			
2. Regulated or Unregulated Emissions Unit? (Check one)			
<input checked="" type="checkbox"/> The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.			
<input type="checkbox"/> The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.			
3. Description of Emissions Unit Addressed in This Section (limit to 60 characters): Combined Cycle Combustion Turbine			
4. Emissions Unit Identification Number:			
ID: 008		<input type="checkbox"/> No ID <input type="checkbox"/> ID Unknown	
5. Emissions Unit Status Code: A	6. Initial Startup Date: July 1992	7. Emissions Unit Major Group SIC Code: 49	8. Acid Rain Unit? <input checked="" type="checkbox"/>
9. Emissions Unit Comment: (Limit to 500 Characters)			
<p>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.</p>			

Emissions Unit Control Equipment

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

Water injection2. Control Device or Method Code(s): **28****Emissions Unit Details**

1. Package Unit:

Manufacturer: **General Electric**Model Number: **Frame 7EA**

2. Generator Nameplate Rating:

88 MW

3. Incinerator Information:

Dwell Temperature:

°F

Dwell Time:

seconds

Incinerator Afterburner Temperature:

°F

B. EMISSIONS UNIT CAPACITY INFORMATION
(Regulated Emissions Units Only)**Emissions Unit Operating Capacity and Schedule**

1. Maximum Heat Input Rate:	1,071.5	mmBtu/hr
2. Maximum Incineration Rate:	lb/hr	tons/day
3. Maximum Process or Throughput Rate:		
4. Maximum Production Rate:		
5. Requested Maximum Operating Schedule:		
	24 hours/day	7 days/week
	52 weeks/year	8,760 hours/year
6. Operating Capacity/Schedule Comment (limit to 200 characters):		
<p>Maximum heat input natural gas firing (LHV) at baseload and turbine inlet temperature of 25°F</p> <p>Maximum heat input for residual oil firing is 1,060 MMBtu/hr (LVH) and turbine inlet temperature of 25°F.</p> <p>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.</p> <p>See Part II, Table 11.</p>		

C. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

List of Applicable Regulations

Application does not change any existing applicable regulations for emission unit.

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

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram?		2. Emission Point Type Code: 3	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): Emission unit can exhaust through either a by-pass stack or heat recovery steam generator (HRSG) stack.			
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:			
5. Discharge Type Code: V	6. Stack Height: 155 feet	7. Exit Diameter: 16 feet	
8. Exit Temperature: 481 °F	9. Actual Volumetric Flow Rate: 1,034,053 acfm	10. Water Vapor: %	
11. Maximum Dry Standard Flow Rate: dscfm		12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates: Zone: 17 East (km): 409.0 North (km): 3102.8			
14. Emission Point Comment (limit to 200 characters): Stack parameters from Title V application. Stack parameters shown for HRSG stack oil firing. By-pass stack parameters: Height: 100 ft Diameter: 17.6 ft (equivalent diameter-stack is rectangular 18.3 ft x 13.3 ft) Temperature: 950°F Flow: 1,549,432 acfm Stack parameters will vary depending upon turbine inlet conditions and mode of operation (peak mode or base load).			

E. SEGMENT (PROCESS/FUEL) INFORMATION
(All Emissions Units)**Segment Description and Rate:** Segment 1 of 2

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

Segment Description and Rate: Segment 2 of 2

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

F. EMISSIONS UNIT POLLUTANTS
(All Emissions Units)

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM			EL
SO ₂			EL
NO _x	028		EL
CO			EL
VOC			EL
PM ₁₀			EL

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

Potential/Fugitive Emissions

1. Pollutant Emitted: PM	2. Total Percent Efficiency of Control:
3. Potential Emissions: 28.7 lb/hour 37 tons/year	4. Synthetically Limited? [X]
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year	
6. Emission Factor: 0.025 lb/MMBtu Reference: PSD-FL-166	7. Emissions Method Code: 0
8. Calculation of Emissions (limit to 600 characters): 1,149 MMBtu/hr x 0.025 lb/MMBtu = 28.7 lb/hr (Oil firing and peak mode at 25°F turbine inlet) 22 TPY x 2/3 (gas) + 22 TPY (oil) = 36.7 TPY (Based on PSD-FL-166) 1,161 MMBtu/hr x 0.006 lb/MMBtu = 7.0 lb/hr (Gas firing and peak mode at 25°F turbine inlet)	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): 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	

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: 0.025 lb/MMBtu	4. Equivalent Allowable Emissions: 28.7 lb/hour 22 tons/year
5. Method of Compliance (limit to 60 characters): Annual compliance test, EPA Method 5/5B or 17 if > 10% and > 400 hr/yr oil-firing.	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Established as BACT for oil firing. Lb/hr for peak mode at 25°F. TPY from PSD-FL-166. Test required if oil firing > 400 hr/yr. Does not include allowance for excess emissions for startup, shutdown, and malfunction [FDEP Rule 62-210.700(1)].	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: PM	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? <input type="checkbox"/>
5. Range of Estimated Fugitive Emissions: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 _____ to _____ tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8. Calculation of Emissions (limit to 600 characters):	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 2 of 2

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

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

Potential/Fugitive Emissions

1. Pollutant Emitted: SO₂		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 233.5 lb/hour 316 tons/year		4. Synthetically Limited? <input checked="" type="checkbox"/> [X]	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year			
6. Emission Factor: 0.2% Sulfur Fuel Reference: PSD-FL-166		7. Emissions Method Code: 0	
8. Calculation of Emissions (limit to 600 characters): 58,384 lb/hr x 0.002 lb/lb fuel x 2 lb SO₂/lb S = 233.5 lb/hr (Oil firing with 19,680 Btu/lb and peak mode at 25°F turbine inlet). 307 TPY (oil) + 12.9 TPY x 2/3 (gas) = 316 TPY (Based on PSD-FL-166) 1.22 x 10⁶ CF/hr x 1 grain/100 CF x 2 lb SO₂/lb S x lb/7,000 grains = 3.5 lb/hr (Gas firing and peak mode at 25°F turbine inlet).			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): 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.			

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: OTHER		2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: 0.2% Sulfur Fuel		4. Equivalent Allowable Emissions: 233.5 lb/hour 307 tons/year	
5. Method of Compliance (limit to 60 characters): Fuel oil analysis.			
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Established as BACT for oil firing. Lb/hr at 25°F and peak mode. TPY from PSD-FL-166.			

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

Potential/Fugitive Emissions

1. Pollutant Emitted: SO₂	2. Total Percent Efficiency of Control:	
3. Potential Emissions: lb/hour	tons/year	4. Synthetically Limited? <input type="checkbox"/>
5. Range of Estimated Fugitive Emissions: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 _____ to _____ tons/year		
6. Emission Factor: Reference:	7. Emissions Method Code:	
8. Calculation of Emissions (limit to 600 characters):		
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):		

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: 1 grain Sulfur/100 CF (annual)	4. Equivalent Allowable Emissions: 3.5 lb/hour 12.9 tons/year
5. Method of Compliance (limit to 60 characters): Custom fuel monitoring schedule	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): 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.	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: NO_x	2. Total Percent Efficiency of Control:
3. Potential Emissions: 192 lb/hour 563 tons/year	4. Synthetically Limited? [X]
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year	
6. Emission Factor: 25 ppmvd/42 ppmvd @ 15% O₂ Reference: PSD-FL-166	7. Emissions Method Code: 0
8. Calculation of Emissions (limit to 600 characters): Lb/hr estimated for peak mode at 25°F and oil and gas firing based on Title V application and PSD-FL-166: Emission basis, ppmvd @ 15% O₂: 42 (oil) and 25 (gas); lb/hr: 192 (oil), 115 (gas) 425 TPY x 2/3 (gas) + 244 TPY (oil) = 563 TPY (Based on PSD-FL-166).	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): 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.	

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: 42 ppmvd	4. Equivalent Allowable Emissions: 192 lb/hour 244 tons/year
5. Method of Compliance (limit to 60 characters): Annual Compliance Test; EPA Method 7E or 20; and oil firing > 400 hr/yr.	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Established as BACT for oil firing. Requested Allowable Emissions and Units corrected to 15% O₂. Lb/hr for peak mode 25°F. TPY from PSD-FL-166.	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: NO_x		2. Total Percent Efficiency of Control:	
3. Potential Emissions: lb/hour _____ tons/year _____		4. Synthetically Limited? <input type="checkbox"/>	
5. Range of Estimated Fugitive Emissions: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 _____ to _____ tons/year			
6. Emission Factor: Reference:		7. Emissions Method Code:	
8. Calculation of Emissions (limit to 600 characters): 			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): 			

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: 25 ppmvd	4. Equivalent Allowable Emissions: 115 lb/hour 425 tons/year
5. Method of Compliance (limit to 60 characters): Annual Compliance Test; EPA Method 7E or 20.	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Established as BACT for gas firing. Requested Allowable Emissions and Units corrected to 15% O₂. Lb/hr gas estimated for peak mode and 25°F. TPY from PSD-FL-166.	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: CO		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 64 lb/hour 254 tons/year		4. Synthetically Limited? <input checked="" type="checkbox"/> [X]	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year			
6. Emission Factor: 25 ppmvd @ 15% O₂ Reference: PSD-FL-166		7. Emissions Method Code: 0	
8. Calculation of Emissions (limit to 600 characters): Lb/hr estimated for peak mode at 25°F and oil and gas firing based on Title V application and PSD-FL-166: Emission basis, ppmvd @ 15% O₂: 25 (oil and gas); lb/hr: 64 (oil), 63 (gas) 232 TPY x 2/3 (gas) + 79 TPY (oil) = 254 TPY (Based on PSD-FL-166)			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): 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.			

Allowable Emissions Allowable Emissions 1 of 2

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

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

Potential/Fugitive Emissions

1. Pollutant Emitted: CO	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? <input type="checkbox"/>
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8. Calculation of Emissions (limit to 600 characters):	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 2 of 2

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

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

Potential/Fugitive Emissions

1. Pollutant Emitted: VOC	2. Total Percent Efficiency of Control:
3. Potential Emissions: 5.1 lb/hour 12.7 tons/year	4. Synthetically Limited? [X]
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year	
6. Emission Factor: 3.5 ppmvw / 1.4 ppmvw Reference: PSD Permit Application, June 1996	7. Emissions Method Code: 0
8. Calculation of Emissions (limit to 600 characters): Lb/hr estimated for peak mode at 25°F and oil and gas firing based on Title V application and PSD-FL-166. Emission basis from Title V application, ppmvw: 3.5 (oil), 1.4 (gas); lb/hr: 5.1 (oil), 2.1 (gas) 9 TPY x 2/3 (gas) + 6.7 TPY (oil) = 12.7 TPY (Based on PSD-FL-166).	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): 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.	

Allowable Emissions Allowable Emissions 1 of 2

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

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

Potential/Fugitive Emissions

1. Pollutant Emitted: VOC	2. Total Percent Efficiency of Control:	
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year		
6. Emission Factor: Reference:	7. Emissions Method Code:	
8. Calculation of Emissions (limit to 600 characters): 		
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): 		

Allowable Emissions Allowable Emissions **2** of **2**

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

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

Potential/Fugitive Emissions

1. Pollutant Emitted: PM₁₀		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 28.7 lb/hour 37 tons/year		4. Synthetically Limited? <input checked="" type="checkbox"/> [X]	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year			
6. Emission Factor: 0.025 lb/MMBtu Reference: PSD-FL-166		7. Emissions Method Code: 0	
8. Calculation of Emissions (limit to 600 characters): 1,149 MMBtu/hr x 0.025 lb/MMBtu = 28.7 lb/hr (Oil firing and peak mode at 25°F) 22 TPY x 2/3 (gas) + 22 TPY (oil) = 36.7 TPY (Based on PSD-FL-166). 1,161 MMBtu/hr x 0.006 lb/MMBtu = 7.0 lb/hr (Gas firing and peak mode at 25°F)			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): 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			

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: OTHER		2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: 0.025 lb/MMBtu		4. Equivalent Allowable Emissions: 28.7 lb/hour 22 tons/year	
5. Method of Compliance (limit to 60 characters): Annual compliance test, EPA Method 5/5B or 17 if > 10% and > 400 hr/yr oil-firing.			
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Established as BACT for oil firing. Lb/hr for peak mode and 25°F. TPY from PSD-FL-166. Test required if oil firing > 400 hr/yr. Does not include allowance for excess emissions for startup, shutdown, and malfunction [FDEP Rule 62-210.700(1)].			

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

Potential/Fugitive Emissions

1. Pollutant Emitted: PM₁₀	2. Total Percent Efficiency of Control:	
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year		
6. Emission Factor: Reference:	7. Emissions Method Code:	
8. Calculation of Emissions (limit to 600 characters):		
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):		

Allowable Emissions Allowable Emissions 2 of 2

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

H. VISIBLE EMISSIONS INFORMATION
(Only Regulated Emissions Units Subject to a VE Limitation)**Visible Emissions Limitation:** Visible Emissions Limitation 1 of 2

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

I. CONTINUOUS MONITOR INFORMATION
(Only Regulated Emissions Units Subject to Continuous Monitoring)**Continuous Monitoring System:** Continuous Monitor 1 of 4

1. Parameter Code: EM	2. Pollutant(s): NO_x
3. CMS Requirement:	[X] Rule [] Other
4. Monitor Information: Manufacturer: Advanced Pollution Inst. Model Number: 252 Serial Number: 132	
5. Installation Date: 28 November 1994	6. Performance Specification Test Date: 12 December 1995
7. Continuous Monitor Comment (limit to 200 characters): CEM required pursuant to 40 CFR Part 75.	

H. VISIBLE EMISSIONS INFORMATION
(Only Regulated Emissions Units Subject to a VE Limitation)**Visible Emissions Limitation:** Visible Emissions Limitation 2 of 2

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

I. CONTINUOUS MONITOR INFORMATION
(Only Regulated Emissions Units Subject to Continuous Monitoring)**Continuous Monitoring System:** Continuous Monitor 2 of 4

1. Parameter Code: EM	2. Pollutant(s): NO_x
3. CMS Requirement:	<input type="checkbox"/> Rule <input checked="" type="checkbox"/> Other
4. Monitor Information: Manufacturer: Advanced Pollution Inst. Model Number: 252 Serial Number: 120	
5. Installation Date: 28 November 1994	6. Performance Specification Test Date: 12 December 1995
7. Continuous Monitor Comment (limit to 200 characters): Redundant Backup	

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

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: [] Rule [] Other
3. Requested Allowable Opacity: Normal Conditions: _____ % Exceptional Conditions: _____ % Maximum Period of Excess Opacity Allowed: _____ min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment (limit to 200 characters):	

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

Continuous Monitoring System: Continuous Monitor 3 of 4

1. Parameter Code: O₂	2. Pollutant(s):
3. CMS Requirement:	[<input checked="" type="checkbox"/>] Rule [] Other
4. Monitor Information: Manufacturer: Graseby STI Model Number: DP0802 Serial Number: 1511-1-8	
5. Installation Date: 28 November 1994	6. Performance Specification Test Date: 12 December 1995
7. Continuous Monitor Comment (limit to 200 characters): Required pursuant to 40 CFR Part 75 for dilution with NO_x monitors.	

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

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: [] Rule [] Other
3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment (limit to 200 characters):	

I. CONTINUOUS MONITOR INFORMATION
(Only Regulated Emissions Units Subject to Continuous Monitoring)**Continuous Monitoring System:** Continuous Monitor 4 of 4

1. Parameter Code: WTF	2. Pollutant(s):
3. CMS Requirement:	[<input checked="" type="checkbox"/>] Rule [] Other
4. Monitor Information: Manufacturer: Model Number: Serial Number:	
5. Installation Date: 07 July 1992	6. Performance Specification Test Date:
7. Continuous Monitor Comment (limit to 200 characters): Required by 40 CFR 60.334, WTF ratio monitored by CT control system as part of DCS. Pollutant emitted: NO_x	

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

1. Process Flow Diagram [] Attached, Document ID: _____ [X] Not Applicable [] Waiver Requested
2. Fuel Analysis or Specification [] Attached, Document ID: _____ [X] Not Applicable [] Waiver Requested
3. Detailed Description of Control Equipment [] Attached, Document ID: _____ [X] Not Applicable [] Waiver Requested
4. Description of Stack Sampling Facilities [] Attached, Document ID: _____ [X] Not Applicable [] Waiver Requested
5. Compliance Test Report [] Attached, Document ID: _____ [] Previously submitted, Date: _____ [X] Not Applicable
6. Procedures for Startup and Shutdown [] Attached, Document ID: _____ [X] Not Applicable [] Waiver Requested
7. Operation and Maintenance Plan [] Attached, Document ID: _____ [X] Not Applicable [] Waiver Requested
8. Supplemental Information for Construction Permit Application [X] Attached, Document ID: Part II [] Not Applicable
9. Other Information Required by Rule or Statute [] Attached, Document ID: _____ [X] Not Applicable
10. Supplemental Requirements Comment:

Additional Supplemental Requirements for Title V Air Operation Permit Applications

11. Alternative Methods of Operation [] Attached, Document ID: _____ [X] Not Applicable
12. Alternative Modes of Operation (Emissions Trading) [] Attached, Document ID: _____ [X] Not Applicable
13. Identification of Additional Applicable Requirements [] Attached, Document ID: _____ [X] Not Applicable
14. Compliance Assurance Monitoring Plan [] Attached, Document ID: _____ [X] Not Applicable
15. Acid Rain Part Application (Hard-copy Required) [] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a)) Attached, Document ID: _____ [] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) Attached, Document ID: _____ [] New Unit Exemption (Form No. 62-210.900(1)(a)2.) Attached, Document ID: _____ [] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) Attached, Document ID: _____ [] Phase II NO _x Compliance Plan (Form No. 62-210.900(1)(a)4.) Attached, Document ID: _____ [] Phase NO _x Averaging Plan (Form No. 62-210.900(1)(a)5.) Attached, Document ID: _____ [X] Not Applicable

PART II

**APPLICATION FOR AIR CONSTRUCTION PERMIT
LARSEN UNIT 8 PEAK OPERATION AND MINOR UPGRADES**

**APPLICATION FOR AIR CONSTRUCTION PERMIT
LARSEN UNIT 8 PEAK OPERATION AND MINOR UPGRADES**

Introduction

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The Charles Larsen Memorial Power Plant is owned and operated by Lakeland Electric, the municipal electric utility of the City of Lakeland, Polk County, Florida. In July 1991, an Air Construction Permit and Prevention of Significant Deterioration (PSD) approval was issued for the installation of a nominal 80 MW combustion turbine (CT) with an associated heat recovery steam generator (HRSG) for supplying to an existing steam electric generator (DEP File No. 105003-002-AC; AC 53-190437; PSD-FL-166). The nominal 120 MW combined cycle unit is designated as Larsen Unit 8. The combustion turbine is a General Electric Frame 7EA (Model PG7111) that is authorized to fire natural gas and No. 2 distillate oil. Water injection is used to control emissions of NO_x to 25 ppmvd corrected to 15-percent oxygen when firing natural gas and 42 ppmvd corrected to 15-percent oxygen when firing distillate oil. The CT is equipped with a direct water spray turbine inlet fogging system. Attachment A provides copies of the original and amended Air Construction/PSD approval.

This application is submitted to request an increase in the maximum heat input at a turbine inlet temperature of 25 degrees Fahrenheit (°F) that would recognize the CTs ability to operate in Peak Mode, as well as a minor upgrade. Also requested is a minor increase in the annual emissions of sulfur dioxide when firing natural gas.

Peak Mode

The original permitting and subsequent heat input curve submitted with the Title V application did not reflect the Unit's ability to run in Peak Mode. Peak Mode operation was included in the original design of Unit 8 and allows the unit to run at higher power and heat input. Peak Mode operation is a computer-controlled increase in firing temperature with greater heat input and output. It is a standard operating feature of the GE Frame 7EA CT. The increase in power and heat input is about 8.7 percent at ISO conditions. The heat rate of the unit decreases by about 50 Btu/Kw-hr or about 0.5 percent. The emission rates authorized in the original PSD permit do not change. Compliance testing was originally performed for this mode of operation, and the water injection rate was established for Peak Mode operation to assure compliance. This mode of operation is normally operated less than a few hundred hours per year. Tables 1, 2, and 3 show the maximum increase in hourly and annual emissions over base load assuming 2,500 hours per year of natural gas and 500 hours per year of oil firing.

Peak Mode operation is neither a physical change nor a change in the method of operation for the unit. Rather it was an oversight in the original permitting. The basis of the potential to emit in the original PSD Permit Application was at a turbine inlet of 59°F and base load, which provides a conservative estimate of annual emissions. Peak Mode operation would not have affected the annual emission rates or any of the emission rates established as BACT. The BACT emission limits were established as concentrations (ppmvd), emission rates (lb/MMBtu) or fuel limits (natural gas or 0.2-percent sulfur distillate oil). Recognizing Peak Mode operation would not affect the established limits.

Turbine Upgrades

Over time the GE Frame 7EA CT has required maintenance of key components due to normal wear on internal parts. Many of these parts have reached their useful life and required replacement. This has included replacement of many internal parts of the CT (e.g., turbine blades, seals) to assure reliability and minimize degradation. In conducting these replacements and maintenance, enhancements are available from GE that theoretically improve performance. This includes decreased heat rate and additional power. The turbine upgrades for Unit 8, for which Lakeland Electric is seeking authorization, involve enhancements to the compressor discharge (high-pressure brush seal) that limit the amount of air leakage. This theoretically results in a 4.4 percent increase in output with an increase in heat input of 1.9 percent from the "new and clean" condition. The heat rate decreases by 2.4 percent. The emissions per unit of output decreases (i.e., lb/MW-hr). Tables 4, 5, and 6 present the hourly and annual emissions increases for the turbine upgrades at base load operation at a turbine inlet of 59°F. Table 4 presents emissions increases when firing natural gas for 8,760 hours per year and Table 5 presents emissions increases when firing oil for 2,920 hours per year. The latter is the approximate hourly limit equivalent to the authorized fuel use of 23,914,800 gallons per year. Table 6 presents the maximum potential increase in annual emissions for 5,840 hours per year of gas firing and 2,920 hours per year of oil firing.

Tables 7, 8, and 9 present the hourly and annual emissions increases for the turbine upgrades at Peak Mode operation at a turbine inlet of 59°F. Table 7 presents emissions increases when firing natural gas for 2,500 hours per year and Table 8 presents emissions increases when firing oil for 500 hours per year. Table 9 presents the maximum potential increase in annual emissions for 2,500 hours per year of gas firing and 500 hours per year of oil firing.

Table 10 presents the maximum potential emissions increase that includes Peak Mode operation (from Table 3), base load operation with turbine upgrades (from Table 6), and Peak Mode operation with upgrades (from Table 9). As shown, the maximum potential increase is less than the PSD thresholds. Figure 1 presents the heat-input curves for base load (current permit), Peak Mode, and Peak Mode with upgrades. Table 11 presents the heat-input information for turbine inlet temperatures of 25, 59, and 90°F. It should be noted that the maximum heat inputs are based on "new and clean" conditions, which will not occur since the turbine has been operating for about 10 years with many parts that have not been replaced. Therefore, the heat inputs are theoretical.

Requested Permit Changes

Based upon the information presented in the preceding sections, Lakeland Electric requests that the heat input limits in Specific Condition 6 of the Air Construction/PSD permit be changed to include Peak Mode operation and the turbine upgrades. The maximum heat input rates at 25°F are 1,161 MMBtu/hr (LHV) and 1,149 MMBtu/hr (LHV) for gas and oil firing, respectively. In addition, since there is a heat-input limit for distillate oil, the 8,190 gallons per hour limit also in Specific Condition 6 is unnecessary. Lakeland Electric requests that this hourly limit be deleted.

Lakeland Electric also requests the annual emissions limit for SO₂ be increased slightly to reflect an annual average of 1 grain sulfur (S) per 100 standard cubic feet (1 gr/100scf) of natural gas. During the original permitting and subsequent changes, lower sulfur contents were assumed (e.g., AP-42 emission factors). The recent PSD permits issued by the Department for combined cycle facilities, such as McIntosh Unit 5, assumes a sulfur content of 1 grain/100 scf. It is requested that the annual SO₂ emission limit be changed from 8.6 tons/year to 12.9 tons/year. The calculation of annual SO₂ emissions is as follows:

- $977.6 \text{ MMBtu/hr (ISO Baseload)} \times \text{scf/950 Btu} \times 1 \text{ grain/100 scf} \times \text{lb/7,000 grains} \times 2 \text{ lb SO}_2/\text{lb S} \times 8,760 \text{ hrs/yr} \times \text{ton/2,000 lb} = 12.9 \text{ tons/year}$

In addition Lakeland Electric requests that the emission limits for mercury, lead and beryllium be removed from the original PSD approval. These emission limits are artifacts of PSD permitting prior to the changes in PSD regulations not regulating certain HAPs (beryllium) and the Department's determinations that natural gas and No.2 distillate oil have extremely low concentrations of contaminants (mercury and lead).

No other changes are requested or necessary.

Figure 1. Heat Input vs Compressor Inlet Temperature

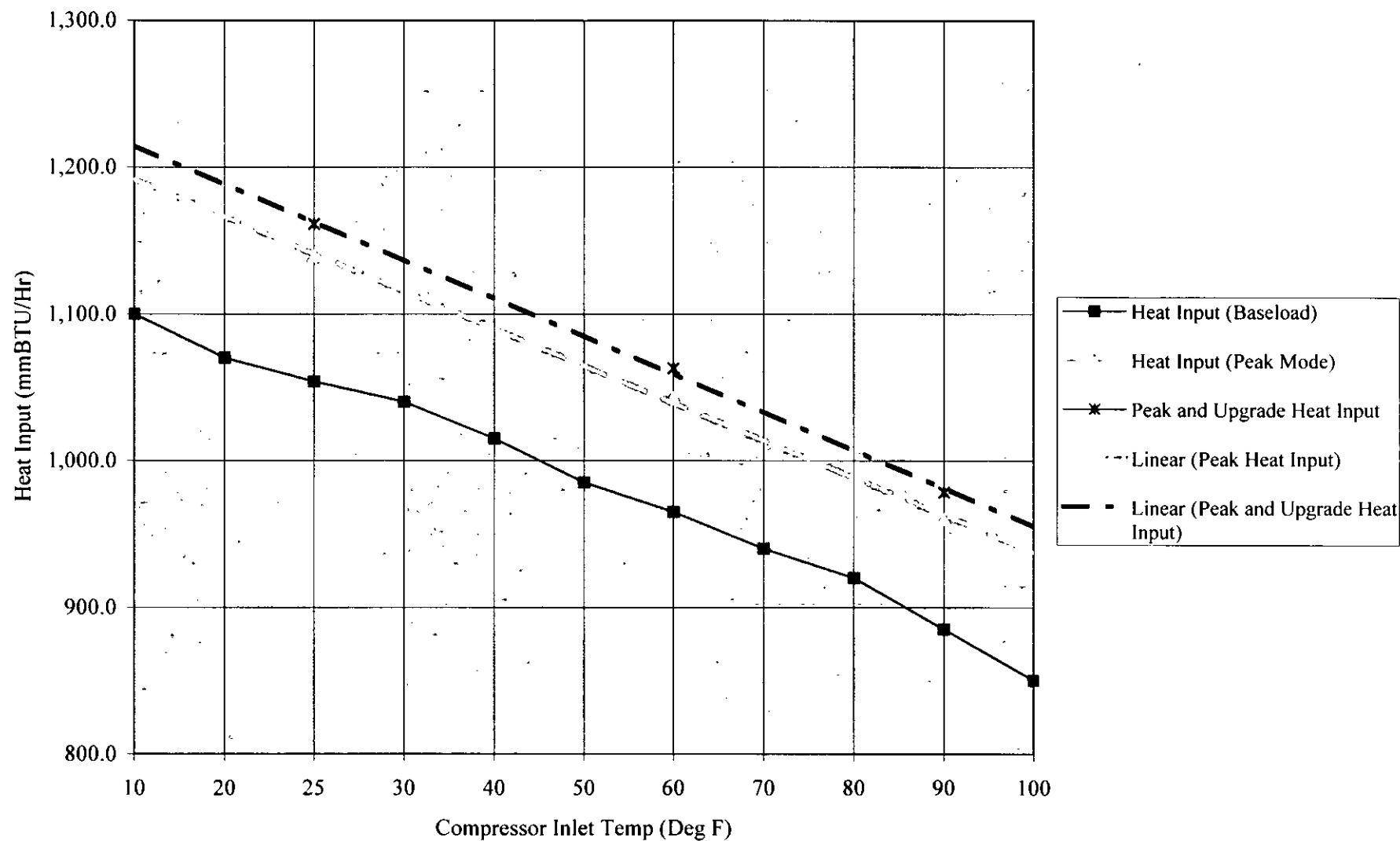


Table 1 Emission Estimates of the City of Lakeland Larsen Plant Unit 8 - Combustion
Turbine Base - Peak Load No Upgrades
(Natural Gas Firing - 2,500 hours/year).

Performance Basis

Heat Input	mmBtu ⁽¹⁾	959.6	
Power Increase		8.69%	GE Data for Frame 7EA
Heat Rate Decrease		0.46%	GE Data for Frame 7EA
Heat Input Increase		8.70%	GE Data for Frame 7EA
Heat Input Change	mmBtu	83.5	
Hours/year		2,500 ⁽²⁾	

Pollutants	Units	Emissions	Comments
PM	lb/MMBtu TPY	0.0060 0.63	from PSD and Title V Permits ⁽³⁾
NO _x	lb/MMBtu TPY	0.0995 10.39	from PSD and Title V Permits ⁽³⁾
SO ₂	lb/MMBtu TPY	0.0028 0.30	from PSD and Title V Permits ⁽³⁾
CO	lb/MMBtu TPY	0.0550 5.74	from PSD and Title V Permits ⁽³⁾
VOC	lb/MMBtu TPY	0.0018 0.19	from PSD and Title V Permits ⁽³⁾

Legend - TPY: tons per year

⁽¹⁾ Heat input for 59°F compressor inlet temperature. A conservative annual average.

⁽²⁾ Hours of operation based on estimate of 2500 hours per year.

⁽³⁾ Emission factor references - PSD and Title V Permits based on maximum hourly emissions and 25°F turbine inlet conditions.

Table 2 Emission Estimates of the City of Lakeland Larsen Plant Unit 8 - Combustion
Turbine Base - Peak Load No Upgrades
(Distillate Oil Firing - 500 hours/year).

Performance Basis

Heat Input Change	mmBtu ⁽¹⁾	959.6	
Power Increase		8.69%	GE Data for Frame 7EA
Heat Rate Decrease		0.46%	GE Data for Frame 7EA
Heat Input Increase		8.70%	GE Data for Frame 7EA
Heat Input Change	mmBtu	83.5	
Hours/year		500 ⁽²⁾	

Pollutants	Units	Emissions	Comments
PM	lb/MMBtu TPY	0.0250 0.52	from PSD and Title V Permits ⁽³⁾
NO _x	lb/MMBtu TPY	0.1692 3.53	from PSD and Title V Permits ⁽³⁾
SO ₂	lb/MMBtu TPY	0.2029 4.24	from PSD and Title V Permits ⁽³⁾
CO	lb/MMBtu TPY	0.0567 1.18	from PSD and Title V Permits ⁽³⁾
VOC	lb/MMBtu TPY	0.0087 0.18	from PSD and Title V Permits ⁽³⁾

Legend - TPY: tons per year

⁽¹⁾ Heat input for 59°F compressor inlet temperature. A conservative annual average.

⁽²⁾ Hours of operation based on 500 hours per year.

⁽³⁾ Emission factor references - PSD and Title V Permits based on maximum hourly emissions and 25°F turbine inlet conditions.

Table 3 Maximum Annual Emissions of the City of Lakeland Larsen Plant Unit 8 - Combustion
Turbine Base - Peak Load No Upgrades
(Natural Gas Firing - 2,500 hours/year and Oil Firing 500 hours/year).

Pollutants	Annual Emissions (tons/year)			PSD SERs ⁽¹⁾ (tons/year)
	Gas Firing	Oil-Firing	Total	
PM	0.63	0.52	1.15	15 & 25 ⁽²⁾
NO _x	10.39	3.53	13.92	40
SO ₂	0.30	4.24	4.53	40
CO	5.74	1.18	6.92	100
VOC	0.19	0.18	0.37	40

⁽¹⁾ PSD = Prevention of Significant Deterioration; SERs - Significant Emission Rates; Rule 62-212.400(2)(e)2.

⁽²⁾ 15 tons/year is for PM₁₀ and 25 tons/year is for PM.

Table 4 Emission Estimates of the City of Lakeland Larsen Plant Unit 8 - Combustion
Turbine Upgrades - Base Load
(Natural Gas Firing - 8,760 hours/year).

Performance Basis

Heat Input	mmBtu ⁽¹⁾	959.6	
Power Increase		4.40%	GE Data for Frame 7EA
Heat Rate Decrease		2.40%	GE Data for Frame 7EA
Heat Input Increase		1.90%	GE Data for Frame 7EA
Heat Input Change	mmBtu	18.2	
Hours/year		8,760 ⁽²⁾	
Pollutants	Units	Emissions	Comments
PM	lb/MMBtu TPY	0.0060 0.48	from PSD and Title V Permits ⁽³⁾
NO _x	lb/MMBtu TPY	0.0995 7.93	from PSD and Title V Permits ⁽³⁾
SO ₂	lb/MMBtu TPY	0.0028 0.23	from PSD and Title V Permits ⁽³⁾
CO	lb/MMBtu TPY	0.0550 4.38	from PSD and Title V Permits ⁽³⁾
VOC	lb/MMBtu TPY	0.0018 0.14	from PSD and Title V Permits ⁽³⁾

Legend - TPY: tons per year

⁽¹⁾ Heat input for 59°F compressor inlet temperature. A conservative annual average.

⁽²⁾ Hours of operation based on estimate of 24 hours per day and 365 days per year.

⁽³⁾ Emission factor references - PSD and Title V Permits based on maximum hourly emissions and 25°F turbine inlet conditions.

Table 5 Emission Estimates of the City of Lakeland Larsen Plant Unit 8 - Combustion
Turbine Upgrades - Base Load
(Distillate Oil Firing - 2,920 hours/year).

Performance Basis			
Heat Input Change	mmBtu ⁽¹⁾	946	
Power Increase		4.40%	GE Data for Frame 7EA
Heat Rate Decrease		2.40%	GE Data for Frame 7EA
Heat Input Increase		1.90%	GE Data for Frame 7EA
Heat Input Change	mmBtu	18.0	
Hours/year		2,920 ⁽²⁾	
Pollutants	Units	Emissions	Comments
PM	lb/MMBtu	0.0250	from PSD and Title V Permits ⁽³⁾
	TPY	0.66	
NO _x	lb/MMBtu	0.1692	from PSD and Title V Permits ⁽³⁾
	TPY	4.44	
SO ₂	lb/MMBtu	0.2029	from PSD and Title V Permits ⁽³⁾
	TPY	5.32	
CO	lb/MMBtu	0.0567	from PSD and Title V Permits ⁽³⁾
	TPY	1.49	
VOC	lb/MMBtu	0.0087	from PSD and Title V Permits ⁽³⁾
	TPY	0.23	

Legend - TPY: tons per year

⁽¹⁾ Heat input for 59°F compressor inlet temperature. A conservative annual average.

⁽²⁾ Hours of operation based on limit of 2,920 hours per year.

⁽³⁾ Emission factor references - PSD and Title V Permits based on maximum hourly emissions and 25°F turbine inlet conditions.

Table 6 Maximum Annual Emissions of the City of Lakeland Larsen Plant Unit 8 - Combustion Turbine with Upgrades - Base Load
(Natural Gas Firing - 5,840 hours/year and Oil Firing 2,920 hours/year).

Pollutants	Annual Emissions (tons/year)			PSD SERs ⁽¹⁾ (tons/year)
	Gas Firing	Oil-Firing	Total	
PM	0.32	0.66	0.97	15 & 25 ⁽²⁾
NO _x	5.29	4.44	9.73	40
SO ₂	0.15	5.32	5.48	40
CO	2.92	1.49	4.41	100
VOC	0.10	0.23	0.32	40

⁽¹⁾ PSD = Prevention of Significant Deterioration; SERs - Significant Emission Rates; Rule 62-212.400(2)(c)2.

⁽²⁾ 15 tons/year is for PM₁₀ and 25 tons/year is for PM.

Table 7 Emission Estimates of the City of Lakeland Larsen Plant Unit 8 - Combustion
Turbine Upgrades - Peak Load
(Natural Gas Firing - 2500 hours/year).

Performance Basis

Heat Input	mmBtu ⁽¹⁾	1043.1	
Power Increase		4.40%	GE Data for Frame 7EA
Heat Rate Decrease		2.40%	GE Data for Frame 7EA
Heat Input Increase		1.89%	GE Data for Frame 7EA
Heat Input Change	mmBtu	19.7	
Hours/year		2,500 ⁽²⁾	

Pollutants	Units	Emissions	Comments
PM	lb/MMBtu TPY	0.0060 0.15	from Title V Application ⁽³⁾
NO _x	lb/MMBtu TPY	0.0995 2.45	from Title V Application ⁽³⁾
SO ₂	lb/MMBtu TPY	0.0028 0.07	from Title V Application ⁽³⁾
CO	lb/MMBtu TPY	0.0550 1.35	from Title V Application ⁽³⁾
VOC	lb/MMBtu TPY	0.0018 0.04	from Title V Application ⁽³⁾

Legend - TPY: tons per year

⁽¹⁾ Heat input for 59°F compressor inlet temperature. A conservative annual average.

⁽²⁾ Hours of operation based on an assumed 2,500 hours per year.

⁽³⁾ Emission factor references - PSD and Title V Permits based on maximum hourly emissions and 25°F turbine inlet conditions.

Table 8 Emission Estimates of the City of Lakeland Larsen Plant Unit 8 - Combustion
Turbine Upgrades - Peak Load
(Distillate Oil Firing - 500 hours/year).

Performance Basis

Heat Input Change	mmBtu ⁽¹⁾	1043.1	
Power Increase		4.40%	GE Data for Frame 7EA
Heat Rate Decrease		2.40%	GE Data for Frame 7EA
Heat Input Increase		1.90%	GE Data for Frame 7EA
Heat Input Change	mmBtu	19.8	
Hours/year		500 ⁽²⁾	

Pollutants	Units	Emissions	Comments
PM	lb/MMBtu TPY	0.0250 0.12	from Title V Application ⁽³⁾
NO _x	lb/MMBtu TPY	0.1692 0.84	from Title V Application ⁽³⁾
SO ₂	lb/MMBtu TPY	0.2029 1.01	from Title V Application ⁽³⁾
CO	lb/MMBtu TPY	0.0567 0.28	from Title V Application ⁽³⁾
VOC	lb/MMBtu TPY	0.0087 0.04	from Title V Application ⁽³⁾

Legend - TPY: tons per year

⁽¹⁾ Heat input for 59°F compressor inlet temperatures. A conservative annual average.

⁽²⁾ Hours of operation based on an assumed 500 hours per year.

⁽³⁾ Emission factor references - PSD and Title V Permits based on maximum hourly emissions and 25°F turbine inlet conditions.

Table 9 Maximum Annual Emissions of the City of Lakeland Larsen Plant Unit 8 - Combustion
Turbine with Upgrades - Peak Load
(Natural Gas Firing - 2500 hours/year and Oil Firing 500 hours/year).

Pollutants	Annual Emissions (tons/year)			PSD SERs ⁽¹⁾ (tons/year)
	Gas Firing	Oil-Firing	Total	
PM	0.15	0.12	0.27	15 & 25 ⁽²⁾
NO _x	2.45	0.84	3.29	40
SO ₂	0.07	1.01	1.08	40
CO	1.35	0.28	1.63	100
VOC	0.04	0.04	0.09	40

⁽¹⁾ PSD = Prevention of Significant Deterioration; SERs - Significant Emission Rates; Rule 62-212.400(2)(c)2.

⁽²⁾ 15 tons/year is for PM₁₀ and 25 tons/year is for PM.

Table 10 Maximum Annual Emissions of the City of Lakeland Larsen Plant Unit 8 - Combustion
Turbine Peak Operation and Upgrades

Pollutants	Annual Emissions (tons/year)				PSD SERs ⁽¹⁾ (tons/year)
	Peak Operation Hours:	Base w/Upgrades	Peak w/Upgrades	Total	
	3,000	5,760	3,000	8,760	
PM	1.15	0.64	0.27	2.06	15 & 25 ⁽²⁾
NO _x	13.92	6.40	3.29	23.61	40
SO ₂	4.53	3.60	1.08	9.21	40
CO	6.92	2.90	1.63	11.46	100
VOC	0.37	0.21	0.09	0.67	40

⁽¹⁾ PSD = Prevention of Significant Deterioration, SERs - Significant Emission Rates, Rule 62-212.400(2)(c)2.

⁽²⁾ 15 tons/year is for PM₁₀ and 25 tons/year is for PM.

Table 11. Current Permitted and Upgraded Performance of GE Frame 7EA Turbine, Larsen Unit 8 Combustion Turbine

BASE LOAD OPERATION:

CONFIGURATION		CURRENT	UPGRADE	CURRENT	UPGRADE	CURRENT	UPGRADE
TURBINE INLET TEMPERATURE	°F	25	25	59	59	90	90
HEAT CONSUMPTION	MMBTU/HR	1051.5	1071.3	959.6	977.8	879.5	896.2
CT OUTPUT	KW	98,284	102,608	88,010	91,882	78,689	82,151

PEAK LOAD OPERATION:

CONFIGURATION		CURRENT	UPGRADE	CURRENT	UPGRADE	CURRENT	UPGRADE
TURBINE INLET TEMPERATURE	DEGREES F	25	25	59	59	90	90
HEAT CONSUMPTION	MMBTU/HR	1139.4	1161.0	1043.1	1062.8	960.1	978.3
CT OUTPUT	KW	106,276	110,952	95,661	99,870	86,294	90,091

Source: Lakeland Electric, 2003.

ASSUMPTIONS:

ALL COMPONENTS IN NEW AND CLEAN CONDITION

IGV = 84 DEG

BAROMETRIC PRESSURE = 14.63 PSIA

RELATIVE HUMIDITY = 60%

INLET / EXHAUST PRESSURE DROPS = 2.5 / 14.0 IN H2O

FUEL = NATURAL GAS

NO_x TARGET = 25 PPMVD @ 15% O2



Farzie Shelton, chE; REM

Manager of Environmental Affairs

March 28, 2003

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

RECEIVED

APR 01 2003

BUREAU OF AIR REGULATION

Attention: Mr. A. A. Linero, P.E., Administrator New Source Review

RE: DEP File No. PSD-FL-166© and 10500003-007-AC
City of Lakeland, Department of Electric Utilities – Charles Larsen Power Plant
Increase of Heat Input Rate and Evaluation of the Peak Mode Operation

Dear Al:

We are in receipt of your letter dated February 14, 2003, in reference to the above. As per the Department's requirement, Mr. Ken Kosky of Golder Associates Inc. has prepared a construction application in reference to the Peak Mode Operation with all the pertinent information for Unit No. 8 at Larsen Power Plant. Therefore, enclosed please find five copies of this application signed and sealed by Mr. Kosky P>E. and certified by Mr. Timothy Bates our Responsible Official.

We appreciate your review of this construction permit and look forward to receiving the modified PSD permit in due course. Please call if you have any questions.

Sincerely,

Farzie Shelton

Enclosures

cc: Ken Kosky P.E.

Chris Peterson, SWD
J. Little, EPA

City of Lakeland • Department of Electric Utilities

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farzie.shelton@lakelandgov.net