Golder Associates Inc.

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

Golder Associates

February 13, 2001

0037654

Florida Department of environmental Protection
Central District – Air Resources Management
3319 Maguire Blvd, Suite 232
Orlando, FL 32803-3767

Attention: Mr. Leonard T. Kozlov, P.E., Administrator

RE: CALPINE EASTERN CORPORATION
VERO BEACH PEAKER PROJECT

Dear Len:

Attached are four copies of a permit application for a facility classified as a minor source. The facility consists of two simple cycle combustion turbines located on property leased from the City of Vero Beach. The project owner, Calpine Eastern Corporation, will own and operate the facility independently from the City of Vero Beach. The maximum emissions will be limited to less than 250 tons/year for any regulated pollutant. As such, Prevention of Significant Deterioration review is not required. I am sending the permit to your office, since air construction permits for minor sources are typically issued by the Districts. Also enclosed is the applicable permit fee of $5,000 for a facility that would emit more than 100 tons/year, but not be subject to PSD review.

Your expeditious review would be appreciated. Please call if you have any questions.

Sincerely,

GOLDER ASSOCIATES INC.

Kennard F, Kosky, P.E.
Principal

KFK/nav

Enclosures

cc: Benjamin Borsch, Calpine
Robert Alff, Calpine

P:/0037654a/F1/WP/L021301.doc

AIR PERMIT APPLICATION
FOR THE VERO BEACH PEAKER PROJECT
INDIAN RIVER COUNTY, FLORIDA

Prepared For:

Calpine Eastern Corporation
4890 West Kennedy Blvd., Suite 600
Tampa, Florida 33609

Prepared By:

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

February 2001
0037654Y/F1

DISTRIBUTION:
4 Copies - FDEP
2 Copies - Calpine Eastern Corporation
2 Copies - Golder Associates Inc.

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PART I

AIR PERMIT APPLICATION

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: **Calpine Eastern Corporation**	
2. Site Name: **Vero Beach Facility**	
3. Facility Identification Number:	[X] Unknown
4. Facility Location: Street Address or Other Locator: **100 17th Street** City: **Vero Beach** County: **Indian River** Zip Code: 32960	
5. Relocatable Facility? [ ] Yes [X] No	6. Existing Permitted Facility? [ ] Yes [X] No

Application Contact

1. Name and Title of Application Contact: **Mr. Benjamin Borsch, Environmental Manager**
2. Application Contact Mailing Address: Organization/Firm: **Calpine Eastern Corporation** Street Address: **4890 West Kennedy Blvd., Suite 600** City: **Tampa** State: **FL** Zip Code: **33609**
3. Application Contact Telephone Numbers: Telephone: (**813**) **637 - 3515** Fax: (**813**) **637 – 3597**

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	~~0610083-001-AC~~ 1-14-01
2. Permit Number:	0610083-001-AC
3. PSD Number (if applicable):	
4. Siting Number (if applicable):	

Purpose of Application

Air Operation Permit Application

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

[ ] Initial Title V air operation permit for an existing facility which is classified as a Title V source.

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

Current construction permit number:_____

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

Current construction permit number:_____

Operation permit number to be revised:_____

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

Operation permit number to be revised/corrected:_____

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

Operation permit number to be revised:_____

Reason for revision:_____

Air Construction Permit Application

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

[X] Air construction permit to construct or modify one or more emissions units.

[ ] Air construction permit to make federally enforceable an assumed restriction on the potential emissions of one or more existing, permitted emissions units.

[ ] Air construction permit for one or more existing, but unpermitted, emissions units.

Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official:
   Robert K. Alff, Senior Vice President

2. Owner/Authorized Representative or Responsible Official Mailing Address:
   Organization/Firm: **Calpine Eastern Corporation**
   Street Address: **The Pilot House, 2nd Floor, Lewis Wharf**
   City: **Boston** State: **MA** Zip Code: **02110**

3. Owner/Authorized Representative or Responsible Official Telephone Numbers:
   Telephone: **(617) 723 - 7200** Fax: **(617) 723 – 7635**

4. Owner/Authorized Representative or Responsible Official Statement:

I, the undersigned, am the owner or authorized representative(check here [ ], if so) or the responsible official (check here [ ], 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.*

Signature Robert K. Alff Date 2/9/01

* 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**

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 13 FEB 2001

(seal)

* Attach any exception to certification statement.

Scope of Application

Emissions Unit ID	Description of Emissions Unit	Permit Type	Processing Fee
01	General Electric LM6000-Sprint CT	AC1B	
02	General Electric LM6000-Sprint CT	AC1B	
03	Emergency Generator		

Application Processing Fee

Check one: [X] Attached - Amount: $: 5,000 [ ] Not Applicable

Construction/Modification Information

1. Description of Proposed Project or Alterations:

   Construction of two 47.9 MW General Electric LM6000-Sprint combustion turbines. See Attachment Part II.

2. Projected or Actual Date of Commencement of Construction: **1 Mar 2001**

3. Projected Date of Completion of Construction: **1 Oct 2001**

Application Comment

See Attachment Part II.

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates: Zone: **17** East (km): **561.4** North (km): **3056.5**			
2. Facility Latitude/Longitude: Latitude (DD/MM/SS): **27 / 37 / 52** Longitude (DD/MM/SS): **80 / 22 / 33**			
3. Governmental Facility Code: **0**	4. Facility Status Code: **A**	5. Facility Major Group SIC Code: **49**	6. Facility SIC(s): **4911**
7. Facility Comment (limit to 500 characters): **See Attachment Part II.**			

Facility Contact

1. Name and Title of Facility Contact: **Mr. Benjamin Borsch, Environmental Manager**
2. Facility Contact Mailing Address: Organization/Firm: **Calpine Eastern Corporation** Street Address: **4890 West Kennedy Blvd., Suite 600** City: **Tampa** State: **FL** Zip Code: **33609**
3. Facility Contact Telephone Numbers: Telephone: **(813) 637 - 3515** Fax: **(813) 637 - 3597**

Facility Regulatory Classifications

Check all that apply:

1. [ ] Small Business Stationary Source?	[ ] Unknown
2. [X] Major Source of Pollutants Other than Hazardous Air Pollutants (HAPs)?	
3. [ ] Synthetic Minor Source of Pollutants Other than HAPs?	
4. [ ] Major Source of Hazardous Air Pollutants (HAPs)?	
5. [ ] Synthetic Minor Source of HAPs?	
6. [X] One or More Emissions Units Subject to NSPS?	
7. [ ] One or More Emission Units Subject to NESHAP?	
8. [ ] Title V Source by EPA Designation?	
9. Facility Regulatory Classifications Comment (limit to 200 characters): **CTs are subject to NSPS Subpart GG.**	

List of Applicable Regulations

Not Applicable	

B. FACILITY POLLUTANTS

List of Pollutants Emitted

1. Pollutant Emitted	2. Pollutant Classif.	3. Requested Emissions Cap lb/hour	3. Requested Emissions Cap tons/year	4. Basis for Emissions Cap	5. Pollutant Comment
PM	B				Particulate Matter-Total
VOC	B				Volatile Organic Compounds
SO_2	B				Sulfur Dioxide
NO_x	A				Nitrogen Oxides
CO	A				Carbon Monoxides
PM_{10}	B				Particulate Matter-PM_{10}

C. FACILITY SUPPLEMENTAL INFORMATION

Supplemental Requirements

1. Area Map Showing Facility Location: [X] Attached, Document ID: Part II [ ] Not Applicable [ ] Waiver Requested
2. Facility Plot Plan: [X] Attached, Document ID: Part II [ ] Not Applicable [ ] Waiver Requested
3. Process Flow Diagram(s): [X] Attached, Document ID: Part II [ ] Not Applicable [ ] Waiver Requested
4. Precautions to Prevent Emissions of Unconfined Particulate Matter: [ ] Attached, Document ID: [X] Not Applicable [ ] Waiver Requested
5. Fugitive Emissions Identification: [ ] Attached, Document ID: [X] Not Applicable [ ] Waiver Requested
6. Supplemental Information for Construction Permit Application: [X] Attached, Document ID: Part II [ ] Not Applicable
7. Supplemental Requirements Comment:

Additional Supplemental Requirements for Title V Air Operation Permit Applications

8. List of Proposed Insignificant Activities:
   [ ] Attached, Document ID:_____ [X] Not Applicable

9. List of Equipment/Activities Regulated under Title VI:
   [ ] Attached, Document ID:_____
   [ ] Equipment/Activities On site but Not Required to be Individually Listed
   [X] Not Applicable

10. Alternative Methods of Operation:
    [ ] Attached, Document ID:_____ [X] Not Applicable

11. Alternative Modes of Operation (Emissions Trading):
    [ ] Attached, Document ID:_____ [X] Not Applicable

12. Identification of Additional Applicable Requirements:
    [ ] Attached, Document ID:_____ [X] Not Applicable

13. Risk Management Plan Verification:
    [ ] Plan previously submitted to Chemical Emergency Preparedness and Prevention Office (CEPPO). Verification of submittal attached (Document ID:_____) or previously submitted to DEP (Date and DEP Office:_____)
    [ ] Plan to be submitted to CEPPO (Date required:_____)
    [X] Not Applicable

14. Compliance Report and Plan:
    [ ] Attached, Document ID:_____ [X] Not Applicable

15. Compliance Certification (Hard-copy Required):
    [ ] Attached, Document ID:_____ [X] Not Applicable

III. EMISSIONS UNIT INFORMATION

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

A. GENERAL EMISSIONS UNIT INFORMATION
(All Emissions Units)

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in This Section: (Check one)

[X] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Regulated or Unregulated Emissions Unit? (Check one)

[X] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):

General Electric LM6000-Sprint CT 01

4. Emissions Unit Identification Number: [ ] No ID
ID: [X] ID Unknown

5. Emissions Unit Status Code:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C	JUNE - 01	49	[ ]

9. Emissions Unit Comment: (Limit to 500 Characters)

This emission unit is a General Electric LM6000-Sprint combustion turbine operating in simple cycle mode. See Attachment Part II.

Emissions Unit Control Equipment

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

Water injection - natural gas firing.

Water injection - distillate oil firing.

2. Control Device or Method Code(s): **28, 28**

Emissions Unit Details

1. Package Unit:
   Manufacturer: **General Electric** Model Number: **LM6000-Sprint**
2. Generator Nameplate Rating: **48** 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:		422.6	mmBtu/hr
2. Maximum Incineration Rate:	lb/hr		tons/day
3. Maximum Process or Throughput Rate:			
4. Maximum Production Rate:			
5. Requested Maximum Operating Schedule:			
	hours/day		days/week
	weeks/year	3,430	hours/year
6. Operating Capacity/Schedule Comment (limit to 200 characters):			

Maximum heat input at 32°F and natural gas firing (LHV); maximum for oil firing is 430.1 MMBtu/hr (32°F-LHV). Hours per year are equivalent full-load hours with oil firing (see Part II).

C. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

List of Applicable Regulations

See Attachment Part II for operational requirements	
See Attachment Part II for permitting requirements	

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? **See Att. Part II**	2. Emission Point Type Code: **1**	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): **Exhausts through a single stack.**		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:		
5. Discharge Type Code: **V**	6. Stack Height: **65** feet	7. Exit Diameter: **10.5** feet
8. Exit Temperature: **849** °F	9. Actual Volumetric Flow Rate: **598,000** acfm	10. Water Vapor: **10.5** %
11. Maximum Dry Standard Flow Rate: dscfm	12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates: Zone: **17** East (km): **561.4** North (km): **3056.5**		
14. Emission Point Comment (limit to 200 characters): **Stack parameters for chiller operation at 50°F.**		

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): **Natural Gas**		
2. Source Classification Code (SCC): **20100201**	3. SCC Units: **Million Cubic Feet Burned**	
4. Maximum Hourly Rate: **0.45**	5. Maximum Annual Rate: **1,428**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit: **946**
10. Segment Comment (limit to 200 characters): **Maximum hourly based on 32°F condition and 946 Btu/cf (LHV). Maximum annual based on 3,240 hr/yr and chiller operation down to 50°F.**		

Segment Description and Rate: Segment 2 of 2

1. Segment Description (Process/Fuel Type) (limit to 500 characters): **Distillate (No. 2) Fuel Oil**		
2. Source Classification Code (SCC): **20100101**	3. SCC Units: **1,000 Gallons Burned**	
4. Maximum Hourly Rate: **3.42**	5. Maximum Annual Rate: **11,433**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **0.05**	8. Maximum % Ash:	9. Million Btu per SCC Unit: **125.7**
10. Segment Comment (limit to 200 characters): **Million BTU per SCC unit = 125.7; based on 6.83 lb/gal; 18,400 Btu/lb (LHV), ISO conditions, maximum hourly rate based on 32°F conditions and annual rate based on an equivalent of 3,430 hours of oil firing per year chiller operation down to 50°F.**		

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: **14.0** lb/hour **23.4** tons/year	4. Synthetically Limited? [X]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **General Electric, 2000**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment Part II.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on 32°F and TPY based on oil firing 3,430 hr/yr with chiller operation down to 50°F.**	

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: **VE ≤10% operation**	4. Equivalent Allowable Emissions: **14.0** lb/hour **23.4** tons/year
5. Method of Compliance (limit to 60 characters): **Annual VE test; EPA Method 9**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Oil firing. See Attachment Part II.**	

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? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 to tons/year	
6. Emission Factor: Reference:	7. EmissionsMethod 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: **VE ≤5% operation**	4. Equivalent Allowable Emissions: **3.0** lb/hour **4.9** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 9**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Gas firing. See Attachment Part II.**	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: **SO_2**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **23.4** lb/hour **39.1** tons/year	4. Synthetically Limited? [X]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **General Electric, 2000**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment Part II.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on 32°F conditions and TPY based on oil firing 3,430 hr/yr with chiller operation down to 50°F.**	

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: **0.05% Sulfur Oil**	4. Equivalent Allowable Emissions: **23.4** lb/hour **39.1** tons/year
5. Method of Compliance (limit to 60 characters): **Fuel Sampling**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Oil firing. See Attachment Part II.**	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: SO_2	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 to tons/year	
6. Emission Factor: Reference:	7. EmissionsMethod 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: See Comment	4. Equivalent Allowable Emissions: 2.6 lb/hour 4.1 tons/year
5. Method of Compliance (limit to 60 characters): Pipeline Natural Gas	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Pipeline natural gas, 2 g/100 cf, See Attachment Part II.	

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: **74.4** lb/hour **249.5** tons/year	4. Synthetically Limited? [**X**]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **General Electric, 2000**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment Part II.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on 32°F condition with oil firing and TPY based on gas firing 3,240 hr/yr with chiller operation down to 50°F.**	

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 corrected to 15% O_2**	4. Equivalent Allowable Emissions: **74.4** lb/hour **124.7** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 20**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **See Attachment Part II.**	

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? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 to tons/year	
6. Emission Factor: Reference:	7. EmissionsMethod 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 corrected to 15% O_2	4. Equivalent Allowable Emissions: 43.0 lb/hour 68.0 tons/year
5. Method of Compliance (limit to 60 characters): EPA Method 20	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): See Attachment Part II.	

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: **77.9** lb/hour **124.7** tons/year	4. Synthetically Limited? [X]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **General Electric, 2000**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment Part II.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on 32°F condition and TPY based on natural gas firing 3,240 hr/yr with chiller operation down to 50°F.**	

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: **75 ppmvd corrected to 15% O_2**	4. Equivalent Allowable Emissions: **77.9** lb/hour **124.7** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 10**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Natural Gas Firing. See Attachment Part II.**	

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? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 to tons/year	
6. Emission Factor: Reference:	7. EmissionsMethod 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: 20 ppmvd corrected to 15% O_2	4. Equivalent Allowable Emissions: 21.6 lb/hour 36.2 tons/year
5. Method of Compliance (limit to 60 characters): EPA Method 10	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Oil firing. See Attachment Part II.	

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: 9 lb/hour 15.4 tons/year	4. Synthetically Limited? [X]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 to tons/year	
6. Emission Factor: Reference: General Electric, 2000	7. Emissions Method Code: 2
8. Calculation of Emissions (limit to 600 characters): See Attachment Part II.	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Lb/hr and TPY based on oil firing 3,430 hr/yr at ISO conditions.	

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:	4. Equivalent Allowable Emissions: 9 lb/hour 15.4 tons/year
5. Method of Compliance (limit to 60 characters): Compliance with CO emission limit.	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Oil firing. See Attachment Part II.	

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. EmissionsMethod 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:	4. Equivalent Allowable Emissions: 6 lb/hour 9.7 tons/year
5. Method of Compliance (limit to 60 characters): Compliance with CO emission limit.	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Gas firing. See Attachment Part II.	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: **PM_{10}**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **13.7** lb/hour **23.4** tons/year	4. Synthetically Limited? [X]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 to tons/year	
6. Emission Factor: Reference: **General Electric, 2000**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment Part II.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr and TPY based on oil firing 3,430 hr/yr at ISO conditions.**	

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:	4. Equivalent Allowable Emissions: **13.7** lb/hour **23.4** tons/year
5. Method of Compliance (limit to 60 characters): **Annual stack test; EPA Method 5 or 17; if <400 hours**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Oil firing; 3,430 hr/yr. See Attachment Part II.**	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: **PM_{10}**	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: **VE < 20% Opacity**	4. Equivalent Allowable Emissions: **3.0** lb/hour **4.9** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 9**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Gas firing; 3,240 hr/yr. See Attachment Part II.**	

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: **VE20**	2. Basis for Allowable Opacity: [X] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: **20 %** Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **Annual VE Test EPA Method 9**	
5. Visible Emissions Comment (limit to 200 characters): **Rule 62-296 F.A.C.**	

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

Continuous Monitoring System: Continuous Monitor 1 of 2

1. Parameter Code: **EM**	2. Pollutant(s): **NO_x**
3. CMS Requirement:	[X] Rule [ ] Other
4. Monitor Information: **To be determined (TBD)** Manufacturer: Model Number: Serial Number:	
5. Installation Date: **TBD**	6. Performance Specification Test Date:
7. Continuous Monitor Comment (limit to 200 characters): **NO_x CEM proposed to meet requirements of 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: [X] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: **100** % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **None**	
5. Visible Emissions Comment (limit to 200 characters): **FDEP Rule 62-201.700(1), Allowed for 2 hours (120 minutes) per 24 hours for start up, shutdown and malfunction.**	

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

Continuous Monitoring System: Continuous Monitor 2 of 2

1. Parameter Code: **WTF**	2. Pollutant(s): **NO_X**
3. CMS Requirement:	[X] Rule [ ] Other
4. Monitor Information: **GE** Manufacturer: Model Number: Serial Number:	
5. Installation Date: **TBD**	6. Performance Specification Test Date:
7. Continuous Monitor Comment (limit to 200 characters): **Required pursuant to 40 CFR Part 60; subpart GG; 60.334.**	

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

Supplemental Requirements

1. Process Flow Diagram [X] Attached, Document ID: **Part II** [ ] 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 NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)
Attached, Document ID:_____

[ ] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)
Attached, Document ID:_____

[X] Not Applicable

III. EMISSIONS UNIT INFORMATION

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

A. GENERAL EMISSIONS UNIT INFORMATION
(All Emissions Units)

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in This Section: (Check one)

[X] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Regulated or Unregulated Emissions Unit? (Check one)

[X] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):

General Electric LM6000-Sprint CT 02

4. Emissions Unit Identification Number: [ ] No ID
ID: [X] ID Unknown

5. Emissions Unit Status Code:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C	JUNE - 01	49	[ ]

9. Emissions Unit Comment: (Limit to 500 Characters)

This emission unit is a General Electric LM6000-Sprint combustion turbine operating in simple cycle mode. See Attachment Part II.

Emissions Unit Control Equipment

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

Water injection - natural gas firing.

Water injection - distillate oil firing.

2. Control Device or Method Code(s): **28, 28**

Emissions Unit Details

1. Package Unit:
   Manufacturer: **General Electric** Model Number: **LM6000-Sprint**
2. Generator Nameplate Rating: **48** 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:		**422.6**	mmBtu/hr
2. Maximum Incineration Rate:	lb/hr		tons/day
3. Maximum Process or Throughput Rate:			
4. Maximum Production Rate:			
5. Requested Maximum Operating Schedule:			
	hours/day		days/week
	weeks/year	**3,430**	hours/year

6. Operating Capacity/Schedule Comment (limit to 200 characters):

Maximum heat input at 32°F and natural gas firing (LHV); maximum for oil firing is 430.1 MMBtu/hr (32°F-LHV). *Hours per year are equivalent full-load hours with oil firing* (see Part II).

C. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

List of Applicable Regulations

See Attachment Part II for operational requirements	
See Attachment Part II for permitting requirements	

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? **See Att. Part II**	2. Emission Point Type Code: **1**	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): **Exhausts through a single stack.**		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:		
5. Discharge Type Code: **V**	6. Stack Height: **65** feet	7. Exit Diameter: **10.5** feet
8. Exit Temperature: **849** °F	9. Actual Volumetric Flow Rate: **598,000** acfm	10. Water Vapor: **10.5** %
11. Maximum Dry Standard Flow Rate: dscfm	12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates: Zone: **17** East (km): **561.4** North (km): **3056.5**		
14. Emission Point Comment (limit to 200 characters): **Stack parameters for chiller operation at 50°F.**		

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): **Natural Gas**		
2. Source Classification Code (SCC): **20100201**	3. SCC Units: **Million Cubic Feet Burned**	
4. Maximum Hourly Rate: **0.45**	5. Maximum Annual Rate: **1,428**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit: **946**
10. Segment Comment (limit to 200 characters): **Maximum hourly based on 32°F condition and 946 Btu/cf (LHV). Maximum annual based on 3,240 hr/yr and chiller operation down to 50°F.**		

Segment Description and Rate: Segment 2 of 2

1. Segment Description (Process/Fuel Type) (limit to 500 characters): **Distillate (No. 2) Fuel Oil**		
2. Source Classification Code (SCC): **20100101**	3. SCC Units: **1,000 Gallons Burned**	
4. Maximum Hourly Rate: **3.42**	5. Maximum Annual Rate: **11,433**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **0.05**	8. Maximum % Ash:	9. Million Btu per SCC Unit: **125.7**
10. Segment Comment (limit to 200 characters): **Million BTU per SCC unit = 125.7; based on 6.83 lb/gal; 18,400 Btu/lb (LHV), ISO conditions, maximum hourly rate based on 32°F conditions and annual rate based on an equivalent of 3,430 hours of oil firing per year chiller operation down to 50°F.**		

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: **14.0** lb/hour **23.4** tons/year	4. Synthetically Limited? [X]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **General Electric, 2000**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment Part II.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on 32°F and TPY based on oil firing 3,430 hr/yr with chiller operation down to 50°F.**	

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: **VE ≤10% operation**	4. Equivalent Allowable Emissions: **14.0** lb/hour **23.4** tons/year
5. Method of Compliance (limit to 60 characters): **Annual VE test; EPA Method 9**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Oil firing. See Attachment Part II.**	

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? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 to tons/year	
6. Emission Factor: Reference:	7. EmissionsMethod 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: VE ≤ 5% operation	4. Equivalent Allowable Emissions: 3.0 lb/hour 4.9 tons/year
5. Method of Compliance (limit to 60 characters): EPA Method 9	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Gas firing. See Attachment Part II.	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: **SO_2**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **23.4** lb/hour **39.1** tons/year	4. Synthetically Limited? [X]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **General Electric, 2000**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment Part II.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on 32°F conditions and TPY based on oil firing 3,430 hr/yr with chiller operation down to 50°F.**	

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: **0.05% Sulfur Oil**	4. Equivalent Allowable Emissions: **23.4** lb/hour **39.1** tons/year
5. Method of Compliance (limit to 60 characters): **Fuel Sampling**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Oil firing. See Attachment Part II.**	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: SO_2	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 to tons/year	
6. Emission Factor: Reference:	7. EmissionsMethod 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: See Comment	4. Equivalent Allowable Emissions: 2.6 lb/hour 4.1 tons/year
5. Method of Compliance (limit to 60 characters): Pipeline Natural Gas	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Pipeline natural gas, 2 g/100 cf, See Attachment Part II.	

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: **74.4** lb/hour **249.5** tons/year	4. Synthetically Limited? [X]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **General Electric, 2000**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment Part II.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on 32°F conditions with oil firing and TPY based on gas firing 3,240 hr/yr with chiller operation down to 50°F.**	

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 corrected to 15% O_2**	4. Equivalent Allowable Emissions: **74.4** lb/hour **124.7** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 20**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **See Attachment Part II.**	

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? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 to tons/year	
6. Emission Factor: Reference:	7. EmissionsMethod 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 corrected to 15% O_2	4. Equivalent Allowable Emissions: 43.0 lb/hour 68.0 tons/year
5. Method of Compliance (limit to 60 characters): EPA Method 20	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): See Attachment Part II.	

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: **77.9** lb/hour **124.7** tons/year	4. Synthetically Limited? [X]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **General Electric, 2000**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment Part II.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on 32°F conditions and TPY based on natural gas firing 3,240 hr/yr with chiller operation down to 50°F.**	

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: **75 ppmvd corrected to 15% O_2**	4. Equivalent Allowable Emissions: **77.9** lb/hour **124.7** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 10**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Natural Gas Firing. See Attachment Part II.**	

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? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 to tons/year	
6. Emission Factor: Reference:	7. EmissionsMethod 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: 20 ppmvd corrected to 15% O_2	4. Equivalent Allowable Emissions: 21.6 lb/hour 36.2 tons/year
5. Method of Compliance (limit to 60 characters): EPA Method 10	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Oil firing. See Attachment Part II.	

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: 9 lb/hour 15.4 tons/year	4. Synthetically Limited? [X]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 to tons/year	
6. Emission Factor: Reference: General Electric, 2000	7. Emissions Method Code: 2
8. Calculation of Emissions (limit to 600 characters): See Attachment Part II.	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Lb/hr and TPY based on oil firing 3,430 hr/yr at ISO conditions.	

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:	4. Equivalent Allowable Emissions: 9 lb/hour 15.4 tons/year
5. Method of Compliance (limit to 60 characters): Compliance with CO emission limit.	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Oil firing. See Attachment Part II.	

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:	4. Equivalent Allowable Emissions: **8.8** lb/hour **14.3** tons/year
5. Method of Compliance (limit to 60 characters): **Compliance with CO emission limit.**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Gas firing. See Attachment Part II.**	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: **PM_{10}**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **13.7** lb/hour **23.4** tons/year	4. Synthetically Limited? [**X**]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **General Electric, 2000**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment Part II.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr and TPY based on oil firing 3,430 hr/yr at ISO conditions.**	

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:	4. Equivalent Allowable Emissions: **3.0** lb/hour **4.9** tons/year
5. Method of Compliance (limit to 60 characters): **Annual stack test; EPA Method 5 or 17; if <400 hours**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Oil firing; 3,430 hr/yr. See Attachment Part II.**	

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

Potential/Fugitive Emissions

1. Pollutant Emitted: **PM_{10}**	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: **VE < 20% Opacity**	4. Equivalent Allowable Emissions: **3.0** lb/hour **4.9** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 9**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Gas firing; 3,240 hr/yr. See Attachment Part II.**	

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: **VE20**	2. Basis for Allowable Opacity: [X] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: **20 %** Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **Annual VE Test EPA Method 9**	
5. Visible Emissions Comment (limit to 200 characters): **Rule 62-296 F.A.C.**	

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

Continuous Monitoring System: Continuous Monitor 1 of 2

1. Parameter Code: **EM**	2. Pollutant(s): **NO_x**
3. CMS Requirement:	[X] Rule [ ] Other
4. Monitor Information: **To be determined (TBD)** Manufacturer: Model Number: Serial Number:	
5. Installation Date: **TBD**	6. Performance Specification Test Date:
7. Continuous Monitor Comment (limit to 200 characters): **NO_x CEM proposed to meet requirements of 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: [X] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: **100** % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **None**	
5. Visible Emissions Comment (limit to 200 characters): **FDEP Rule 62-201.700(1), Allowed for 2 hours (120 minutes) per 24 hours for start up, shutdown and malfunction.**	

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

Continuous Monitoring System: Continuous Monitor 2 of 2

1. Parameter Code: **WTF**	2. Pollutant(s): **NO_x**
3. CMS Requirement:	[X] Rule [ ] Other
4. Monitor Information: **GE** Manufacturer: Model Number: Serial Number:	
5. Installation Date: **TBD**	6. Performance Specification Test Date:
7. Continuous Monitor Comment (limit to 200 characters): **Required pursuant to 40 CFR Part 60; subpart GG; 60.334.**	

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

Supplemental Requirements

1. Process Flow Diagram [X] Attached, Document ID: Part II [ ] 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 NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)
Attached, Document ID:_____

[ ] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)
Attached, Document ID:_____

[X] Not Applicable

PART II

REPORT

1.0 INTRODUCTION

Calpine Eastern Corporation (Calpine) proposes to license, construct, and operate a nominal 99-megawatt (MW) power production facility, referred to as the Vero Beach Peaker Project (the "Project"), in Vero Beach, Indian River County, Florida (Figure 1-1). The site will be located on a 1-acre parcel at the existing 10-acre City of Vero Beach Municipal Utilities site. Calpine will lease the property and own/control the operation of the facility. Calpine will own the equipment and dispatch the units to supply power to Florida Municipal Power Authority (FMPA). The Project consists of the construction and operation of two 49-MW dual-fuel General Electric LM6000 Sprint combustion turbines (CTs). The CTs will use wet injection when operating on either natural gas or distillate fuel oil. The units are designed for peaking service. The primary fuel for the CT will be natural gas with distillate fuel oil used as backup fuel. Fuel oil will contain a maximum sulfur content of 0.05 percent.

The permitting of the Project in Florida requires an air construction permit. To assist in performing the necessary permitting, Golder Associates Inc. (Golder) was contracted to prepare the necessary permit applications and determining the Project's applicability to any state and federal new source review (NSR) regulation, including prevention of significant deterioration (PSD) and nonattainment review requirements.

The requested operational conditions for the proposed Project will classify the facility as a "minor source" and therefore will not trigger PSD review.

The air permit application is divided into three major sections.

- Section 2.0 presents a description of the facility, including air emissions and stack parameters.
- Section 3.0 provides a review of the regulatory requirements applicable to the proposed Project.

2.0 PROJECT DESCRIPTION

2.1 SITE DESCRIPTION

The Project site, shown in Figure 2-1, consists of a 1-acre parcel of the existing 10-acre City of Vero Beach Municipal Utilities site that is predominated by other commercial services. There are industrial, commercial, and residential developments within a 3-kilometer (km) radius of the site. The plant elevation will be approximately 5 feet above mean sea level (ft-msl). The terrain surrounding the site is flat.

The Project will connect to the electrical grid at the existing Vero Beach Power Plant Substation. Natural gas is transported to the CT via a pipeline lateral already existing at the plant site. Distillate fuel oil will be stored in tanks located at the existing Vero Beach Plant site.

Water for the nitrogen oxide (NO_x) control when firing gas or distillate fuel oil, potable water, and additional fire protection supply water will be supplied under contract by the existing power plant.

2.2 SIMPLE-CYCLE COMBUSTION TURBINE

The proposed project will be the construction and operation of two General Electric LM6000-Sprint CTs operated in simple-cycle mode. The annual operation for these units is based on limiting the facility to less than 250 tons per year (TPY) for any air pollutant regulated under the Clean Air Act (CAA). Natural gas and fuel oil will be used. The maximum sulfur content of the distillate fuel oil will be 0.05 percent.

The turbine inlets for each turbine will be equipped with inlet chillers to reduce turbine inlet air to 50 degrees Fahrenheit (°F). This increases the power and efficiency of each unit. Small freshwater cooling towers will be associated with each chiller system.

Plant performance with the General Electric LM6000-Sprint CTs was developed for natural gas and distillate fuel oil firing; at 100-percent load; and at 32°F, 59°F, 74°F, and 95°F ambient

temperatures. For ambient temperatures of 59°F, 74°F, and 95°F, the inlet air would be chilled resulting in similar performance. CT performance is based on a performance envelope developed from General Electric and provided in Appendix A.

The CT is capable of normal steady state operation from 50 to 100 percent of baseload. The efficiency of the CT decreases at part load. As a result, the economic incentive is to dispatch the plant to keep the units operating as near baseload as possible.

Natural gas will be transported to the site via the existing pipeline and fuel oil will be stored at the two existing, aboveground storage tanks.

Air emissions control, when firing natural gas or distillate fuel oil, will consist of using water injection. The sulfur dioxide (SO_2) emissions will be controlled by the use of low-sulfur fuels. Good combustion practices and clean fuels will also minimize potential emissions of particulate matter less than 10 microns (PM_{10}), carbon monoxide (CO), volatile organic compound (VOC), and other pollutants (e.g., trace metals).

2.3 PROPOSED SOURCE EMISSIONS AND STACK PARAMETERS

The estimated maximum hourly emissions and exhaust information for the CTs operating at baseload conditions are presented in Tables 2-1 and 2-2. The data are presented for ambient temperatures of 32°F, 59°F, 74°F, and 95°F. These ambient temperatures represent the range of ambient temperatures that the CT is most likely to experience. For ambient temperatures of 59°F, 74°F, and 95°F, the inlet chillers would be used to cool the engines to 50°F. The performance calculations for the operating conditions are given in Appendix A.

The emission rates used to calculate maximum potential annual emissions for regulated air pollutants from the proposed CT are presented in Table 2-3. These annual emissions are based on using chillers down to a 50°F turbine inlet conductor. To limit emissions below the major PSD source threshold, a fuel use limitation equivalent to both CTs operating at 100-percent load for 3,240 hours per year when using natural gas or 3,430 hours per year when

using distillate fuel oil. For natural gas firing, the equivalent heat input is 2,698,272 million British thermal units (mmBtu)/year-LHV (based on 3,240 hours x 416.4 mmBtu/hour x 2 turbines). For oil firing, the equivalent heat input is 2,871,596 mmBtu/year-LHV (based on 3,430 hours x 418.6 mmBtu/hour x 2 turbines). The lower heat input within the range of 59°F and 95°F ambient was used. The limiting air pollutant for natural gas firing is CO while the limiting pollutant for distillate oil firing is nitrogen oxides. Since the use of both fuels is requested, a total fuel use limit equivalent to that for distillate oil is requested with a deduction of 1.064 mmBtu each 1.0 mmBtu of natural gas. This could be expressed as follows:

Facility Heat Input Limit = 2,871,596 mmBtu/year (LHV)
- 0.064 x heat input from natural gas in mmBtu/year (LHV)

The pollutant gaseous emission concentrations and PM_{10} emission rates for all conditions are as follows:

Pollutant	Natural Gas	Distillate Oil
NO_x, ppmvd @ 15-percent O_2	25	42
CO, ppmvd @ 15-percent O_2	75	20
VOC as CH_4, ppmvd @ 15-percent O_2	15	15
SO_x as SO_2	Calculated Based on Fuel (2.0 grains S/100 SCF)	Calculated Based on Fuel (0.05-percent sulfur)
PM_{10} lb/hour (dry filterable)	3	14

Note: ppmvd = parts per million volume dry.
Lb = pound.

These emission rates represent maximum emissions over the operating range of the turbines. Therefore, the annual emission rates are conservative, especially for the pollutants of CO and VOCs. For example, at higher loads, the CO concentration would be expected to be much less than 75 ppmvd corrected to 15-percent O_2.

A process flow diagram of the turbine operating at an ambient temperature of 59°F and turbine inlet temperature of 50°F at 100-percent load for gas and fuel oil firing is presented in Figure 2-2.

Appendix A contains estimated emission for hazardous air pollutants (HAPs). The HAP emissions are based on emission factors from the April 2000 revision of U. S. Environmental Protection Agency's (EPA's) AP-42 emission factor database.

Except for formaldehyde when firing natural gas, the HAP emission factors are those presented in Tables 3.1-3, 3.1-4, and 3.1-5 of the revised AP-42 section for CTs. For formaldehyde when firing natural gas, a review of EPA's database was conducted and an emission factor was estimated based on comparisons of the turbines and emission characteristics from EPA's database to those proposed for this project. A discussion regarding this review and estimation of the formaldehyde emission factor is presented in the following section.

The recent EPA emission factor suggests formaldehyde emissions from gas turbines of 780 lb/10^{12} Btu when firing natural gas at loads greater than 80 percent. The EPA suggested emission factor for all loads is 3,100 lb/10^{12} Btu.

The emission factors are not appropriate for the proposed CT based on several factors. First, and most importantly, the data used to develop the AP-42 emission factors are not representative of the General Electric (49 MW) CT. Second, a review of the data of the pertinent information in the EPA database that relates to the characteristics clearly suggests a much lower emission factor for formaldehyde. Some of the important aspects of the EPA Gas Turbine Database related to formaldehyde emission are as follows.

- The formaldehyde emissions are from small (<30 MW) gas turbines. The available data are from an average capacity of about 28 MW. More importantly, the median capacity, or the turbine size where an equal number of turbines are above and

below that size, is about 15 MW. Data from only 8 large turbines (>30 MW) are included in the EPA database.

- In contrast to the AP-42 emission factors for formaldehyde, which are based on an average value, the median value is substantially lower. For all loads, the median formaldehyde emission factor is about 320 lb/10^{12} Btu; for turbine loads greater than 50 percent, the median emission factor is about 110 lb/10^{12} Btu. Since the median emission factor is about 8 to ten times lower than the average factor, this clearly points to the large range in formaldehyde emissions and how the individual turbine combustion characteristics can influence the results.

The emission factors for many of the other pollutants were developed with even less data and the use of the AP-42 emission factors for these pollutants provide an estimate of HAP emissions that are likely very conservative. An evaluation of the HAP emission from the Project indicates that emissions are less than 25 tons/year for all HAPs and less than 10 tons/year for a single HAP. Therefore, the requirements of 40 Code of Federal Regulations (CFR) 63.43 for maximum achievable control technology are not applicable to the Project.

The Project will include an emergency generator in the event power is lost while the units are operating. The emergency generator will provide power to allow the units to shut down without causing damage to the units. The emergency generator will be 250 KW or less and will have a maximum operation of 200 hours/year. For maintenance and operation checks, the emergency generator may be operated about 2 hours/month. The maximum emissions from the generator are presented in Table 2-4. The emissions units meet the criteria in Rule 62-210.700 as an exempt emission under both categorical and generic exemptions.

Table 2-2. Stack, Operating, and Emission Data for the Simple Cycle CT (Oil Firing)

Parameter		Operating and Emission Data [a] for Ambient Temperature			
		32 °F	59 °F	74 °F	95 °F
Stack Data (ft)					
Height		65	65	65	65
Diameter		10.5	10.5	10.5	10.5
100 Percent Load					
Operating Data					
Temperature (°F)		824	851	852	852
Velocity (ft/sec)		115.5	114.1	114.1	114.1
Maximum Hourly Emissions per Unit [b]					
SO_2	lb/hr	23.4	22.8	22.8	22.8
PM/PM_{10}	lb/hr	14.0	13.7	13.7	13.7
NO_x	lb/hr	74.4	72.8	72.7	72.7
CO	lb/hr	21.6	21.1	21.1	21.1
VOC (as methane)	lb/hr	9.0	9.0	9.0	9.0
Sulfuric Acid Mist	lb/hr	3.58	3.49	3.48	3.48
Mercury	lb/hr	5.16E-04	5.03E-04	5.02E-04	5.02E-04

[a] Refer to Appendix A for detailed information. Data at 100% load for 95 °F are based on evaporative cooler on and operating at 95 percent efficiency.

[b] Other regulated pollutants are assumed to have negligible and minor amounts of emissions. These pollutants include lead, reduced sulfur compounds, hydrogen sulfide, fluorides, MSC Organics, Metals and Acid Gases.

Basis for pollutant emission rates at 59 °F ambient temperature are:

SO_2 = 0.05% S in fuel oil
PM/PM_{10} = dry filterables
NO_x = 42 ppmvd at 15% O_2
CO = 20.0 ppmvd at 15% O_2
VOC = 15.0 ppmvd at 15% O_2
Sulfuric acid mist = 10% SO_2 emissions
Mercury = Oil: 1.2 lb/10^{12} Btu

Table 2-3. Summary of Maximum Potential Annual Emissions for the Simple Cycle CT

Pollutant	Annual Emissions (tons/year)[a]		Maximum Emissions (tons/year)[c]		Maximum Emissions (tons/year)[c]	
			Natural Gas Firing-Case A		Distillate Oil Firing-Case B	
Load:	100%	100%				
Hours[b]:	3,240	3,430				
Fuel:	Gas	Oil	One Turbine	Two Turbines	One Turbine	Two Turbines
One Combustion Turbine- Simple Cycle						
SO_2	4.1	39.1	4.1	8.2	39.1	78.2
PM/PM_{10}	4.9	23.4	4.9	9.7	23.4	46.8
NO_x	68	125	68.0	136.1	124.7	249.4
CO	125	36	124.7	249.5	36.2	72.4
VOC (as methane)	14.3	15.4	14.3	28.5	15.4	30.9
Sulfuric Acid Mist	0.6	6.0	0.6	1.2	6	12
Mercury	5.60E-07	8.61E-04	5.6E-07	1.1E-06	8.6E-04	1.7E-03
Lead	NA	1.01E-02	NA	NA	1.0E-02	2.0E-02

[a] Based on 59 °F ambient inlet air temperature and chilled turbine inlet.

[b] Annual emission calculations based on theoretical hours of operation.

[c] Maximum emission cases:

Operation	Number of Hours for Operation	
	Case A	Case B
100 % Load - Gas	3,240	0
100 % Load - Oil	0	3,430
Total hours	3,240	3,430

Table 2-4. Performance, Stack Parameters and Emissions for the Emergency Generator

	Emergency Generator
Performance	
Fuel	Diesel
Fuel Usage (scf/hr- generator; gallons/hr-diesel)	17.09
Rating (kW)	250
Rating (hp)	335
Heat Input (mmBtu/hr-HHV)	2.38
Typical Hours per Year for Maintneance (2 hours/month)	24
Typical Fuel Usage (gallons/yr)	410
Maximum Fuel Usage (gallons/yr)[a]	3,500
Maximum Operation (hours)	202
Number of Units	1
Stack Parameters	
Diameter (ft)	0.5
Height (ft)	6
Temperature (°F)	770
Velocity (ft/sec)	62
Flow (acfm)	1,456
Emissions	
SO_2 -Basis (%S diesel) [b]	0.50%
(lb/hr)	1.213
(tpy) - typical maximum	0.015
(tpy) - maximum [a]	0.123
NO_x - (lb/mmBtu) [c]	4.410
(lb/hr)	10.474
(tpy)	0.126
(tpy) - maximum [a]	1.058
CO - (lb/mmBtu) [c]	0.950
(lb/hr)	2.256
(tpy)	0.027
(tpy) - maximum [a]	0.228
VOC - (lb/mmBtu) [c]	0.350
(lb/hr)	0.831
(tpy)	0.010
(tpy) - maximum [a]	0.084
PM/PM10 - (lb/mmBtu) [c]	0.310
(lb/hr)	0.736
(tpy)	0.009
(tpy) - maximum [a]	0.074

[a] Maximum based on about 200 hours/year of black-shutdown.

[b] Typical maximum sulfur content for distillate fuel oil

[c] Emission data for emergency diesel generator based on EPA, 1996 (AP-42, Table 3.3-1).

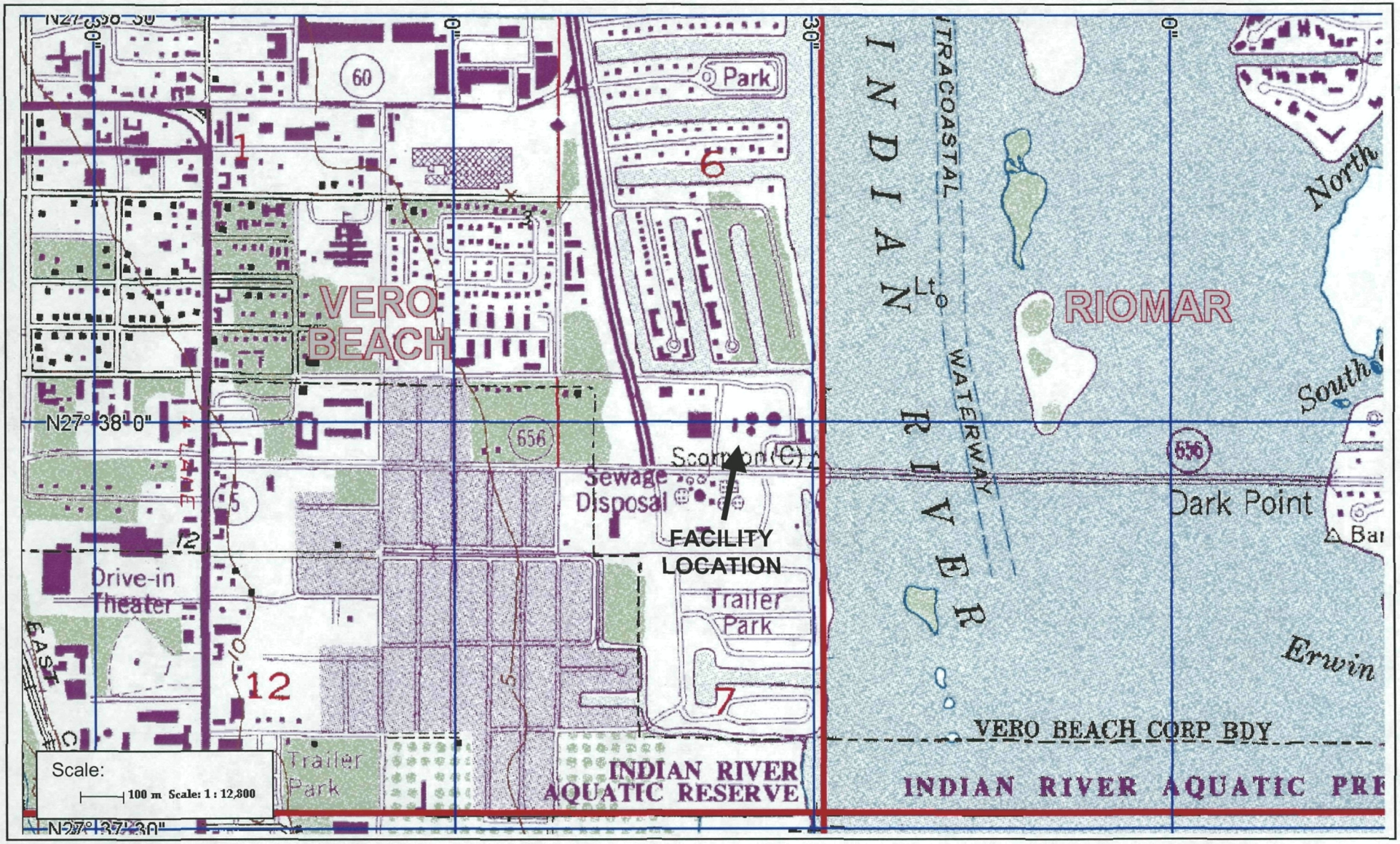


Figure 2-1
Project Site Topographical Map

Source: DeLorme TopoQuads, 1999; Golder, 2001.

Golder Associates

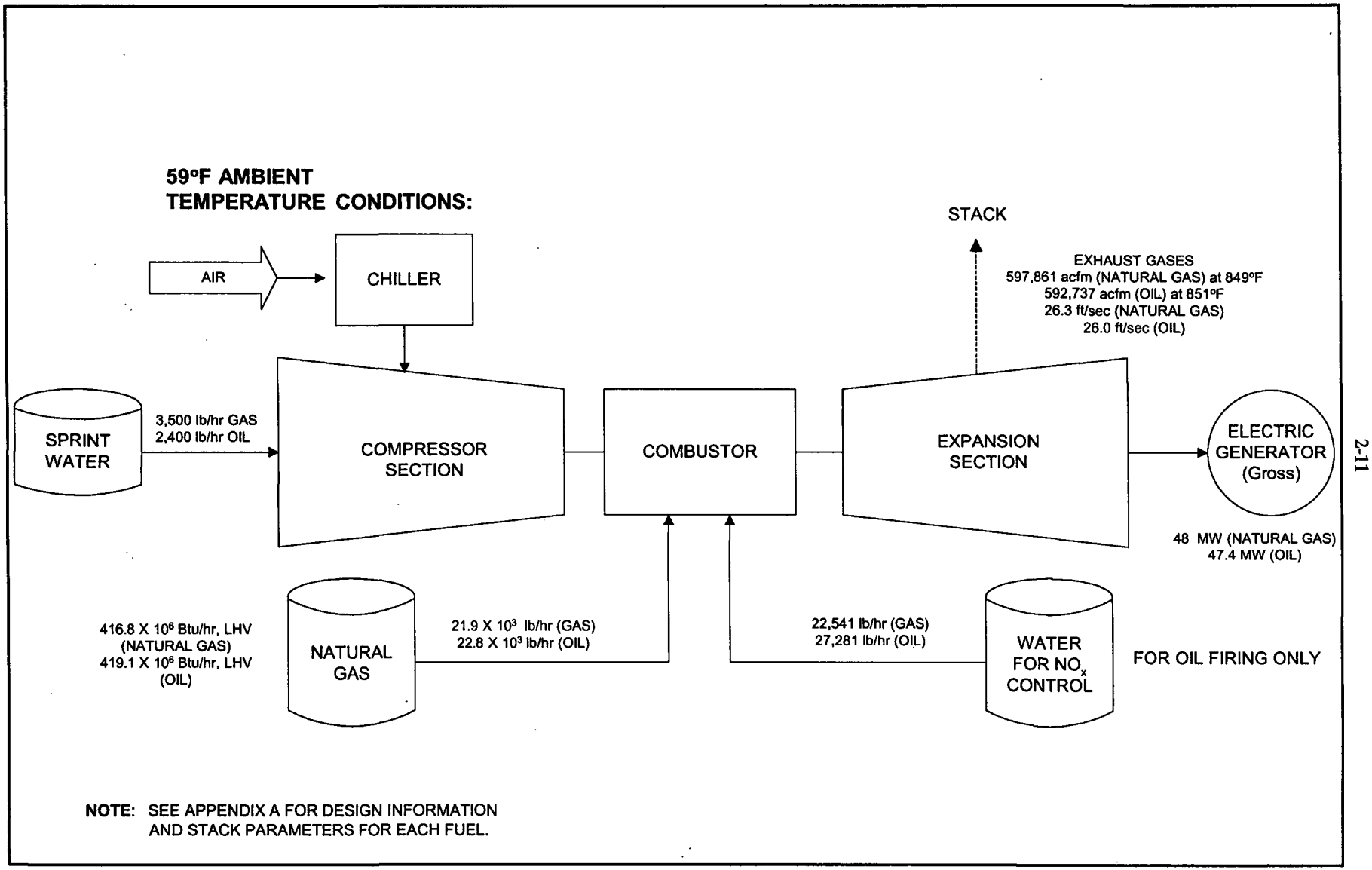
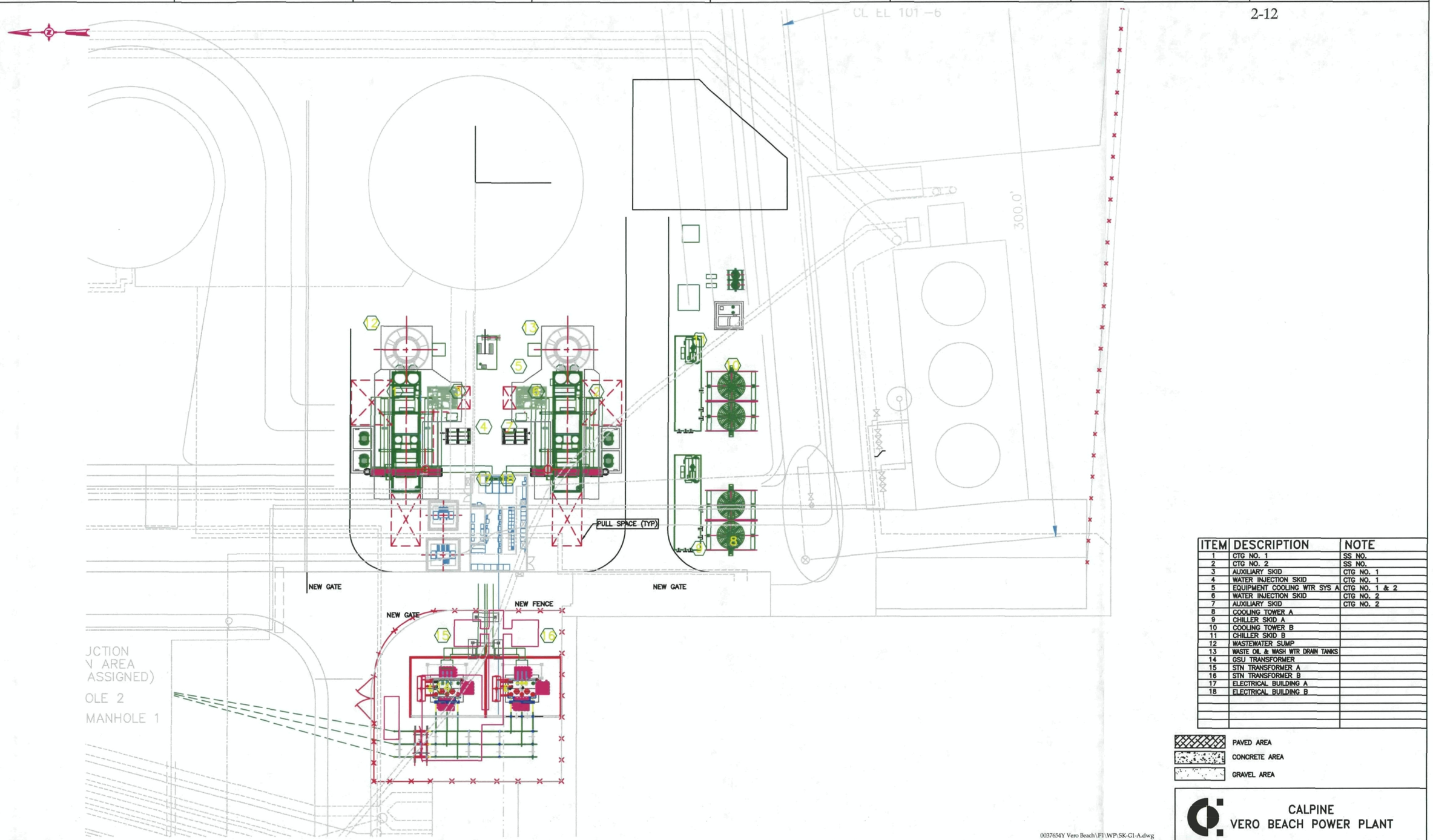


Figure 2-2
Simplified Flow Diagram of Proposed LM6000-Sprint Combustion Turbine
Baseload, Annual Design Conditions

Process Flow Legend
Solid/Liquid ——→
Gas - - - - - →
Steam ·····→

Project No. 0037654Y\F1\WP
Filename: **FIGURE 2-2.VSD**
Date: 2/13/01

Golder Associates



ITEM	DESCRIPTION	NOTE
1	CTG NO. 1	SS NO.
2	CTG NO. 2	SS NO.
3	AUXILIARY SKID	CTG NO. 1
4	WATER INJECTION SKID	CTG NO. 1
5	EQUIPMENT COOLING WTR SYS A	CTG NO. 1 & 2
6	WATER INJECTION SKID	CTG NO. 2
7	AUXILIARY SKID	CTG NO. 2
8	COOLING TOWER A	
9	CHILLER SKID A	
10	COOLING TOWER B	
11	CHILLER SKID B	
12	WASTEWATER SUMP	
13	WASTE OIL & WASH WTR DRAIN TANKS	
14	GSU TRANSFORMER	
15	STN TRANSFORMER A	
16	STN TRANSFORMER B	
17	ELECTRICAL BUILDING A	
18	ELECTRICAL BUILDING B	

PAVED AREA
CONCRETE AREA
GRAVEL AREA

0037654Y Vero Beach\FI\WP\SK-G1-A.dwg

DRAWING NO.	TITLE	REVISIONS					REVISIONS				
		REV	DATE	BY	APP'D	DESCRIPTION	REV	DATE	BY	APP'D	DESCRIPTION
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REV	DATE	BY	APP'D	
A	1/23/01	GRW		ISSUED FOR CLIENT REVIEW
				PRELIMINARY ISSUE

SCALE	1"=20'-0"	MO DAY YR
DRAWN	GRW	1/23/01
CHK'D		
APP'D		
APP'D		
APPROVED		
DATE		
PROJECT		

CALPINE
VERO BEACH POWER PLANT

Harris Group Inc.
DENVER, COLORADO

PROPOSED GENERAL ARRANGEMENT
LM 6000 UNITS PEAKING PLANT

Figure 2-3

DRAWING NUMBER SK-G1 REV A

3.0 AIR QUALITY REVIEW REQUIREMENTS AND APPLICABILITY

The following discussion pertains to the federal and state air regulatory requirements and their applicability to the proposed simple-cycle peaking units.

3.1 NATIONAL AND STATE AMBIENT AIR QUALITY STANDARDS (AAQS)

The existing applicable National and Florida AAQS are presented in Table 3-1. National primary AAQS were promulgated to protect the health of the general public, including the young, elderly, and those with respiratory ailments. National secondary AAQS were promulgated to protect the public welfare, including consideration of economic interests, vegetation, visibility, and other factors, with an adequate margin of safety from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. Areas of the country in violation of AAQS are designated as nonattainment areas, and new sources to be located in or near these areas may be subject to more stringent air permitting requirements.

Florida has adopted EPA's primary and secondary AAQS in Chapter 62-204, Florida Administrative Code (F.A.C.). In addition, Florida has additional AAQS for SO_2 of 60 and 260 micrograms per cubic meter ($\mu g/m^3$) for the annual and 24-hour averaging periods, respectively, not to be exceeded more than once per year.

3.2 GENERAL PSD AND PERMITTING REQUIREMENTS

3.2.1 PSD REQUIREMENTS

Under federal and State of Florida PSD review requirements, all major new or modified sources of air pollutants regulated under the CAA must be reviewed and a pre-construction permit issued. Florida's State Implementation Plan, which contains PSD regulations, has been approved by EPA; therefore, PSD approval authority has been granted to the Florida Department of Environmental Protection (FDEP).

A "major facility" is defined as any one of 28 named source categories that have the potential to emit 100 TPY or more or any other stationary facility that has the potential to emit 250 TPY or more of any pollutant regulated under CAA. "Potential to emit" means the

capability, at maximum design capacity, to emit a pollutant after the application of control equipment.

A "major modification" is defined under PSD regulations as a change at an existing major facility that increases emissions by greater than significant amounts. PSD significant emission rates are shown in Table 3-2.

EPA has promulgated as regulations certain increases above an air quality baseline concentration level of SO_2, PM_{10}, and nitrogen dioxide (NO_2) concentrations that would constitute significant deterioration. The EPA Class designations and allowable PSD increments are presented in Table 3-1. The State of Florida has adopted the EPA Class designations and allowable PSD increments for SO_2, PM_{10}, and NO_2 increments.

PSD review is used to determine whether significant air quality deterioration will result from the new or modified facility. Federal PSD requirements are contained in 40 CFR 52.21, *Prevention of Significant Deterioration of Air Quality*. The State of Florida has adopted PSD regulations by reference [Rule 62-212.400 F.A.C.]. Major facilities and major modifications are required to undergo the following analysis related to PSD for each pollutant emitted in significant amounts:

1. Control technology review,
2. Source impact analysis,
3. Air quality analysis (monitoring),
4. Source information, and
5. Additional impact analyses.

In addition to these analyses, a new facility or emission unit also must be reviewed with respect to Good Engineering Practice (GEP) stack height regulations.

3.2.2 FLORIDA AIR PERMITTING REQUIREMENTS

The FDEP regulations require any new source to obtain an air permit prior to construction. Major new sources must meet the appropriate PSD and nonattainment requirements as discussed previously. Required permits and approvals for air pollution sources include NSR

for nonattainment areas, PSD, NSPS, National Emission Standards for Hazardous Air Pollutants (NESHAP), Permit to Construct, and Permit to Operate. The requirements for construction permits and approvals are contained in Rules 62-4.030, 62-4.050, 62-4.052, 62-4.210, and 62-210.300(1), F.A.C. Specific emission standards are set forth in Chapter 62-296, F.A.C.

3.3 EMISSION STANDARDS

3.3.1 NEW SOURCE PERFORMANCE STANDARDS

The New Source Performance Standards (NSPS) are a set of national emission standards that apply to specific categories of new sources. As stated in the CAA Amendments of 1977, these standards "shall reflect the degree of emission limitation and the percentage reduction achievable through application of the best technological system of continuous emission reduction the Administrator determines has been adequately demonstrated."

The proposed Project will be subject to one or more NSPS. The CT is subject to 40 CFR Part 60, Subpart GG.

3.3.1.1 Combustion Turbine

The CT is subject to emission limitations covered under Subpart GG, which limits NO_x and SO_2 emissions from all stationary CTs with a heat input at peak load equal to 10.7 gigajoules per hour (10 mmBtu/hour), based on the lower heating value of the fuel fired.

NO_x emissions are limited to 75 ppmvd corrected to 15-percent O_2 and heat rate while sulfur dioxide emissions are limited to using a fuel with a sulfur content of 0.05 percent. In addition to emission limitations, there are requirements for notification, record keeping, reporting, performance testing and monitoring. These are summarized below:

40 CFR 60.7 Notification and Record Keeping

(a)(1) Notification of the date of construction - 30 days after such date.

(a)(2) Notification of the date of initial start-up - no more than 60 days or less than 30 days prior to date.

(a)(3) Notification of actual date of initial start-up - within 15 days after such date.

60.7 (a)(5) Notification of date which demonstrates continuous emission monitoring (CEM) - not less than 30 days prior to date.

(b) Maintain records of the start-up, shutdown, and malfunction quarterly.

(c) Excess emissions reports - by the 30th day following end of quarter. (required even if no excess emissions occur)

(d) Maintain file of all measurements for two years.

60.8 Performance Tests

(a) Must be performed within 60 days after achieving maximum production rate but no later than 180 days after initial start-up.

(d) Notification of Performance tests at least 30 days prior to them occurring.

40 CFR Subpart GG

60.334 Monitoring of Operations

(a) Continuous monitoring system required for water-to-fuel ratio to meet NSPS; system must be accurate within ±5 percent.

(b) Monitor sulfur and nitrogen content of fuel.

Oil - (1): each occasion that fuel is transferred to bulk storage tank.

Gas - (2): daily monitoring required

3.3.2 FLORIDA RULES

The FDEP regulations for new stationary sources are covered in the F.A.C. The FDEP has adopted the EPA NSPS by reference in Rule 62-204.800(7); subsection (b)38 for stationary gas turbines. Therefore, the Project is required to meet the same emissions, performance testings, monitoring, reporting, and record keeping as those described in Section 3.4.1. FDEP has authority for implementing NSPS requirements in Florida.

3.4 SOURCE APPLICABILITY

3.4.1 AREA CLASSIFICATION

The Project site is located in Indian River County, which has been designated by EPA and FDEP as an attainment area for all criteria pollutants. Indian River County and surrounding counties are designated as PSD Class II areas for SO_2, PM_{10}, and NO_2. The nearest Class I area to the site is the Everglades National Park, which is about 208 km (130 miles) from the site.

3.4.2 PSD REVIEW

3.4.2.1 Pollutant Applicability

The Project is a new facility and requesting a federally enforceable permit condition to limit the maximum potential emission rate to less than 250 TPY. For simple-cycle CTs, the applicable major source PSD threshold is 250 TPY; therefore, no PSD review is required. Simple-cycle CTs are not one of the 28 named source categories in the FDEP rules. The Project is also not associated with the existing City of Vero Beach facility. Calpine will own and control the operation of the project as a separate facility. Calpine will purchase and own the gas turbines, generators, chillers, transformers, and other associated equipment. The electric power from the units will be dispatched by Calpine and sold under contract to FMPA.

3.4.2.2 Emission Standards

The applicable NSPS for the CT is 40 CFR Part 60, Subpart GG. The proposed emissions for the turbine will be well below the NSPS limits. With the heat rate correction, the applicable NSPS are 118 ppm corrected to 15-percent O_2 for natural gas firing and 116 ppmvd corrected to 15-percent O_2 for oil firing.

3.4.3 OTHER CLEAN AIR ACT REQUIREMENTS

The 1990 CAA Amendments established a program to reduce potential precursors of acidic deposition. The Acid Rain Program was delineated in Title IV of the CAA Amendments and required EPA to develop the program. EPA's final regulations were promulgated on January 1, 1993, and included permit provisions (40 CFR Part 72), allowance system (Part 73),

continuous emission monitoring (Part 75), excess emission procedures (Part 77), and appeal procedures (Part 78).

EPA's Acid Rain Program applies to all existing and new utility units except those serving a generator less than 25 MW, existing simple-cycle CT, and certain non-utility facilities; units which fall under the program are referred to as affected units. The EPA regulations would be applicable to the proposed Project for the purposes for obtaining a permit and allowances, as well as emission monitoring. New units are required to obtain permits under the program by submitting a complete application 24 months before the date on which the unit begins serving an electric generator (greater than 25 MW).

The permit would provide SO_2 and NO_x emission limitations and the requirement to hold emission allowances. Emission limitations established in the Acid Rain Program are presumed to be less stringent than BACT or lowest achievable emission rate (LAER) for new units. An allowance is a market-based financial instrument that is equivalent to 1 ton of SO_2 emissions. Allowances can be sold, purchased, or traded.

CEM for SO_2 and NO_x is required for gas-fired and oil-fired affected units. When an SO_2 CEM is selected to monitor SO_2 mass emissions, a flow monitor is also required. Alternately, SO_2 emissions may be determined using procedures established in Appendix D, 40 CFR Part 75 (flow proportional oil sampling or manual daily oil sampling). CO_2 emissions must also be determined either through a CEM (e.g., as a diluent for NO_x monitoring) or calculation. Alternate procedures, test methods, and quality assurance/quality control (QA/QC) procedures for CEM are specified (Part 75 Appendices A through I). The CEM requirements including QA/QC procedures are, in general, more stringent than those specified in the NSPS for Subpart GG. New units are required to meet the requirements not later than 90 days after the unit commences commercial operation.

The EPA has, and is currently developing, emissions standards for HAPs for various industrial categories. These new NESHAPs that result from the 1990 CAA Amendments are based on the use of Maximum Achievable Control Technology (MACT). The adopted standards are contained in 40 CFR 63. New sources that emit more than 10 TPY of a single

HAP or 25 TPY of total HAPs are required to apply MACT for the promulgated industrial category or to obtain a case-by-case MACT determination from the applicable regulatory authority after submitting a MACT analysis. EPA is currently developing NESHAP for stationary CTs. The proposed NESHAP are anticipated in late 2000 with promulgation in early 2002. For the Project, emissions of HAPs will be less than 10 TPY of a single HAP and 25 TPY of all HAPs.

Table 3-1. National and State AAQS, Allowable PSD Increments, and Significant Impact Levels

Pollutant	Averaging Time	AAQS ($\mu g/m^3$)			PSD Increments ($\mu g/m^3$)		Significant Impact Levels ($\mu g/m^3$) [b]
		Primary Standard	Secondary Standard	Florida	Class I	Class II	
Particulate Matter[c] (PM_{10})	Annual Arithmetic Mean	50	50	50	4	17	1
	24-Hour Maximum	150	150	150	8	30	5
Sulfur Dioxide	Annual Arithmetic Mean	80	NA	60	2	20	1
	24-Hour Maximum	365	NA	260	5	91	5
	3-Hour Maximum	NA	1,300	1,300	25	512	25
Carbon Monoxide	8-Hour Maximum	10,000	10,000	10,000	NA	NA	500
	1-Hour Maximum	40,000	40,000	40,000	NA	NA	2,000
Nitrogen Dioxide	Annual Arithmetic Mean	100	100	100	2.5	25	1
Ozone[c]	8-Hour Maximum[d]	157	157	157	NA	NA	NA
Lead	Calendar Quarter Arithmetic Mean	1.5	1.5	1.5	NA	NA	NA

Note: Particulate matter (PM_{10}) = particulate matter with aerodynamic diameter less than or equal to 10 micrometers.
NA = Not applicable, i.e., no standard exists.

[a] Short-term maximum concentrations are not to be exceeded more than once per year.

[b] Maximum concentrations are not to be exceeded.

[c] On July 18, 1997, EPA promulgated revised AAQS for particulate matter and ozone. For particulate matter, $PM_{2.5}$ standards were introduced with a 24-hour standard of 65 g/m^3 (3-year average of 98th percentile) and an annual standard of 15 g/m^3 (3-year average at community monitors). These standards have been stayed by a court case against EPA and implementation of these standards are many years away pending EPA appeal.

[d] 0.08 ppm; achieved when 3-year average of 99th percentile is 0.08 ppm or less. These have been stayed by a court case against EPA. EPA is appealing. The 1-hour standard of 0.12 ppm is still applicable. FDEP has not yet adopted the new standards.

Sources: Federal Register, Vol. 43, No. 118, June 19, 1978.
40 CFR 50; 40 CFR 52.21.
Chapter 62-272, F.A.C.

Table 3-2. PSD Significant Emission Rates and *De Minimis* Monitoring Concentrations

Pollutant	Regulated Under	Significant Emission Rate (TPY)	*De Minimis* Monitoring Concentration[a] (µg/m3)
Sulfur Dioxide	NAAQS, NSPS	40	13, 24-hour
Particulate Matter [PM(TSP)]	NSPS	25	10, 24-hour
Particulate Matter (PM_{10})	NAAQS	15	10, 24-hour
Nitrogen Dioxide	NAAQS, NSPS	40	14, annual
Carbon Monoxide	NAAQS, NSPS	100	575, 8-hour
Volatile Organic Compounds (Ozone)	NAAQS, NSPS	40	100 TPY[b]
Lead	NAAQS	0.6	0.1, 3-month
Sulfuric Acid Mist	NSPS	7	NM
Total Fluorides	NSPS	3	0.25, 24-hour
Total Reduced Sulfur	NSPS	10	10, 1-hour
Reduced Sulfur Compounds	NSPS	10	10, 1-hour
Hydrogen Sulfide	NSPS	10	0.2, 1-hour
Mercury	NESHAP	0.1	0.25, 24-hour
MWC Organics	NSPS	3.5×10^{-6}	NM
MWC Metals	NSPS	15	NM
MWC Acid Gases	NSPS	40	NM
MSW Landfill Gases	NSPS	50	NM

Note: Ambient monitoring requirements for any pollutant may be exempted if the impact of the increase in emissions is below *de minimis* monitoring concentrations.

NAAQS = National Ambient Air Quality Standards.
NM = No ambient measurement method established; therefore, no *de minimis* concentration has been established.
NSPS = New Source Performance Standards.
NESHAP = National Emission Standards for Hazardous Air Pollutants.
g/m^3 = micrograms per cubic meter.
MWC = Municipal waste combustor.
MSW = Municipal solid waste.

[a] Short-term concentrations are not to be exceeded.
[b] No *de minimis* concentration; an increase in VOC emissions of 100 TPY or more will require monitoring analysis for ozone.
[c] Any emission rate of these pollutants.

Sources: 40 CFR 52.21.
Rule 62-212.400.

APPENDIX A

EXPECTED PERFORMANCE AND EMISSION INFORMATION ON GENERAL ELECTRIC LM6000-SPRINT COMBUSTION TURBINE

(Note: SO_2 emissions based on 2 gr/100 cf of sulfur to account for odorant (mercaptans) in pipeline gas.)

Table A-1. Design Information and Stack Parameters for the Calpine Vero Beach Project
GE LM6000-Sprint Simple Cycle Unit, Wet Injection, Natural Gas, 100 % Load

Parameter	Ambient/Compressor Inlet Temperature 32 °F	59 °F	74 °F[a]	95 °F
Combustion Turbine Performance				
Chiller status	Off	On	On	On
Ambient Relative Humidity (%)	60	60	80	60
Gross power output (MW)	49.68	47.98	47.95	47.95
Heat rate (Btu/kWh, LHV) - calculated	8,507	8,687	8,686	8,684
- provided	8,507	8,686	8,684	8,684
(Btu/kWh, HHV) - provided	None	None	None	None
Heat Input (MMBtu/hr, LHV)- calculated	422.6	416.8	416.6	416.4
- provided	422.6	416.8	416.4	416.4
(MMBtu/hr, HHV) - estimated	467.0	460.6	460.1	460.1
(HHV/LHV)	None	None	None	None
Fuel heating value (Btu/lb, LHV)- provided	19,000	19,000	19,000	19,000
(Btu/lb, HHV)- provided	20,996	20,996	20,996	20,996
(HHV/LHV)	1.11	1.11	1.11	1.11
CT Exhaust Flow				
Mass Flow (lb/hr)	1,088,280	1,055,880	1,055,160	1,055,160
Temperature (°F)	819	849	849	849
Moisture (% Vol.)	9.87	10.49	10.58	10.58
Oxygen (% Vol.)	13.17	12.95	12.92	12.92
Molecular Weight - calculated	28.18	28.12	28.11	28.11
- provided	None	None	None	None
Volume Flow (acfm)= [(Mass Flow (lb/hr) x 1,545 x (Temp. (°F)+ 460°F)] / [Molecular weight x 2116.8] / 60 min/hr				
Mass flow (lb/hr)	1,088,280	1,055,880	1,055,160	1,055,160
Temperature (°F)	819	849	849	849
Molecular weight	28.18	28.12	28.11	28.11
Volume flow (acfm)- calculated	600,797	597,861	597,691	597,691
- provided	None	None	None	None
Fuel Usage				
Fuel usage (lb/hr)= Heat Input (MMBtu/hr) x 1,000,000 Btu/MMBtu (Fuel Heat Content, Btu/lb (LHV))				
Heat input (MMBtu/hr, LHV)	422.6	416.8	416.4	416.4
Heat content (Btu/lb, LHV)	19,000	19,000	19,000	19,000
Fuel usage (lb/hr)- calculated	22,242	21,937	21,916	21,916
- provided	21,937	21,937	21,915	21,915
Heat content (Btu/cf, LHV)- provided	946	946	946	946
Fuel density (lb/ft^3)	0.0498	0.0498	0.0498	0.0498
Fuel usage (cf/hr)- calculated	446,723	440,592	440,169	440,169
Stack and Exit Gas Conditions				
Stack height (ft)	65	65	65	65
Diameter (ft)	10.5	10.5	10.5	10.5
Velocity (ft/sec)= Volume flow (acfm) / [((diameter)^2 /4) x 3.14159] / 60 sec/min				
Volume flow (acfm)	600,797	597,861	597,691	597,691
Diameter (ft)	10.5	10.5	10.5	10.5
Velocity (ft/sec)- calculated	115.6	115.1	115.0	115.0
Velocity (ft/sec)- provided	none	none	none	none
Velocity (m/sec)- calculated (from calculated value)	35.25	35.07	35.06	35.06

Note: Universal gas constant= 1,545 ft-lb(force)/°R; atmospheric pressure= 2,116.8 lb(force)/ft^2

Source: General Electric, 2000.

Table A-1A. Molecular Weight of CT Exhaust

Compound	Molecular Weight	Volume (%)	Molecular Weight (Percent)
32 °F (without chiller)			
Oxygen	32.00	13.17	4.21
Carbon Dioxide	44.01	3.31	1.46
Water	18.02	9.87	1.78
Nitrogen	28.01	72.78	20.39
Argon	39.95	0.87	0.35
TOTAL		100.00	28.18
59 °F (with chiller)			
Oxygen	32.00	12.95	4.14
Carbon Dioxide	44.01	3.36	1.48
Water	18.02	10.49	1.89
Nitrogen	28.01	72.34	20.26
Argon	39.95	0.86	0.34
TOTAL		100.00	28.12
74 °F (with chiller)			
Oxygen	32.00	12.92	4.14
Carbon Dioxide	44.01	3.36	1.48
Water	18.02	10.58	1.91
Nitrogen	28.01	72.27	20.25
Argon	39.95	0.86	0.34
TOTAL		100.00	28.11
95 °F (with chiller)			
Oxygen	32.00	12.92	4.14
Carbon Dioxide	44.01	3.36	1.48
Water	18.02	10.58	1.91
Nitrogen	28.01	72.27	20.25
Argon	39.95	0.86	0.34
TOTAL		100.00	28.11

Table A-2. Maximum Emissions for Criteria and Other Regulated Pollutants for the Calpine Vero Beach Project
GE LM6000-Sprint Simple Cycle Unit, Wet Injection, Natural Gas, 100 % Load

Parameter	Ambient/Compressor Inlet Temperature 32 °F	59 °F	74°F	95 °F
Hours of Operation	3,240	3,240	3,240	3,240
Particulate from CT= Emission rate (lb/hr) from CT manufacturer (dry filterables)				
Emission Rate (lb/MMBtu HHV)	6.42E-03	6.51E-03	6.52E-03	6.52E-03
Heat Input - MMBtu/hr (HHV)	467.0	460.6	460.1	460.1
Emission rate (lb/hr) - calculated	3.0	3.0	3.0	3.0
(lb/hr)- provided	3.0	3.0	3.0	3.0
(TPY)	4.9	4.9	4.9	4.9
[Ratio lb/hr provided/calculated]	None	None	None	None
Sulfur Dioxide (lb/hr)= Natural gas (cf/hr) x sulfur content(gr/100 cf) x 1 lb/7000 gr x (lb SO_2 /lb S) /100				
Fuel use (cf/hr)	446,723	440,592	440,169	440,169
Sulfur content (2 grains/ 100 cf - assumed (b)	2	2	2	2
lb SO_2 /lb S (64/32)	2	2	2	2
Emission rate (lb/hr)- calculated	2.6	2.5	2.5	2.5
(lb/hr)- provided	None	None	None	None
(TPY) based on calculated value	4.1	4.1	4.1	4.1
[Ratio lb/hr provided/calculated]	None	None	None	None
Nitrogen Oxides (lb/hr)= NOx(ppm) x {[20.9 x (1 - Moisture(%)/100)] - Oxygen(%)} x 2116.8 x Volume flow (acfm) x 46 (mole. wgt NOx) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 5.9 x 1,000,000 (adj. for ppm)]				
Basis, ppmvd @15% O_2 (a)	25	25	25	25
Moisture (%)	9.87	10.49	10.58	10.58
Oxygen (%)	13.17	12.95	12.92	12.92
Volume Flow (acfm)	600,797	597,861	597,691	597,691
Temperature (°F)	819	849	849	849
Emission rate (lb/hr)- calculated	42.7	42.1	42.1	42.2
(lb/hr)- provided	43.0	42.0	42.0	42.0
(TPY) based on provided value	69.7	68.0	68.0	68.0
[Ratio lb/hr provided/calculated]	1.008	0.997	0.996	0.996
Carbon Monoxide (lb/hr)= CO(ppm) x {[20.9 x (1 - Moisture(%)/100)] - Oxygen(%)} x 2116.8 lb/ft2 x Volume flow (acfm) x 28 (mole. wgt CO) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]				
Basis, ppmvd- calculated	79.9	81.8	81.9	81.9
Basis, ppmvd @ 15% O2- calculated	75.0	75.0	75.0	75.0
- provided (a)	75.0	75.0	75.0	75.0
Moisture (%)	9.87	10.49	10.58	10.58
Oxygen (%)	13.17	12.95	12.92	12.92
Volume Flow (acfm)	600,797	597,861	597,691	597,691
Temperature (°F)	819	849	849	849
Emission rate (lb/hr)- calculated from given ppmvd	77.9	76.9	77.0	77.0
(TPY) based on provided ppm	126.2	124.6	124.7	124.7
VOCs (lb/hr)= VOC(ppm) x [1 - Moisture(%)/ 100] x 2116.8 lb/ft2 x Volume flow (acfm) x 16 (mole. wgt as methane) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]				
Basis, ppmvd (as CH_4)- calculated	16.0	16.4	16.4	16.4
Basis, ppmvd @ 15% O2- calculated	15.0	15.0	15.0	15.0
- provided (a)	15.0	15.0	15.0	15.0
Moisture (%)	9.87	10.49	10.58	10.58
Oxygen (%)	13.17	12.95	12.92	12.92
Volume Flow (acfm)	600,797	597,861	597,691	597,691
Temperature (°F)	819	849	849	849
Emission rate (lb/hr)- calculated	8.9	8.8	8.8	8.8
(lb/hr)- provided	8.8	8.8	8.8	8.8
(TPY) based on provided value	14.3	14.3	14.3	14.3
[Ratio lb/hr provided/calculated]	0.989	1.001	1.000	1.000
Lead (lb/hr)= NA				
Emission Rate Basis	NA	NA	NA	NA
Emission rate (lb/hr)	NA	NA	NA	NA
(TPY)	NA	NA	NA	NA
Mercury (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu				
Basis, lb/10^{12} Btu (b)	7.48E-04	7.48E-04	7.48E-04	7.48E-04
Heat Input Rate (MMBtu/hr)	469.1	462.6	462.2	462.2
Emission Rate (lb/hr)	3.51E-07	3.46E-07	3.46E-07	3.46E-07
(TPY)	5.68E-07	5.61E-07	5.60E-07	5.60E-07
Sulfuric Acid Mist = SO2 emission rate (lb/hr) x conversion rate of SO2 to H_2SO_4 (%) x MW H_2SO_4 /MW SO_2 (98/64)				
SO2 emission rate (lb/hr)	2.6	2.5	2.5	2.5
lb H_2SO_4 /lb SO_2 (98/64)	1.53	1.53	1.53	1.53
Conversion to H_2SO_4 (%) (b)	10	10	10	10
Emission Rate (lb/hr)	0.39	0.39	0.39	0.39
(TPY)	0.63	0.62	0.62	0.62

Note: ppmvd= parts per million, volume dry; O2= oxygen.

Source: (a) General Electric, 2000; (b) Golder Associates, 2000

Table A-3. Design Information and Stack Parameters for the Calpine Vero Beach Project
GE LM6000-Sprint Simple Cycle Unit, Distillate Oil, 100 % Load

Parameter	Ambient/Compressor Inlet Temperature 32 °F	59 °F	74 °F	95 °F
Combustion Turbine Performance				
Chiller status	Off	On	On	On
Ambient Relative Humidity (%)	60	60	80	60
Gross power output (MW)	49.691	47.35	47.31	47.31
Heat rate (Btu/kWh, LHV) - calculated	8,655	8,851	8,850	8,849
- provided	8,655	8,852	8,849	8,849
(Btu/kWh, HHV) - provided	None	None	None	None
Heat Input (MMBtu/hr, LHV)- calculated	430.1	419.1	418.9	418.6
- provided	430.1	419.1	418.6	418.6
(MMBtu/hr, HHV) - estimated	455.9	444.2	443.7	443.7
(HHV/LHV)	None	None	None	None
Fuel heating value (Btu/lb, LHV)- provided	18,400	18,400	18,400	18,400
(Btu/lb, HHV)- estimated	19,504	19,504	19,504	19,504
(HHV/LHV)	1.06	1.06	1.06	1.06
CT Exhaust Flow				
Mass Flow (lb/hr)	1,094,400	1,057,320	1,056,240	1,056,240
Temperature (°F)	824	851	852	852
Moisture (% Vol.)	8.58	9.03	9.11	9.11
Oxygen (% Vol.)	13.19	13.03	13.02	13.02
Molecular Weight - calculated	28.49	28.45	28.44	28.44
- provided	None	None	None	None
Volume Flow (acfm)= [(Mass Flow (lb/hr) x 1,545 x (Temp. (°F)+ 460°F)] / [Molecular weight x 2116.8] / 60 min/hr				
Mass flow (lb/hr)	1,094,400	1,057,320	1,056,240	1,056,240
Temperature (°F)	824	851	852	852
Molecular weight	28.49	28.45	28.44	28.44
Volume flow (acfm)- calculated	599,893	592,737	592,781	592,781
- provided	None	None	None	None
Fuel Usage				
Fuel usage (lb/hr)= Heat Input (MMBtu/hr) x 1,000,000 Btu/MMBtu (Fuel Heat Content, Btu/lb (LHV))				
Heat input (MMBtu/hr, LHV)	430	419	419	419
Heat content (Btu/lb, LHV)	18,400	18,400	18,400	18,400
Fuel usage (lb/hr)- calculated	23,375	22,777	22,766	22,750
- provided	23,373	22,778	22,751	22,751
Stack and Exit Gas Conditions				
Stack height (ft)	65	65	65	65
Diameter (ft)	10.5	10.5	10.5	10.5
Velocity (ft/sec)= Volume flow (acfm) / [((diameter)^2 /4) x 3.14159] / 60 sec/min				
Volume flow (acfm)	599,893	592,737	592,781	592,781
Diameter (ft)	10.5	10.5	10.5	10.5
Velocity (ft/sec)- calculated	115.5	114.1	114.1	114.1
Velocity (ft/sec)- provided	none	none	none	none
Velocity (m/sec)- calculated (from provided value)	35.19	34.77	34.78	34.78

Note: Universal gas constant= 1,545 ft-lb(force)/°R; atmospheric pressure= 2,116.8 lb(force)/ft^2

Source: General Electric, 2000.

Table A-3A. Molecular Weight of CT Exhaust

Compound	Molecular Weight	Volume (%)	Molecular Weight (Percent)
32 °F (without chiller)			
Oxygen	32.00	13.19	4.22
Carbon Dioxide	44.01	4.43	1.95
Water	18.02	8.58	1.55
Nitrogen	28.01	72.93	20.43
Argon	39.95	0.87	0.35
TOTAL		100.00	28.49
59 °F (with chiller)			
Oxygen	32.00	13.03	4.17
Carbon Dioxide	44.01	4.47	1.97
Water	18.02	9.03	1.63
Nitrogen	28.01	72.59	20.34
Argon	39.95	0.87	0.35
TOTAL		100.00	28.45
74 °F (with chiller)			
Oxygen	32.00	13.02	4.17
Carbon Dioxide	44.01	4.47	1.97
Water	18.02	9.11	1.64
Nitrogen	28.01	72.53	20.32
Argon	39.95	0.87	0.35
TOTAL		100.00	28.44
95 °F (with chiller)			
Oxygen	32.00	13.02	4.17
Carbon Dioxide	44.01	4.47	1.97
Water	18.02	9.11	1.64
Nitrogen	28.01	72.53	20.32
Argon	39.95	0.87	0.35
TOTAL		100.00	28.44

Table A-4. Maximum Emissions for Criteria and Other Regulated Pollutants for the Calpine Vero Beach Project
GE LM6000-Sprint Simple Cycle Unit, Distillate Oil, 100 % Load

Parameter	Ambient/Compressor Inlet Temperature 32 °F	59 °F	74 °F	95 °F
Hours of Operation	3,430	3,430	3,430	3,430
Particulate from CT= Emission rate (lb/hr) from CT manufacturer (dry filterables)				
Emission factor (ll/1,000 lb fuel input)	6.00E-01	6.00E-01	6.00E-01	6.00E-01
Fuel Input - 1, 000/hr	23,373.0	22,778.0	22,751.0	22,751.0
Emission rate (lb/hr) - calculated	14.0	13.7	13.7	13.7
(lb/hr)- provided	None	None	None	None
(TPY)	24.1	23.4	23.4	23.4
[Ratio lb/hr provided/calculated]	None	None	None	None
Sulfur Dioxide (lb/hr)= Fuel Oil (lb/hr) x sulfur content(gr/100 cf) x ($lb\ SO_2$ /lb S) /100				
Fuel use (lb/hr)	23,373	22,778	22,751	22,751
Fuel Sulfur content	0.05%	0.05%	0.05%	0.05%
lb SO_2 /lb S (64/32)	2	2	2	2
Emission rate (lb/hr)- calculated	23.4	22.8	22.8	22.8
(lb/hr)- provided	None	None	None	None
(TPY) - based on caculated value	40.1	39.1	39.0	39.0
[Ratio lb/hr provided/calculated]	None	None	None	None
Nitrogen Oxides (lb/hr)= NOx(ppm) x {[20.9 x (1 - Moisture(%)/100)] - Oxygen(%)} x 2116.8 x Volume flow (acfm) x 46 (mole. wgt NOx) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 5.9 x 1,000,000 (adj. for ppm)]				
Basis, ppmvd @15% O_2 (a)	42	42	42	42
Moisture (%)	8.58	9.03	9.11	9.11
Oxygen (%)	13.19	13.03	13.02	13.02
Volume Flow (acfm)	599,893	592,737	592,781	592,781
Temperature (°F)	824	851	852	852
Emission rate (lb/hr)- calculated	74.4	72.8	72.7	72.7
(lb/hr)- provided	73.0	73.0	73.0	73.0
(TPY) - based on provided value	127.6	124.8	124.7	124.7
[Ratio lb/hr provided/calculated]	0.981	1.003	1.004	1.004
Carbon Monoxide (lb/hr)= CO(ppm) x {[20.9 x (1 - Moisture(%)/100)] - Oxygen(%)} x 2116.8 lb/ft2 x Volume flow (acfr 28 (mole. wgt CO) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]				
Basis, ppmvd- calculated	21.9	22.3	22.3	22.3
Basis, ppmvd @ 15% O2- calculated	20.0	20.0	20.0	20.0
- provided (a)	20.0	20.0	20.0	20.0
Moisture (%)	8.58	9.03	9.11	9.11
Oxygen (%)	13.19	13.03	13.02	13.02
Volume Flow (acfm)	599,893	592,737	592,781	592,781
Temperature (°F)	824	851	852	852
Emission rate (lb/hr)- calculated from given ppmvd	21.6	21.1	21.1	21.1
(TPY) based on provided ppm	37.0	36.2	36.1	36.1
VOCs (lb/hr)= VOC(ppm) x [1 - Moisture(%)/ 100] x 2116.8 lb/ft2 x Volume flow (acfm) x 16 (mole. wgt as methane) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]				
Basis, ppmvd (as CH_4)- calculated	16.5	16.7	16.7	16.7
Basis, ppmvd @ 15% O2- calculated	15.0	15.0	15.0	15.0
- provided (a)	15.0	15.0	15.0	15.0
Moisture (%)	8.58	9.03	9.11	9.11
Oxygen (%)	13.19	13.03	13.02	13.02
Volume Flow (acfm)	599,893	592,737	592,781	592,781
Temperature (°F)	824	851	852	852
Emission rate (lb/hr)- calculated	9.2	9.0	9.0	9.0
(lb/hr)- provided	9.0	9.0	9.0	9.0
(TPY) based on provided value	15.4	15.4	15.4	15.4
[Ratio lb/hr provided/calculated]	0.974	0.995	0.997	0.997
Lead (lb/hr)= NA				
Basis, lb/10^{12} Btu (b)	14	14	14	14
Heat Input Rate (MMBtu/hr)	430	419	419	419
Emission rate (lb/hr)	6.02E-03	5.87E-03	5.86E-03	5.86E-03
(TPY)	1.03E-02	1.01E-02	1.01E-02	1.01E-02
Mercury (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu				
Basis, lb/10^{12} Btu (b)	1.20	1.20	1.20	1.20
Heat Input Rate (MMBtu/hr)	430	419	419	419
Emission Rate (lb/hr)	5.16E-04	5.03E-04	5.02E-04	5.02E-04
(TPY)	8.85E-04	8.63E-04	8.61E-04	8.61E-04
Sulfuric Acid Mist = SO2 emission rate (lb/hr) x conversion rate of SO2 to H_2SO_4 (%) x MW H_2SO_4 /MW SO_2 (98/64)				
SO2 emission rate (lb/hr)	23.4	22.8	22.8	22.8
lb H_2SO_4 /lb SO_2 (98/64)	1.53	1.53	1.53	1.53
Conversion to H_2SO_4 (%) (b)	10	10	10	10
Emission Rate (lb/hr)	3.58	3.49	3.48	3.48
(TPY)	6.14	5.98	5.97	5.97

Note: ppmvd= parts per million, volume dry; O2= oxygen.

Source: (a) General Electric, 2000; (b) Golder Associates, 2000

Table A-5. Toxic Air Pollutant Emission Factors and Emissions for Combustion Turbine when Firing Natural Gas
Calpine Vero Beach Project

Parameter		Emission Rate (lb/hr) firing Natural Gas for Operating Condition 100 %Load				Natural Gas Maximum Annual Emissions (TPY) (2)
Ambient Temperature (°F)		32 °F	59 °F	74 °F	95 °F	
HIR (MMBtu/hr)		467.0	460.6	460.1	460.1	2 CTs
HAPs (Section 112(b) of Clean Air Act)						
1,3-Butadiene		0.00020	0.00020	0.00020	0.00020	0.0006
Acetaldehyde		0.019	0.018	0.018	0.018	0.0597
Acrolein		0.0030	0.0029	0.0029	0.0029	0.0096
Benzene		0.0056	0.0055	0.0055	0.0055	0.0179
Ethylbenzene		0.0149	0.0147	0.0147	0.0147	0.0478
Formadehyde		0.070	0.069	0.069	0.069	0.2238
Naphthalene		0.00061	0.00060	0.00060	0.00060	0.0019
Polycyclic Aromatic Hydrocarbons (PAH)	(3)	0.00103	0.00101	0.00101	0.00101	0.0033
Propylene Oxide		0.0135	0.0134	0.0133	0.0133	0.0433
Toluene		0.015	0.015	0.015	0.015	0.0492
Xylene		0.030	0.029	0.029	0.029	0.0955
Antimony		0.0	0.0	0.0	0.0	0.0000
Arsenic		0.0	0.0	0.0	0.0	0.0000
Beryllium		0.0	0.0	0.0	0.0	0.0000
Cadmium		0.0	0.0	0.0	0.0	0.0000
Chromium		0.0	0.0	0.0	0.0	0.0000
Lead		0.0	0.0	0.0	0.0	0.0000
Manganese		0.0	0.0	0.0	0.0	0.0000
Mercury		0.0	0.0	0.0	0.0	0.0000
Nickel		0.0	0.0	0.0	0.0	0.0000
Selenium		0.0	0.0	0.0	0.0	0.0000
HAPs (Total)						0.5526

(1) Emissions based on the following emission factors and conversion factors for firing natural gas:

Emission Factors		Value	Reference
		10%	Conversion of SO_2 to SO_3 in gas turbine
1,3-Butadiene	(a)	0.43	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000
Acetaldehyde		40	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000
Acrolein		6.4	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000
Benzene		12	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000
Ethylbenzene		32	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000
Formadehyde		150	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000. Database
Naphthalene		1.3	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000
Polycyclic Aromatic Hydrocarbons (PAH)		2.2	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000
Propylene Oxide	(a)	29	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000
Toluene		33	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000. Database
Xylene		64	lb/10^{12} Btu; AP-42,Table 3.1-3. EPA 2000
Antimony		0.0	
Arsenic		0.0	
Beryllium		0.0	
Cadmium		0.0	
Chromium		0.0	
Lead		0.0	
Manganese		0.0	
Mercury		7.48E-04	
Nickel		0.0	
Selenium		0.0	

(a) Based on 1/2 the detection limit; expected emissions are lower.

(2) Annual emissions based on ambient temperature of 59 °F firing natural gas for 3240 hours at 100% load

(3) Assumed to be representative of Polycyclic Organic Matter (POM) emissions, a regulated HAP.

Table A-6. Toxic Air Pollutant Emission Factors and Emissions for Combustion Turbine when Firing Natural Gas and Fuel Oil
Calpine Vero Beach Project

Parameter	Emission Rate (lb/hr) firing Distillate Fuel Oil for Operating Conditions of 100 % Load				Maximum Annual Emissions (TPY)	
					Distillate Fuel Oil (2)	Natural Gas (2)
Ambient Temperature (°F)	32 °F	59 °F	74 °F	95 °F		
HIR (MMBtu/hr)	456	444	419	419	2 CT's	2 CT's
HAPs (Section 112(b) of Clean Air Act)						
1,3-Butadiene	0.0073	0.0071	0.0067	0.0067	0.023	0.0006
Acetaldehyde	0.0	0.0	0.0	0.0	0.000	0.06
Acrolein	0.0	0.0	0.0	0.0	0.000	0.010
Benzene	0.025	0.024	0.023	0.023	0.079	0.018
Ethylbenzene	0.0	0.0	0.0	0.0	0.000	0.048
Formadehyde	0.128	0.124	0.117	0.117	0.402	0.22
Naphthalene	0.0160	0.0155	0.0147	0.0147	0.050	0.0019
Polycyclic Aromatic Hydrocarbons (PAH) (3)	0.018	0.018	0.017	0.0167	0.057	0.0033
Propylene Oxide	0.0	0.0	0.0	0.0	0.000	0.043
Toluene	0.0	0.0	0.0	0.0	0.000	0.049
Xylene	0.0	0.0	0.0	0.0	0.000	0.10
Antimony	0.0	0.0	0.0	0.0	0.000	0.0
Arsenic	0.0050	0.0049	0.0046	0.0046	0.016	0.0
Beryllium	0.000141	0.000138	0.000130	0.000130	0.000	0.0
Cadmium	0.00219	0.00213	0.00201	0.00201	0.007	0.0
Chromium	0.0050	0.0049	0.0046	0.0046	0.016	0.0
Lead	0.0064	0.0062	0.0059	0.0059	0.020	0.0
Manganese	0.36	0.35	0.33	0.33	1.134	0.0
Mercury	0.00055	0.00053	0.00050	0.00050	0.002	0.0
Nickel	0.00210	0.00204	0.00193	0.00193	0.007	0.0
Selenium	0.0114	0.0111	0.0105	0.0105	0.036	0.0
HAPs (Total)					1.8	0.6

(1) Emissions based on the following emission factors and conversion factors for firing distillate fuel oil:

Emission Factors		Value	Reference
		10%	Conversion of SO_2 to SO_3 in gas turbine
1,3-Butadiene	(a)	16	lb/10^{12} Btu; AP-42,Table 3.1-4. EPA 2000
Acetaldehyde		0.0	
Acrolein		0.0	
Benzene		55	lb/10^{12} Btu; AP-42,Table 3.1-4. EPA 2000
Ethylbenzene		0.0	
Formadehyde		280	lb/10^{12} Btu; AP-42,Table 3.1-4. EPA 2000
Naphthalene		35	lb/10^{12} Btu; AP-42,Table 3.1-4. EPA 2000
Polycyclic Aromatic Hydrocarbons (PAH)		40	lb/10^{12} Btu; AP-42,Table 3.1-4. EPA 2000
Propylene Oxide		0.0	
Toluene		0.0	
Xylene		0.0	
Antimony		0.0	
Arsenic	(a)	11	lb/10^{12} Btu; AP-42,Table 3.1-5. EPA 2000
Beryllium	(a)	0.31	lb/10^{12} Btu; AP-42,Table 3.1-5. EPA 2000
Cadmium		4.8	lb/10^{12} Btu; AP-42,Table 3.1-5. EPA 2000
Chromium		11	lb/10^{12} Btu; AP-42,Table 3.1-5. EPA 2000
Lead		14	lb/10^{12} Btu; AP-42,Table 3.1-5. EPA 2000
Manganese		790	lb/10^{12} Btu; AP-42,Table 3.1-5. EPA 2000
Mercury		1.2	lb/10^{12} Btu; AP-42,Table 3.1-5. EPA 2000
Nickel	(a)	4.6	lb/10^{12} Btu; AP-42,Table 3.1-5. EPA 2000
Selenium	(a)	25	lb/10^{12} Btu; AP-42,Table 3.1-5. EPA 2000

(a) Based on 1/2 the detection limit; expected emissions are lower.

(2) Annual emissions based on ambient temperature of 59 °F and firing fuel oil for : 3,430
natural gas for 3,240

(3) Assumed to be representative of Polycyclic Organic Matter (POM) emissions, a regulated HAP.