Department of
Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

December 17, 1998

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Richard L. Wolfinger, Vice President
Oleander Power Project, L.P.
250 West Pratt Street, 23rd floor
Baltimore, MD 21201

Re: Request for Additional Information
DEP File No. 0090180-001-AC (PSD-FL-258)
Oleander Power Project - Five 190 MW Combustion Turbines

Dear Mr. Wolfinger:

On November 24 the Department has received your application and complete fee for an air construction/operation permit for five 190-MW dual fuel, proposed 'F' class combustion turbines for the Oleander Power Project in Brevard County. The application is incomplete. In order to continue processing your application, the Department will need the additional information below. Should your response to any of the below items require new calculations, please submit the new calculations, assumptions, reference material and appropriate revised pages of the application form.

1. Please provide a detailed cost analysis in terms of overall and marginal cost effectiveness (annualized dollars/ton of nitrogen oxides removed) for the following distillate fuel oil use scenarios. This does not constitute any intent regarding a Best Available Control Technology (BACT) determination. It is for cost sensitivity purposes.

Hours of Distillate Fuel Oil Used	NO_X, ppmvd @ 15% O_2
First 500	42
Second 500	36
Third 500	30
Fourth 500, 2000 total	24

2. Please provide the rationale for the 16 ppmvd @ 15% O_2 limit proposed for CO as BACT. The combustors capable of meeting 9 ppm NO_X typically achieve 12 ppm of CO.

3. Please describe the adequacy of the 60 foot stack height with respect to both plume rise/bouyancy and possibilities of localized downwash.

4. Please submit overlays (isopleths) of the maximum ground-level concentrations of NO_X, PM/PM_{10}, CO, and SO_2 with respect to residential communities up to 2 miles (3.2 kilometers) from the proposed site.

5. Please provide a detailed map showing the location of all of the fence-line receptors used in the air quality impact analysis. These receptor locations should be shown in UTM coordinates since the UTM coordinate system is used in the modeling. In addition send us diskettes containing all of the air quality impact analysis modeling output files.

6. How will fuel oil be delivered to the site, e.g. pipeline or trucks?

7. At the rated of 100,000 pounds per hour per turbine, the amount of fuel oil used in one day for the entire facility is 1.5 million gallons. The two 2.8 million gallon storage tanks can store only four days-worth of fuel oil. Please comment on the practicality of actually operating 2000 hours per year on fuel oil given this apparent limitation.

8. The emission limits proposed do comport with recent Department Best Available Control Technology (BACT) determinations for natural gas firing with fuel oil back-up. However the Department's BACT determinations include minimization of fuel oil-firing and maximization of natural gas use.

9. Please re-examine the use of natural gas versus fuel oil and the cost-effectiveness of NO_X emission control strategies from the stand-point of average expected revenues and profitability per MW-hr versus pollution control costs per MW-hr. The approach towards cost-effectiveness of pollution control in peaking operation mode should parallel the economics of a project that presumably maximizes revenues and profitability under peaking mode. Because the project otherwise comports with very recent and draft BACT Department determinations (especially for peaking units), this analysis is not required if Oleander can agree to minimize its operation in the fuel oil use mode.

10. Please provide the emission characteristics of the Siemens, Westinghouse, General Electric and ABB combustion turbines under consideration for this project. Include any information regarding their ability to meet 9 ppm NO_X by Dry Low NO_X (DLN) technology or high temperature selective catalytic reduction. If a vendor has been identified and the information is available, it will not be necessary to provide the information regarding other suppliers.

11. Provide the worst case start-up and shutdown emissions characteristics for the units under consideration including start-up curves and duration of excess emissions. The Department plans to address excess emissions in its BACT determination.

We received a request to conduct a public meeting. We will advise you of the schedule. It will partially depend on the status of the Department's review of this application.

Rule 62-4.050(3), F.A.C. requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature. Please note that per Rule 62-4.055(1): *"The applicant shall have ninety days after the Department mails a timely request for additional information to submit that information to the Department..... Failure of an applicant to provide the timely requested information by the applicable date shall result in denial of the application."*

If you have any questions, please call Susan DeVore-Fillmore at 850/921-9537 or Mike Halpin at 850/921-9530 (engineers). Matters regarding review of the modeling should be directed to Cleve Holladay (meteorologist) at 850/921-8986.

Sincerely,

A.A. Linero, P.E. Administrator
New Source Review Section

AAL/sdf

cc: Gregg Worley, EPA
Mr. John Bunyak, NPS
Len Kosiov, DEP CD
Ken Kosky, P.E., Golder Associates

Department of
Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

December 22, 1998

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Richard L. Wolfinger, Vice President
Oleander Power Project, L.P.
250 West Pratt Street, 23rd floor
Baltimore, MD 21201

Re: Request for Additional Information No. 2
DEP File No. 0090180-001-AC (PSD-FL-258)
Oleander Power Project - Five 190 MW Combustion Turbines

Dear Mr. Wolfinger:

Further to our letter dated December 17, 1998 and in an effort by the Department to gain reasonable assurance as to how the proposed power plant will operate, additional information is requested. Should your response to any of the below items require new calculations, please submit the new calculations, assumptions, reference material and appropriate revised pages of the application form.

1. What commitment has been received from FGT concerning their ability to supply OPP's gas consumption requirements? Please provide documentation from FGT specifying that:
   - FGT is capable of accommodating OPP's gas supply needs. [Based upon application, the requirements appear to be 1.81 mmcf/hr per machine or 9.05 mmcf/hr for all 5 machines]
   - What quantity of the 9 mmcf/hr gas is to be contracted as readily available or "firm."
   - What quantity of the 9 mmcf/hr gas is to be considered as occasionally available or "interruptible".
2. For "interruptible" supplies, please provide FGT's probability estimates for gas availability during peak power periods in quantities up to 9 mmcf/hr.
3. What commitments have been received concerning water supplies? Please provide documentation from local water suppliers (e.g. the City of Cocoa) or appropriate permitting agencies that:
   - OPP's water supply needs for NO_X control (water injection during oil firing) can be met [based upon application, the requirements appear to be at least 120,900 lb/hr per machine or 362,000 gallons/hr for all 5 machines]

- Annual water consumption for NO_X control of 724 million gallons per year can be met [assumes 2000 hours per year oil operation on all 5 turbines].

4. Describe the impacts of the fuel oil delivery. Based upon the application, trucking of the fuel oil is contemplated. At 2000 hours per year of oil operation on all 5 turbines, an annual oil consumption of approximately 146 million gallons may be consumed, or approximately 20,000 truckloads.

Rule 62-4.050(3), F.A.C. requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature. Please note that per Rule 62-4.055(1): *"The applicant shall have ninety days after the Department mails a timely request for additional information to submit that information to the Department..... Failure of an applicant to provide the timely requested information by the applicable date shall result in denial of the application."*

If you have any questions, please call Mike Halpin (permit engineer) at 850/921-9530.

Sincerely,

12/22

A.A. Linero, P.E. Administrator
New Source Review Section

cc: Gregg Worley, EPA
John Bunyak, NPS
Len Koslov, DEP CD
Ken Kosky, P.E., Golder Associates

Golder Associates Fax

To: MIKE HALPIN Fax Number: 850-922-6979

Company: Date: 3/17/99

From: BOB McCANN e-mail: @golder.com

Our ref: 9839574-0300 Voice Mail:

RE:

Total pages (including cover): 40 Hard copy to follow ☐

MESSAGE

See ATTACHED FAX.

CALL IF YOU HAVE ANY QUESTIONS.

Response

Golder Associates
6241 NW 23rd St., Suite 500
Gainesville, FL 32653
U.S.A.
Telephone: (352) 336-5600
Fax: (352) 336-6603

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Golder Associates Inc.

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

March 17, 1999

9839514Y/F1/WP/3

New Source Review Section
Bureau of Air Regulation
Florida Department of Environmental Protection
111 S. Magnolia Drive, Suite 4
Tallahassee, FL 32301

Attention: Mr. A. A. Linero, P.E., Administrator

RE: Oleander Power Project
PSD-FL-258

Dear Al:

As a follow-up to my letter dated February 25, 1999 regarding Oleander's decision to limit oil used to an equivalent 1,000 hours/year/CT at full load, I am enclosing sections of the application form and changes in the appended material that reflect this commitment. In addition, the updated forms and information reflect data representative of the General Electric (GE) Frame 7FA combustion turbine as the primary vendor, which I indicated in my February 1, 1999 letter. The changes specific to the GE machine reflect a decrease in the emission rate of particulate matter (PM) for distillate fuel oil-firing, and a decrease in the emission rates for carbon monoxide (CO) and volatile organic compounds (VOCs) for both actual gas- and oil-firing. Taken together, the total reduction in pollutant emissions is about 30 percent lower than the previous information submitted. The reduction by pollutant is: PM - 53%, sulfur dioxide (SO_2) - 29%, nitrogen oxides (NO_x) - 22%, CO - 41.4% and VOC - 32.6%.

Over the last several months, the applicant has recognized the concern by the Department and the general public over the higher emission rates when firing distillate fuel oil relative to natural gas. Both the reduction in hours of firing oil and the lower emission rates with the GE machine substantially reduce emissions, a desired goal.

We have also reviewed the relationships of the ambient ozone concentrations for the various monitoring sites in the Central Florida region. For 1998, the data appear to follow a similar temporal trend among the monitoring stations located in Orange County, Brevard County, and St. Lucie County. This suggests a regional relationship in ozone concentrations. Because ozone is currently monitored at two locations in Brevard County, additional monitoring in the vicinity of the Oleander site that was suggested at the March 4, 1999 public meeting would be unwarranted. In addition, the maximum VOC emissions from the project is proposed as 64 tons/year which is well below the Prevention of Significant Deterioration (PSD) *de minimis* monitoring criteria of 100 tons/year for VOCs.

These emission reductions coupled with our previous air quality impacts analyses clearly indicate that the project will fully comply with EPA's and the Department's ambient air quality standards. Indeed, the impacts are many times lower than the Department's significant impact levels for both natural gas- and distillate oil-firing. The air quality modeling was also performed assuming that either natural gas or oil would be used at all times over the 5 years of meteorological data used in the model. This produces very conservative estimates of impacts given that the facility is a peaking plant and will not operate over all hours in any year.

Oleander appreciates this opportunity to provide the Department with this additional information. Please call or contact me via e-mail if you have questions or would like to discuss this further.

Sincerely,

GOLDER ASSOCIATES INC.

Robert E McLean Jr.

Kennard F. Kosky, P.E.
Project Engineer

KFK/arz

cc: R. Wolfinger, Oleander Power Project
R.A. Zwolak, GAI

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ATTACHMENT (March 17, 1999 Letter)

PSD APPLICATION REPLACEMENT PAGES, TEXT, AND TABLES

4. Professional Engineer's 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 (seal) Date

* Attach any exception to certification statement.

4. Professional Engineer's 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 (seal) March 16, 1999

Date

* Attach any exception to certification statement.

Emissions Unit Information Section 1 of 6 **Combustion Turbine 1**

F. SEGMENT (PROCESS/FUEL) INFORMATION
(Regulated and Unregulated Emissions Units)

Segment Description and Rate: Segment 1 of 2

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **Distillate (No. 2) Fuel Oil**	
2. Source Classification Code (SCC): **20100101**	
3. SCC Units: **1,000 gallons used**	
4. Maximum Hourly Rate: **14.6**	5. Maximum Annual Rate: **14,563**
6. Estimated Annual Activity Factor:	
7. Maximum Percent Sulfur: **0.05**	8. Maximum Percent Ash:
9. Million Btu per SCC Unit: **132**	
10. Segment Comment (limit to 200 characters): **Million Btu per SCC Unit = 131.8 (rounded to 132). Based on 7.1 lb/gal; LHV of 18,560 Btu/lb, - ISO conditions, 1,000 hrs/yr operation.**	

Emissions Unit Information Section 1 of 6

Combustion Turbine 1
Particulate Matter - Total

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Pollutant Detail Information:

1. Pollutant Emitted: **PM**
2. Total Percent Efficiency of Control: %
3. Potential Emissions: **17** lb/hour **19.3** tons/year
4. Synthetically Limited? [X] Yes [ ] No
5. Range of Estimated Fugitive/Other Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/yr
6. Emission Factor: Reference. **GE, '98; Golder, '99**
7. Emissions Method Code: [ ] 0 [ ] 1 [X] 2 [ ] 3 [ ] 4 [ ] 5
8. Calculation of Emissions (limit to 600 characters): **See Attachment PSD-FCLASS; Section 2.0; Appendix A.**
9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters): **Lb/hr based on oil firing, all loads. Tons/year based on 2,390 hrs/yr gas firing and 1,000 hrs/yr oil firing; ISO conditions.**

Combustion Turbine 1
Particulate Matter - Total

Emissions Unit Information Section 1 of 6
Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **17 lb/hr**	
4. Equivalent Allowable Emissions: **17** lb/hour	**8.5** tons/year
5. Method of Compliance (limit to 60 characters): **Annual stack test; EPA Methods 5 or 17; if < 400 hours**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Oil firing - all loads; 1,000 hrs/yr. See Attachment PSD-FCLASS; Section 2.0; Appendix A.**	

B.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **10 percent opacity**	
4. Equivalent Allowable Emissions: **9** lb/hour	**15.3** tons/year
5. Method of Compliance (limit to 60 characters): **VE Test < 10% opacity**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Gas firing - all loads; 3,390 hrs/yr. See Attachment PSD-FCLASS; Section 2.0; Appendix A.**	

Combustion Turbine 1
Sulfur Dioxide

Emissions Unit Information Section 1 of 6

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Pollutant Detail Information:

1. Pollutant Emitted: SO2

2. Total Percent Efficiency of Control: %

3. Potential Emissions: 103.8 lb/hour 68.3 tons/year

4. Synthetically Limited? [x] Yes [ ] No

5. Range of Estimated Fugitive/Other Emissions:

[ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/yr

6. Emission Factor: See Comment

Reference: Applicant

7. Emissions Method Code:

[ ] 0 [ ] 1 [x] 2 [ ] 3 [ ] 4 [ ] 5

8. Calculation of Emissions (limit to 600 characters):

See Attachment PSD-FCLASS; Section 2.0; Appendix A.

9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):

Emission Factor: 1 grain S per 100 CF gas; 0.05% S oil. lb/hr based on oil firing, 100% load, 32 degrees F. Tons/yr based on 2,390 hrs/yr gas firing and 1,000 hrs/yr oil firing, ISO conditions.

Combustion Turbine 1

Emissions Unit Information Section 1 **of** 6 Sulfur Dioxide

Allowable Emissions (Pollutant identified on front page)

A.

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:	103.8 lb/hour 51.9 tons/year
5. Method of Compliance (limit to 60 characters): Fuel Sampling	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): Oil firing - 32 degrees F; 100% load; 1,000 hrs/yr. See Attachment PSD-FCLASS; Section 2.0; Appendix A.	

B.

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:	5.5 lb/hour 9.3 tons/year
5. Method of Compliance (limit to 60 characters): Fuel Sampling	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): Requested Allowable Emissions and Units: Pipeline Natural Gas. Gas firing, 1 gram/100 cf - 32 degrees F, 100% load; 3,390 hrs/yr. See Attachment PSD-FCLASS; Section 2.0; Appendix A.	

Emissions Unit Information Section 1 of 6

Combustion Turbine 1
Nitrogen Oxides

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Pollutant Detail Information:

1. Pollutant Emitted: **NOx**
2. Total Percent Efficiency of Control: %
3. Potential Emissions: **344** lb/hour **247.1** tons/year
4. Synthetically Limited? [X] Yes [ ] No
5. Range of Estimated Fugitive/Other Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/yr
6. Emission Factor: Reference: **Applicant**
7. Emissions Method Code: [ ] 0 [ ] 1 [X] 2 [ ] 3 [ ] 4 [ ] 5
8. Calculation of Emissions (limit to 600 characters): **See Attachment PSD-FCLASS; Section 2.0; Appendix A.**
9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters): **Lb/hr based on oil firing, 100% load, 59 degrees F. Tons/yr based on 2,390 hrs/yr gas firing and 1,000 hrs/yr oil firing; ISO conditions.**

Combustion Turbine 1

Emissions Unit Information Section 1 of 6

Nitrogen Oxides

Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **42 ppmvd**	
4. Equivalent Allowable Emissions:	**344** lb/hour **172.2** tons/year
5. Method of Compliance (limit to 60 characters): **CEM - 30 Day Rolling Average**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Requested Allowable Emissions is at 15% O2-100% load. Oil firing; 59 degrees F; 100% load; 1,000 hrs/yr. See Attachment PSD-FCLASS; Section 2.0; Appendix A.**	

B.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **9 ppmvd**	
4. Equivalent Allowable Emissions:	**64.9** lb/hour **109.9** tons/year
5. Method of Compliance (limit to 60 characters): **CEM 30-Day Rolling Average**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Requested Allowable Emissions and Units is at 15% O2-100 percent load. Gas firing; 32 degrees F; 100 percent load, 3,390 hrs/yr; see Attachment PSD-FCLASS; Section 2.0; Appendix A.**	

Emissions Unit Information Section 1 of 6

Combustion Turbine 1
Carbon Monoxide

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Pollutant Detail Information:

1. Pollutant Emitted: CO
2. Total Percent Efficiency of Control: %
3. Potential Emissions: 66.9 lb/hour 82.5 tons/year
4. Synthetically Limited? [X] Yes [ ] No
5. Range of Estimated Fugitive/Other Emissions: [ ]1 [ ]2 [ ]3 _____ to _____ tons/yr
6. Emission Factor: Reference: Applicant
7. Emissions Method Code: [ ]0 [ ]1 [X]2 [ ]3 [ ]4 [ ]5
8. Calculation of Emissions (limit to 600 characters): **See Attachment PSD-FCLASS; Section 2.0; Appendix A.**
9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters): **Lb/hr based on oil firing; 100% load; 59 degrees F. Tons/yr based on 2,390 hrs/yr gas firing and 1,000 hrs/yr oil firing; ISO conditions.**

Combustion Turbine 1
Carbon Monoxide

Emissions Unit Information Section 1 of 6
Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **20 ppmvd**	
4. Equivalent Allowable Emissions:	**66.9** lb/hour **33.5** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 10; high load**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Oil firing; 59 degrees F; 100% load; 1,000 hrs/yr. See Attachment PSD-FCLASS; Section 2.0; Appendix A.**	

B.

1. Basis for Allowable Emissions Code: **OTHER**	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: **12 ppmvd**	
4. Equivalent Allowable Emissions:	**41.9** lb/hour **71.1** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 10; high load**	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Gas firing; 32 degrees F; 100% load; 3,390 hrs/yr. See Attachment PSD-FCLASS; Section 2.0; Appendix A.**	

Emissions Unit Information Section 1 of 6

Combustion Turbine 1
Volatile Organic Compounds

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Pollutant Detail Information:

1. Pollutant Emitted: VOC
2. Total Percent Efficiency of Control: %
3. Potential Emissions: 11.5 lb/hour 12.8 tons/year
4. Synthetically Limited? [X] Yes [ ] No
5. Range of Estimated Fugitive/Other Emissions: [ ]1 [ ]2 [ ]3 _____ to _____ tons/yr
6. Emission Factor: Reference: Applicant
7. Emissions Method Code: [ ]0 [ ]1 [X]2 [ ]3 [ ]4 [ ]5
8. Calculation of Emissions (limit to 600 characters): **See Attachment PSD-FCLASS; Section 2.0; Appendix A.**
9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters): **Lb/hr based on oil firing, 100% load; 59 degrees F. Tons/yr based on 2,390 hrs/yr gas firing and 1,000 hrs/yr oil firing; ISO conditions.**

Combustion Turbine 1

Emissions Unit Information Section 1 of 6

Volatile Organic Compounds

Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: OTHER	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: 6 ppmvd	
4. Equivalent Allowable Emissions: 11.5 lb/hour	5.7 tons/year
5. Method of Compliance (limit to 60 characters): EPA Method 25A; high load	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): Oil firing; 59 degrees F; 100% load; 1,000 hrs/yr. See Attachment PSD-FCLASS; Section 2.0; Appendix A.	

B.

1. Basis for Allowable Emissions Code: OTHER	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: 3 ppmvd	
4. Equivalent Allowable Emissions: 6 lb/hour	10.1 tons/year
5. Method of Compliance (limit to 60 characters): EPA Method 25A; high load	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): Gas firing; 32 degrees F; 100% load; 3,390 hrs/yr. See Attachment PSD-FCLASS; Section 2.0; Appendix A.	

Emissions Unit Information Section 1 of 6

Combustion Turbine 1
Particulate Matter - PM10

H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units Only - Emissions Limited Pollutants Only)

Pollutant Detail Information:

1. Pollutant Emitted: **PM10**

2. Total Percent Efficiency of Control: %

3. Potential Emissions: **17** lb/hour **19.3** tons/year

4. Synthetically Limited? [X] Yes [ ] No

5. Range of Estimated Fugitive/Other Emissions:

[ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/yr

6. Emission Factor:

Reference: **Applicant**

7. Emissions Method Code:

[ ] 0 [ ] 1 [X] 2 [ ] 3 [ ] 4 [ ] 5

8. Calculation of Emissions (limit to 600 characters):

See Attachment PSD-FCLASS; Section 2.0; Appendix A.

9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):

Lb/hr based on oil firing, all loads. Tons/year based on 2,390 hrs/yr gas firing and 1,000 hrs/yr oil firing; ISO conditions.

Combustion Turbine 1

Emissions Unit Information Section 1 of 6

Particulate Matter - PM10

Allowable Emissions (Pollutant identified on front page)

A.

1. Basis for Allowable Emissions Code: OTHER	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: 17 lb/hr	
4. Equivalent Allowable Emissions: 17 lb/hour	8.5 tons/year
5. Method of Compliance (limit to 60 characters): Annual stack test; EPA Methods 5 or 17; if < 400 hours	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): Oil firing - all loads; 1,000 hrs/yr. See Attachment PSD-FCLASS; Section 2.0; Appendix A.	

B.

1. Basis for Allowable Emissions Code: OTHER	
2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: 9 lb/hr	
4. Equivalent Allowable Emissions: 9 lb/hour	15.3 tons/year
5. Method of Compliance (limit to 60 characters): VE Test < 20% opacity	
6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): Gas firing - all loads; 3,390 hrs/yr. See Attachment PSD-FCLASS; Section 2.0; Appendix A.	

2.0 PROJECT DESCRIPTION

2.1 SITE DESCRIPTION

The project site, shown in Figure 2-1, consists of 38 acres that is currently zoned for light industry which allows for the siting of an electric power plants. There is minimal industrial, commercial, and residential development within a 3-km radius of the site. The plant elevation will be approximately 25 feet above sea level. The terrain surrounding the site is flat.

Natural gas will be supplied by a lateral pipeline connected to the Florida Gas Transmission (FGT) natural gas pipeline located immediately to the west of the site. The site has access to transmission facilities from a 230 kV transmission line and electrical substation that is located to the north of the site. Water for the evaporative cooler, and NO_x control when firing oil, will be supplied by nearby groundwater or surface water sources, including reclaimed water and storm water, largely developed by the city of Cocoa. Potable water and additional fire protection supply water will be served from the potable water supply pipe near Townsend Road.

2.2 POWER PLANT

The proposed project will consist of five "F" class CTs and associated facilities. The annual capacity factor of the plant will be 39 percent which is equivalent to operating 3,390 hours/year at full load. Natural gas will be used as the primary fuel and fuel oil will be used as a backup fuel. Fuel oil usage will be limited to the equivalent of 1,000 hours/year at full load.

Plant performance with General Electric 7FA and Westinghouse 501F combustion turbines was developed for natural gas and oil; at 50, 75, and 100 percent load; and at 32°F, 59°F, and 95°F ambient dry bulb temperatures. Nominal part load percentages herein are relative to 100 percent load without evaporative cooling. Generic "F" class combustion turbine performance is based on a performance envelope and has been adjusted to reflect anticipated future performance improvements. In particular, the future "F" class combustion turbine performance assumes 7 percent higher power output and a 1 percent lower heat rate (see Appendix A).

Pollutant	Natural Gas	Distillate Oil
NO_x, ppmvd @ 15% O_2	9	42
CO, ppmvd	12	20
VOC as CH_4, ppmvd	3	6
SO_x as SO_2	Calculated Based on Fuel (1.0 grains S/100 SCF)	Calculated Based on Fuel (0.05% sulfur)
PM_{10} lb/hr (dry filterable)	9	17

The maximum short-term emission rates (lb/hr) generally occur at base load, 32°F operation, where the CT has the greatest output and greatest fuel consumption.

Based on an ambient temperature of 59°F, the emission rates used to calculate maximum potential annual emissions for the proposed facility for regulated air pollutants are presented in Table 2-7 for one and 5 CTs. To produce the maximum annual emissions, the CTs are assumed to operate at baseload for 3,390 hours (39 percent capacity factor) firing natural gas for 2,390 hours and fuel oil for 1,000 hours. The potential emissions are based on the 59°F ambient air condition since it represents a nominal average between the higher emission levels at the 32°F ambient condition (winter) and the infrequent 95°F ambient condition (summer).

Process flow diagrams of the facility operating at summer and winter base load conditions are presented in Figures 2-2 and 2-3, respectively for the "F" Class CT.

Based on a review of the emission rates for natural gas and fuel oil combustion, the highest emission rates for the regulated pollutants generally occur when firing fuel oil. Combustion of natural gas and fuel oil result in slightly different exhaust flow gas rates and stack exit temperatures; however, the differences are minor. As a result of the higher emissions when firing oil, the air modeling analyses were based on determining maximum ground-level impacts with fuel oil.

As discussed in Section 6.0, the air modeling analyses that addressed compliance with ambient standards were based on modeling the CTs for the operating load and ambient temperature which produced the maximum impacts from the load impact analysis that was performed. Although the highest emission rates occur with low ambient temperatures (i.e., 32°F) and baseload conditions, the lowest exhaust gas flow rates occur with an ambient temperature of 95°F and 50 percent operating

Table 2-1. Stack, Operating, and Emission Data for the Proposed "F" Class Combustion Turbine with Dry Low-NO_x Combustors firing Natural Gas-- Base Load for Simple Cycle Operation

Parameter		Operating and Emission Data[a] for Ambient Temperature 32°F	59°F	95°F
Stack Data (ft)				
Height		60	60	60
Diameter		22	22	22
Operating Data				
Temperature(°F)		1,109	1,115	1,138
Velocity (ft/sec)		113.9	112.5	107.6
Maximum Hourly Emission per Unit[b]				
SO_2	lb/hr	5.5	5.5	5.0
	Basis	1.0 grain S/100CF	1.0 grain S/100CF	1.0 grain S/100CF
PM/PM10	lb/hr	9.0	9.0	9.0
	Basis	Dry filterables	Dry filterables	Dry filterables
NO_x	lb/hr	64.9	62.6	58.7
	Basis	9 ppmvd at 15% O_2	9 ppmvd at 15% O_2	9 ppmvd at 15% O_2
CO	lb/hr	41.9	41.0	37.9
	Basis	12 ppmvd	12 ppmvd	12 ppmvd
VOC (as methane)	lb/hr	6.0	5.9	5.5
	Basis	3 ppmvd	3 ppmvd	3 ppmvd
Sulfuric Acid Mist	lb/hr	0.85	0.85	0.77
	Basis	10% SO_2	10% SO_2	10% SO_2

Note: ppmvd = parts per million volume dry; O_2 = oxygen; S = sulfur; CF = cubic feet

[a] Refer to Appendix A for detailed information.

[b] Other regulated pollutants are assumed to have negligible emissions. These pollutants include lead, reduced sulfur compounds, hydrogen sulfide, fluorides, beryllium, mercury, arsenic, asbestos, vinyl chloride, and radionuclides.

Table 2-2. Stack, Operating, and Emission Data for the Proposed "F" Class Combustion Turbine with Dry Low-NO_x Combustors firing Natural Gas-- 75 Percent Load for Simple Cycle Operation

Parameter		Operating and Emission Data[a] for Ambient Temperature 32°F	59°F	95°F
Stack Data (ft)				
Height		60	60	60
Diameter		22	22	22
Operating Data				
Temperature(°F)		1,173	1,186	1,190
Velocity (ft/sec)		98.4	95.5	91.4
Maximum Hourly Emission per Unit[b]				
SO_2	lb/hr	4.5	4.5	4.0
	Basis	1.0 grain S/ 100CF	1.0 grain S/ 100CF	1.0 grain S/ 100CF
PM/PM10	lb/hr	9.0	9.0	9.0
	Basis	Dry filterables	Dry filterables	Dry filterables
NO_x	lb/hr	53.9	50.9	48.2
	Basis	9 ppmvd at 15% O_2	9 ppmvd at 15% O_2	9 ppmvd at 15% O_2
CO	lb/hr	34.8	33.4	31.2
	Basis	12 ppmvd	12 ppmvd	12 ppmvd
VOC (as methane)	lb/hr	4.9	4.8	4.6
	Basis	3 ppmvd	3 ppmvd	3 ppmvd
Sulfuric Acid Mist	lb/hr	0.69	0.69	0.61
	Basis	10% SO_2	10% SO_2	10% SO_2

Note: ppmvd = parts per million volume dry; O_2 = oxygen; S = sulfur; CF = cubic feet

[a] Refer to Appendix A for detailed information.

[b] Other regulated pollutants are assumed to have negligible emissions. These pollutants include lead, reduced sulfur compounds, hydrogen sulfide, fluorides, beryllium, mercury, arsenic, asbestos, vinyl chloride, and radionuclides.

Table 2-3. Stack, Operating, and Emission Data for the Proposed "F" Class Combustion Turbine with Dry Low-NO_x Combustors firing Natural Gas-- 50 Percent Load for Simple Cycle Operation

Parameter		Operating and Emission Data[a] for Ambient Temperature 32°F	59°F	95°F
Stack Data (ft)				
Height		60	60	60
Diameter		22	22	22
Operating Data				
Temperature(°F)		1,043	1,059	1,087
Velocity (ft/sec)		82.1	80.1	77.3
Maximum Hourly Emission per Unit[b]				
SO_2	lb/hr	3.5	3.5	3.0
	Basis	1.0 grain S/ 100CF	1.0 grain S/ 100CF	1.0 grain S/ 100CF
PM/PM10	lb/hr	9.0	9.0	9.0
	Basis	Dry filterables	Dry filterables	Dry filterables
NO_x	lb/hr	48.8	46.3	43.5
	Basis	9 ppmvd at 15% O_2	9 ppmvd at 15% O_2	9 ppmvd at 15% O_2
CO	lb/hr	31.9	30.5	26.9
	Basis	12 ppmvd	12 ppmvd	12 ppmvd
VOC (as methane)	lb/hr	4.5	4.4	4.0
	Basis	3 ppmvd	3 ppmvd	3 ppmvd
Sulfuric Acid Mist	lb/hr	0.54	0.54	0.46
	Basis	10% SO_2	10% SO_2	10% SO_2

Note: ppmvd = parts per million volume dry; O_2 = oxygen; S = sulfur; CF = cubic feet

[a] Refer to Appendix A for detailed information.

[b] Other regulated pollutants are assumed to have negligible emissions. These pollutants include lead, reduced sulfur compounds, hydrogen sulfide, fluorides, beryllium, mercury, arsenic, asbestos, vinyl chloride, and radionuclides.

Table 2-4. Stack, Operating, and Emission Data for the Proposed "F" Class Combustion Turbine with Water Injection firing Distillate Fuel Oil– Base Load for Simple Cycle Operation

Parameter		Operating and Emission Data[a] for Ambient Temperature 32°F	59°F	95°F
Stack Data (ft)				
Height		60	60	60
Diameter		22	22	22
Operating Data				
Temperature(°F)		1,114	1,109	1,123
Velocity (ft/sec)		112.7	114.4	111.4
Maximum Hourly Emission per Unit[b]				
SO_2	lb/hr	103.8	103.4	98.0
	Basis	0.05 % S	0.05 % S	0.05 % S
PM/PM10	lb/hr	17.0	17.0	17.0
	Basis	Dry filterables	Dry filterables	Dry filterables
NO_x	lb/hr	344.1	344.4	327.7
	Basis	42 ppmvd at 15% O_2	42 ppmvd at 15% O_2	42 ppmvd at 15% O_2
CO	lb/hr	66.0	66.9	63.8
	Basis	20 ppmvd	20 ppmvd	20 ppmvd
VOC (as methane)	lb/hr	11.3	11.5	11.0
	Basis	6 ppmvd	6 ppmvd	6 ppmvd
Sulfuric Acid Mist	lb/hr	15.9	15.8	15.0
	Basis	10% SO_2	10% SO_2	10% SO_2

Note: ppmvd = parts per million volume dry; O_2 = oxygen; S = sulfur; CF = cubic feet; ppmvw = parts per million volume wet

[a] Refer to Appendix A for detailed information.

[b] Other regulated pollutants are assumed to have negligible emissions. These pollutants include lead, reduced sulfur compounds, hydrogen sulfide, fluorides, beryllium, mercury, arsenic, asbestos, vinyl chloride, and radionuclides.

Table 2-5. Stack, Operating, and Emission Data for the Proposed "F" Class Combustion Turbine with Water Injection firing Distillate Fuel Oil-- 75 Percent Load for Simple Cycle Operation

Parameter		Operating and Emission Data[a] for Ambient Temperature 32°F	59°F	95°F
Stack Data (ft)				
Height		60	60	60
Diameter		22	22	22
Operating Data				
Temperature(°F)		1,166	1,179	1,190
Velocity (ft/sec)		100.6	97.5	93.3
Maximum Hourly Emission per Unit[b]				
SO_2	lb/hr	90.1	84.8	78.0
	Basis	0.05 % S	0.05 % S	0.05 % S
PM/PM10	lb/hr	17.0	17.0	17.0
	Basis	Dry filterables	Dry filterables	Dry filterables
NO_x	lb/hr	297.4	281.0	263.5
	Basis	42 ppmvd at 15% O_2	42 ppmvd at 15% O_2	42 ppmvd at 15% O_2
CO	lb/hr	57.1	54.7	51.3
	Basis	20 ppmvd	20 ppmvd	20 ppmvd
VOC (as methane)	lb/hr	9.7	9.3	9.0
	Basis	6 ppmvd	6 ppmvd	6 ppmvd
Sulfuric Acid Mist	lb/hr	13.8	13.0	11.9
	Basis	10% SO_2	10% SO_2	10% SO_2

Note: ppmvd = parts per million volume dry; O_2 = oxygen; S = sulfur; CF = cubic feet; ppmvw = parts per million volume wet

[a] Refer to Appendix A for detailed information.

[b] Other regulated pollutants are assumed to have negligible emissions. These pollutants include lead, reduced sulfur compounds, hydrogen sulfide, fluorides, beryllium, mercury, arsenic, asbestos, vinyl chloride, and radionuclides.

Table 2-6. Stack, Operating, and Emission Data for the Proposed "F" Class Combustion Turbine with Water Injection firing Distillate Fuel Oil-- 50 Percent Load for Simple Cycle Operation

Parameter		Operating and Emission Data[a] for Ambient Temperature 32°F	59°F	95°F
Stack Data (ft)				
Height		60	60	60
Diameter		22	22	22
Operating Data				
Temperature(°F)		998	1,014	1,043
Velocity (ft/sec)		83.2	81.2	78.4
Maximum Hourly Emission per Unit[b]				
SO_2	lb/hr	67.2	63.6	59.0
	Basis	0.05 % S	0.05 % S	0.05 % S
PM/PM10	lb/hr	17.0	17.0	17.0
	Basis	Dry filterables	Dry filterables	Dry filterables
NO_x	lb/hr	274.1	260.2	242.9
	Basis	42 ppmvd at 15% O_2	42 ppmvd at 15% O_2	42 ppmvd at 15% O_2
CO	lb/hr	52.8	50.8	46.3
	Basis	20 ppmvd	20 ppmvd	20 ppmvd
VOC (as methane)	lb/hr	9.0	8.6	8.2
	Basis	6 ppmvd	6 ppmvd	6 ppmvd
Sulfuric Acid Mist	lb/hr	10.3	9.7	9.0
	Basis	10% SO_2	10% SO_2	10% SO_2

Note: ppmvd = parts per million volume dry; O_2 = oxygen; S = sulfur; CF = cubic feet; ppmvw = parts per million volume wet

[a] Refer to Appendix A for detailed information.

[b] Other regulated pollutants are assumed to have negligible emissions. These pollutants include lead, reduced sulfur compounds, hydrogen sulfide, fluorides, beryllium, mercury, arsenic, asbestos, vinyl chloride, and radionuclides.

Table 2-7b. Summary of Pollutant Emissions for the Proposed Okeander Power Project (Revised 3/8/99; 1,000 hours oil; Revise CO, VOC, PM (oil); Proposed "F" Class Combustion Turbines, Simple-Cycle Mode

		Pollutant Emissions Proposed "F" Class Combustion Turbine								
		32 °F			59 °F			95 °F		
Load (%)	Pollutant	ppmvd	lb/hr	TPY	ppmvd	lb/hr	TPY	ppmvd	lb/hr	TPY
ONE UNIT										
Natural gas										
100	NOx	9.0	64.9	109.9	9.0	62.6	106.2	9.0	58.7	99.4
	CO	9.6	41.9	71.1	9.7	41.0	69.5	9.6	37.9	64.2
	SO_2	0.5	5.5	9.3	0.5	5.5	9.3	0.5	5.0	8.5
	VOC	2.4	6.0	10.1	2.4	5.9	10.0	2.4	5.5	9.2
	PM/PM10	NA	9.0	15.3	NA	9.0	15.3	NA	9.0	15.3
75	NOx	9.0	53.9	91.3	9.0	50.9	86.3	9.0	48.2	81.8
	CO	9.6	34.8	58.9	9.7	33.4	56.6	9.6	31.2	52.9
	SO_2	0.5	4.5	7.6	0.5	4.5	7.6	0.5	4.0	6.8
	VOC	2.4	4.9	8.4	2.4	4.8	8.1	2.4	4.6	7.8
	PM/PM10	NA	9.0	15.3	NA	9.0	15.3	NA	9.0	15.3
50	NOx	9.0	48.8	82.7	9.0	46.3	78.4	9.0	43.5	73.8
	CO	9.6	31.9	54.1	9.7	30.5	51.6	9.6	26.9	45.7
	SO_2	0.5	3.5	5.9	0.5	3.5	5.9	0.5	3.0	5.1
	VOC	2.4	4.5	7.6	2.4	4.4	7.4	2.4	4.0	6.8
	PM/PM10	NA	9.0	15.3	NA	9.0	15.3	NA	9.0	15.3
Distillate Oil										
100	NOx	42.0	344.1	172.1	42.0	344.4	172.2	42.0	327.7	163.9
	CO	13.3	66.0	33.0	13.4	66.9	33.5	13.4	63.8	31.9
	SO_2	9.1	103.8	51.9	9.0	103.4	51.7	9.0	98.0	49.0
	VOC	4.0	11.3	5.7	4.0	11.5	5.7	4.0	11.0	5.5
	PM/PM10	NA	17.0	8.5	NA	17.0	8.5	NA	17.0	8.5
75	NOx	42.0	297.4	148.7	42.0	281.0	140.5	42.0	263.5	131.8
	CO	13.3	57.1	28.6	13.4	54.7	27.4	13.4	51.3	25.6
	SO_2	9.1	90.1	45.1	9.1	84.8	42.4	8.9	78.0	39.0
	VOC	4.0	9.7	4.8	4.0	9.3	4.7	4.0	9.0	4.5
	PM/PM10	NA	17.0	8.5	NA	17.0	8.5	NA	17.0	8.5
50	NOx	42.0	274.1	137.1	42.0	260.2	130.1	42.0	242.9	121.5
	CO	13.3	52.8	26.4	13.4	50.8	25.4	13.4	46.3	23.2
	SO_2	7.4	67.2	33.6	7.4	63.6	31.8	7.3	59.0	29.5
	VOC	4.0	9.0	4.5	4.0	8.6	4.3	4.0	8.2	4.1
	PM/PM10	NA	17.0	8.5	NA	17.0	8.5	NA	17.0	8.5
Maximum Emissions (Maximum oil/ balance gas) (2)										
	NOx			249.6			247.1			233.9
	CO			83.1			82.5			77.2
	SO_2			58.5			58.3			55.0
	VOC			12.8			12.8			12.0
	PM10 (1)			19.3			19.3			19.3
5 UNITS										
Maximum Emissions (Maximum oil/ balance gas) (2)										
	NOx			1,248			1,235			1,170
	CO			415			412			386
	SO_2			292			291			275
	VOC			64			64			60
	PM10 (1)			96			96			96

(1) Emission rates are ppmvd at 15 percent O2. PM/PM10 are dry filterables only.
(2) Assumed hours firing oil and natural gas ar 1,000 and 2,390 , respectively.

Table 3-3b. Maximum Emissions Due to the Proposed Oleander Power Project Compared to the PSD Significant Emission Rates

Pollutant	Pollutant Emissions (TPY)		PSD Review
	Potential Emissions from Proposed Facility[a]	Significant Emission Rate	
Sulfur Dioxide	291	40	Yes
Particulate Matter [PM(TSP)]	96	25	Yes
Particulate Matter (PM10)	96	15	Yes
Nitrogen Dioxide	1,235	40	Yes
Carbon Monoxide	412	100	Yes
Volatile Organic Compounds	64	40	Yes
Lead	NEG	0.6	No
Sulfuric Acid Mist	44.4	7	Yes
Total Fluorides	NEG	3	No
Total Reduced Sulfur	NEG	10	No
Reduced Sulfur Compounds	NEG	10	No
Hydrogen Sulfide	NEG	10	No
Mercury	NEG	0.1	No
MWC Organics (as 2,3,7,8-TCDD)	$< 8.8 \times 10^{-6}$	3.5×10^{-6}	No
MWC Metals (as Be, Cd)	NEG	15	No
MWC Acid Gases (as HCl)	11.3	40	No

Note: NEG = Negligible.

[a] Based on emissions from operating at baseload at 59°F; firing natural gas and distillate fuel oil for 2,390 and 1,000 hours per year per turbine for a total of five CTs, respectively (Refer to Table 2-7).

Table 3-4b. Predicted Net Increase in Impacts Due To the Proposed Oleander Power Project Compared to PSD *De Minimis* Monitoring Concentrations

	Concentration (µg/m3)	
Pollutant	Predicted Increase in Impacts[a]	*De Minimis* Monitoring Concentration
Sulfur Dioxide	1.1	13, 24-hour
Particulate Matter (PM10)	0.3	10, 24-hour
Nitrogen Dioxide	0.3	14, annual
Carbon Monoxide	2.4	575, 8-hour
Volatile Organic Compounds	64 TPY	100 TPY

Note: NA = not applicable.
NM = no ambient measurement method.
TPY = tons per year.

[a] See Section 6.0 for air dispersion modeling results.

Table 4-1. NO_x Emission Estimates (TPY) of BACT Alternative Technologies (per Unit)

Alternative BACT Control Technologies	Operating Mode[a]		
	Oil	Gas	Total
NO_x Emission (TPY)			
Dry Low-NO_x (DLN) only	172	75	247
DLN with SCR[b]	69	30	99
Reduction	(103)	(45)	(148)
Basis of Emissions (ppmvd)			
DLN only	42	9	
DLN with SCR	16.8	3.6	
Hours of Operation	1,000	2,390	3,390

Note: DLN = Dry low-NO_x.
SCR = selective catalytic reduction.
TPY = tons per year.

[a] Emission rates were based on a "F" class combustion turbine operating at 100-percent capacity and firing natural gas for 2,390 hours and distillate fuel oil for 1,000 hours. Emission data are based on an ambient temperature of 59°F at maximum emission rates.

[b] Based on primary emissions with SCR; no account is made for additional emissions (secondary) due to lost energy from heat rate penalty and electrical usage for SCR operation (see Table 4-3).

Table 4-2b. Comparison of Alternative BACT Control Technologies for NO_x (per Unit)

	Alternative BACT Control Technologies	
	DLN Only	SCR
Technical Feasibility	Feasible	Feasible for gas
Economic Impact[a]		
Capital Costs	included	$7,507,200
Annualized Costs	included	$2,603,640
Cost Effectiveness		
NO_x Removed (per ton of NO_x)	NA	$17,568
NO_x Removed (per ton of total pollutants)	NA	$44,813
Environmental Impact[b]		
Total NO_x (TPY)	247	99
NO_x Reduction (TPY)	NA	(148)
Ammonia Emissions (TPY)	0	39.1
PM Emissions (TPY)	0	18.0
Secondary Emissions (TPY)	0	32.8
Net Emission Reduction (TPY)	NA	(58.1)
Energy Impacts[c]		
Energy Use (kWh/yr)	0	4,200,210
Energy Use (mmBtu/yr) at 10,000 Btu/kWh	0	50,400
Energy Use (mmcf/yr) at 1,000 Btu/cf for natural gas	0	41

[a] See Appendix B for detailed development of capital costs (including recurring costs) and annualized costs.

[b] See emission data presented in Table 4-3.

[c] Energy impacts are estimated due to the lost energy from heat rate penalty and electrical usage for the SCR operation at 3,390 hours per year. Lost energy is based on 0.5 percent of 192 MW. SCR electrical usage is based on 0.080 MWh per SCR system and 0.20 MWh for cooling fan.

Table 4-3b. Maximum Potential Incremental Emissions (TPY) with Selective Catalytic Reduction

Pollutants	Incremental Emissions (TPY) of Project with SCR		
	Primary	Secondary[a]	Total
Particulate	15.9[b]	0.96	25.6
Sulfur Dioxide	–	12.7	12.7
Nitrogen Oxides	(148)[c]	17.6	(172.4)
Carbon Monoxide	–	1.21	1.21
Volatile Organic Compounds	–	0.30	0.3
Ammonia	39.1[d]	0	39.1
Total	(93.0)	32.8	(92.5)
Carbon Dioxide[e]	–	4,330	4,330

Note: Btu/kWh = British thermal units per kilowatt-hour
CT = combustion turbine
MW = megawatt
% = percent
SCR = selective catalytic reduction
TPY = tons per year
– = no differences in the project's emissions with SCR and without SCR

[a] Lost energy from heat rate penalty and electrical usage for 3,390 hours per year operation (0.5% of 192 MW per CT plus 0.080 MWh for SCR system and 0.2 MWh for dilution fan). Assumes baseloaded oil-fired unit would replace lost energy. EPA emission factors based on oil-fired peaking turbines used were (lb/10^6 Btu): PM = 0.038; SO_2 = 0.505; NO_x = 0.698, CO = 0.048, and VOC = 0.017. Example calculation for PM is ((0.5% x 192 + 0.28) MW x 12,000 Btu/kWh x 1,000 kW/MW x 3,390 hr/yr x 0.038 lb pm/10^6 Btu ÷ 2,000 lb/ton = 0.96 TPY.

[b] Assume 5% SO_2 conversion in catalyst and SO_3 and the SO_3 formed in the combustion process reacts with ammonia to form ammonium sulfate; 58.3 TPY SO_2 x 0.05 = 2.92 TPY SO_2; 2.92 TPY SO_2 x 98 MW of H_2SO_4 ÷ 64 MW SO_2 = 4.46 TPY H_2SO_4; 8.88 TPY H_2SO_4 from combustion of oil and gas for total H_2SO_4 = 13.4 TPY SO_3 x 132 (MW of ammonia salt) ÷ 98 (MW of H_2SO_4) = 18.0 TPY.

[c] Based on the maximum difference between the project's emissions with SCR and without SCR (see Table 4-1).

[d] 10 ppm ammonia slip (ideal gas law): 2,591,756 acfm x (10 ppm ÷ 10^6) x 17 x 2,116.8 ÷ 1,545 ÷ (460 + 1,111) x 60 x 3,390 ÷ 2,000 = 39.1 TPY (flow average of gas and oil).

[e] Reflects differential emissions due to lost energy efficiency with SCR (i.e., calculated from total heat input lost; 1.24 MW times 12,000 Btu/kWh; CO_2 calculated based on 85.7% carbon in fuel oil and 18,300 Btu/lb for 0.5% sulfur oil).

Table B-4b. Annualized Cost for Selective Catalytic Reduction for Frame "F" Simple Cycle Operation

Cost Component	Costs	Basis of Cost Component
Direct Annual Costs		
Operating Personnel	$24,960	24 hours/week at $20/hr
Supervision	$3,744	15% of Operating Personnel;OAQPS Cost Control Manual
Maintenance - Labor	$13,104	0.5 hr per shift, $24/hr; OAQPS Cost Manual
- Materials	$13,104	100% of maintenance labor; OAQPS Cost Manual
Ammonia	$64,552	$300 per ton NH3 Aqueous
PSM/RMP Update	$5,000	Engineering Estimate
Inventory Cost	$93,044	Capital Recovery (11.74%) for 1/3 catalyst
Catalyst Disposal Cost	$35,793	$28/1,000 lb/hr mass flow over 3 years; developed from vendor quotes
Contingency	$7,599	3% of Direct Annual Costs
Total Direct Annual Costs (TDAC)	$260,900	
Energy Costs		
Electrical	$47,460	80kW/h for SCR; 200 kW/h for cooling fan@ $0.05/kWh times Capacity Factor
Heat Rate Penalty	$162,551	0.5% of MW output; EPA, 1993 (Page 6-20)
MW Loss Penalty	$230,160	3 days lost energy costs @ $0.05 kWh each three period
Fuel Escalation	$13,705	Escalation of fuel over inflation; 3% of energy costs
Contingency	$13,601	3% of Energy Costs
Total Energy Costs (TEC)	$466,977	
Indirect Annual Costs		
Overhead	$17,222	60% of Operating/Supervision Labor and Ammonia
Property Taxes, Insurance, Admin.	$300,289	4% of Total Capital Costs
Annualized Total Direct Capital	$602,665	11.75% Capital Recovery Factor of 10% over 20 years times sum of TDCC, TDIC, and ThC
Annualized Total Direct Recurring	$955,587	40.21% Capital Recovery Factor of 10% over 3 years times RCC
Total Indirect Annual Costs (TIAC)	$1,875,763	
TOTAL ANNUALIZED COSTS	$2,603,640	Sum of TDAC, TEC and TIAC
COST EFFECTIVENESS	$17,568	

Table B-7b. Annualized Cost for CO Catalyst for Frame "F" Simple Cycle Operation

Cost Component	Cost	Basis of Cost Estimate
Direct Annual Costs		
Operating Personnel	$8,320	8 hours/week at $20/hr
Supervision	$1,248	15% of Operating Personnel;OAQPS Cost Control Manual
Maintenance - Labor	$4,368	0.5 hr per shift, $24/hr; OAQPS Cost Manual
- Materials	$4,368	100% of maintenance labor; OAQPS Cost Manual
Inventory Cost	$27,401	Capital Recovery (11.74%) for 1/3 catalyst
Catalyst Disposal Cost	$35,793	$28/1,000 lb/hr mass flow over 3 years: developed from vendor quotes
Contingency	$2,445	3% of direct costs
Total Direct Annual Costs (TDAC)	$83,943	
Energy Costs		
Heat Rate Penalty	$66,105	0.2% of MW output; EPA, 1993 (Page 6-20)
MW Loss Penalty	$46,800	2 days replacement energy costs @ $0.01 kWh each three period
Fuel Escalation	$5,387	Escalation of fuel over inflation; 3% of energy costs
Contingency	$11,629	10% of energy costs
Total Energy Costs (TEC)	$127,921	
Indirect Annual Costs		
Overhead	$0	60% of Operating/Supervision Labor and Ammonia
Property Taxes, insurance, admin.	$0	4 % of Total Capital Costs
Annualized Total Direct Capital	$0	11.75% Capital Recovery Factor of 10% over 20 years times sum of TDCC, TDIC and TI
Annualized Total Direct Recurring	$0	40.21% Capital Recovery Factor of 10% over 3 years times RCC
Total Indirect Annual Costs (TIAC)	$0	
TOTAL ANNUALIZED COSTS	$211,864	Sum of TDAC, TEC and TIAC
COST EFFECTIVENESS	$3,424	

Table 6-2b. Maximum Predicted Pollutant Concentrations For One Simple-Cycle Combustion Turbine- Screening Analysis
Class F Combustion Turbine, Natural Gas- Fired

Pollutant	Maximum Emission Rates (lb/hr) by Operating Load and Air Temperature						Averaging Time	Maximum Predicted Concentrations ($\mu g/m^3$) by Operating Load and Air Temperature (1)					
	Base Load		75% Load		50% Load			Base Load		75% Load		50% Load	
	32 °F	95 °F	32 °F	95 °F	32 °F	95 °F		32 °F	95 °F	32 °F	95 °F	32 °F	95 °F
Generic (10 g/s)	79.37	79.37	79.37	79.37	79.37	79.37	Annual	0.012	0.013	0.013	0.015	0.018	0.019
							24-Hour	0.153	0.155	0.169	0.178	0.241	0.314
							8-Hour	0.365	0.385	0.435	0.455	0.654	0.875
							3-Hour	0.885	0.908	1.124	1.143	1.669	2.258
							1-Hour	1.760	1.893	2.074	2.543	5.008	6.774
SO_2	5.5	5.0	4.5	4.0	3.5	3.0	Annual	0.00086	0.00079	0.00076	0.00074	0.00078	0.00073
							24-Hour	0.0106	0.0107	0.0096	0.0090	0.0106	0.0119
							3-Hour	0.061	0.063	0.064	0.058	0.074	0.085
NO_x	64.9	58.7	53.9	48.2	48.8	43.5	Annual	0.010	0.009	0.009	0.009	0.011	0.011
PM10	9.0	9.0	9.0	9.0	9.0	9.0	Annual	0.0014	0.0014	0.0015	0.0017	0.0020	0.0022
							24-Hour	0.017	0.018	0.019	0.020	0.027	0.036
CO	41.9	37.9	34.8	31.2	31.9	26.9	8-Hour	0.2	0.2	0.2	0.2	0.3	0.3
							1-Hour	0.9	0.9	0.9	1.0	2.0	2.3

(1) Concentrations are based on highest predicted concentrations using five years of meteorological for 1987 to 1991 of surface and upper air data from the National Weather Service stations in Orlando and Ruskin, respectively.

Pollutant concentrations were based on a modeled or generic concentration predicted using a modeled emission rate of 79.37 lb/hr (10 g/s). Specific pollutant concentrations were estimated by multiplying the modeled concentration (at 10 g/s) by the ratio of the specific pollutant emission rate to the modeled emission rate of 10 g/s.

Table 6-3b. Maximum Pollutant Concentrations Predicted for 5 Simple-Cycle Combustion Turbines (Natural Gas-Fired) Compared to EPA Significant Impact and Deminimis Monitoring Levels- Screening Analysis

Pollutant	Averaging Time	Maximum Predicted Concentrations (ug/m^3) by Operating Load and Air Temperature (1)						EPA Significant Impact Levels (ug/m^3)	EPA Deminimis Levels (ug/m^3)
		Base Load		75% Load		50% Load			
		32 °F	95 °F	32 °F	95 °F	32 °F	95 °F		
SO_2	Annual	0.00430	0.00394	0.00380	0.00370	0.00392	0.00363	1	NA
	24-Hour	0.053	0.054	0.048	0.045	0.053	0.059	5	13
	3-Hour	0.307	0.314	0.319	0.288	0.368	0.427	25	NA
NO_x	Annual	0.051	0.046	0.046	0.045	0.055	0.053	1	14
PM10	Annual	0.007	0.007	0.008	0.008	0.010	0.011	1	NA
	24-Hour	0.087	0.088	0.096	0.101	0.136	0.178	5	10
CO	8-Hour	1.0	0.9	1.0	0.9	1.3	1.5	500	575
	1-Hour	5	5	5	5	10	11	2,000	NA

(1) Concentrations are based on highest predicted concentrations using five years of meteorological for 1987 to 1991 of surface and upper air data from the National Weather Service stations in Orlando and Ruskin, respectively.

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Table 6-4b. Maximum Predicted Pollutant Concentrations For One Simple-Cycle Combustion Turbine- Screening Analysis
Class F Combustion Turbine, Distillate Fuel Oil- Fired

Pollutant	Maximum Emission Rates (lb/hr) by Operating Load and Air Temperature						Averaging Time	Maximum Predicted Concentrations (ug/m^3) by Operating Load and Air Temperature (1)					
	Base Load		75% Load		50% Load			Base Load		75% Load		50% Load	
	32 °F	95 °F	32 °F	95 °F	32 °F	95 °F		32 °F	95 °F	32 °F	95 °F	32 °F	95 °F
Generic (10 g/s)	79.37	79.37	79.37	79.37	79.37	79.37	Annual	0.013	0.013	0.013	0.014	0.018	0.019
							24-Hour	0.154	0.154	0.167	0.174	0.227	0.297
							8-Hour	0.369	0.372	0.431	0.445	0.612	0.823
							3-Hour	0.889	0.894	1.120	1.137	1.557	2.121
							1-Hour	1.762	1.770	2.038	2.197	4.671	6.362
SO_2	103.8	98	90.1	78	67.2	59	Annual	0.016	0.015	0.015	0.014	0.015	0.014
							24-Hour	0.20	0.20	0.19	0.17	0.19	0.22
							3-Hour	1.2	1.2	1.3	1.1	1.3	1.6
NO_x	344.1	327.7	297.4	263.5	274.1	242.9	Annual	0.054	0.052	0.049	0.047	0.061	0.059
PM10	17	17	17	17	17	17	Annual	0.0027	0.0027	0.0028	0.0030	0.0038	0.0041
							24-Hour	0.033	0.033	0.036	0.037	0.049	0.064
CO	66	63.8	57.1	51.3	52.8	46.3	8-Hour	0.31	0.30	0.31	0.29	0.41	0.48
							1-Hour	1.5	1.4	1.5	1.4	3.1	3.7

(1) Concentrations are based on highest predicted concentrations using five years of meteorological for 1987 to 1991 of surface and upper air data from the National Weather Service stations in Orlando and Ruskin, respectively.

Pollutant concentrations were based on a modeled or generic concentration predicted using a modeled emission rate of 79.37 lb/hr (10 g/s). Specific pollutant concentrations were estimated by multiplying the modeled concentration (at 10 g/s) by the ratio of the specific pollutant emission rate to the modeled emission rate of 10 g/s.

Table 6-5b. Maximum Pollutant Concentrations Predicted for 5 Simple-Cycle Combustion Turbines (Distillate Fuel Oil-Fired) Compared to EPA Significant Impact and Deminimis Monitoring Levels- Screening Analysis

Pollutant	Averaging Time	Maximum Predicted Concentrations (ug/m^3) by Operating Load and Air Temperature (1)						EPA Significant Impact Levels (ug/m^3)	EPA Deminimis Levels (ug/m^3)
		Base Load		75% Load		50% Load			
		32 °F	95 °F	32 °F	95 °F	32 °F	95 °F		
SO_2	Annual	0.082	0.077	0.074	0.070	0.075	0.071	1	NA
	24-Hour	1.0	1.0	0.9	0.9	1.0	1.1	5	13
	3-Hour	5.8	5.8	6.4	5.6	6.6	7.9	25	NA
NO_x	Annual	0.27	0.26	0.25	0.24	0.31	0.29	1	14
PM10	Annual	0.013	0.013	0.014	0.015	0.019	0.021	1	NA
	24-Hour	0.16	0.16	0.18	0.19	0.24	0.32	5	10
CO	8-Hour	1.5	1.5	1.6	1.4	2.0	2.4	500	575
	1-Hour	7	7	7	7	16	19	2,000	NA

(1) Concentrations are based on highest predicted concentrations using five years of meteorological for 1987 to 1991 of surface and upper air data from the Federal Aviation Administration and National Weather Service stations in Ft. Myers and Ruskin, respectively.

Table 6-6b. Summary of Maximum Pollutant Concentrations Predicted for 5 Simple-Cycle Combustion Turbines Compared to EPA Significant Impact and Deminimis Monitoring Levels- Refined Analysis

Pollutant	Averaging Time	Maximum Predicted Concentrations (ug/m^3)		EPA Significant Impact Levels (ug/m^3)	EPA Deminimis Levels (ug/m^3)
		Natural Gas-Fired	Oil-Fired		
SO_2	Annual	0.0043 (1)	0.082 (1)	1	NA
	24-Hour	0.059 (2)	1.10 (2)	5	13
	3-Hour	0.43 (2)	7.9 (2)	25	NA
NO_x	Annual	0.055 (3)	0.31 (3)	1	14
PM10	Annual	0.011 (2)	0.021 (2)	1	NA
	24-Hour	0.18 (2)	0.32 (2)	5	.10
CO	8-Hour	1.5 (2)	2.4 (2)	500	575
	1-Hour	11.5 (2)	18.6 (2)	2,000	NA

(1) Based on operating conditions at base load and ambient temperature of 32 °F.
(2) Based on operating conditions at 50 percent load and ambient temperature of 95 °F.
(3) Based on operating conditions at 50 percent load and ambient temperature of 32 °F.