

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
NOTICE OF PERMIT

In the Matter of an  
Application for Permit by:

Mr. Gregory M. Nelson, P.E.  
Manager, Environmental Planning  
Tampa Electric Company  
6944 U.S. Highway 41 North  
Apollo Beach, Florida 33572-9200

Facility I.D. No. 1050233  
DEP Permit No. PSD-FL-263  
Polk Power Station  
Polk County

Enclosed is the Final Permit Number PSD-FL-263 for an air construction permit to construct/install two nominal 165 megawatt General Electric PG7241FA simple cycle, intermittent duty natural gas and No. 2 fuel oil-fired combustion turbine-electrical generators at the existing Polk Power Station, Polk County. This permit is issued pursuant to Chapter 403, Florida Statutes and 40CFR52.21.

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

Executed in Tallahassee, Florida.

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

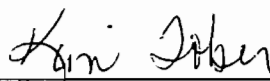
**CERTIFICATE OF SERVICE**

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF FINAL PERMIT (including the FINAL permit) was sent by certified mail (\*) and copies were mailed by U.S. Mail before the close of business on 10-8-99 to the person(s) listed:

Gregory M. Nelson, TEC\*  
Gregg Worley, EPA  
John Bunyak, NPS  
Bill Thomas, DEP SWD  
Buck Owen, DEP PPSO  
Thomas W. Davis, P.E, ECT

Clerk Stamp

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

  
\_\_\_\_\_  
(Clerk)

10-8-99  
(Date)

## FINAL DETERMINATION

Tampa Electric Company  
Polk Power Station  
165 MW Simple Cycle Combustion Turbines  
DEP File No: PSD-FL-263

The Department distributed a public notice package on June 30, 1999 for the project to construct two nominal 165 megawatt (MW) natural gas and distillate fuel oil-fired simple cycle combustion turbine-electrical generators and two 114-foot stacks at the Polk Power Station, 9995 State Route 37 South, Mulberry, Polk County. The Public Notice of Intent to Issue PSD Permit was published in the Lakeland Ledger on Saturday July 10, 1999.

Comments were received and considered from the U.S. Fish and Wildlife Service and Hillsborough County prior to issuance of the Intent, but none were received from any agencies or the public after issuance of the Intent. Written comments were received from Tampa Electric Company (TEC) dated August 9, and September 14, 1999. TEC commented on the Public Notice, Draft Permit, Draft BACT Determination and the Technical Evaluation and Preliminary Determination. TEC's comments (italics and keyed to the respective documents) and the Department's responses follow.

### **Public Notice of Intent to Issue PSD Permit**

*TEC states that although the notice was published as requested by the Department, it should be noted that the referenced units do not have "evaporative inlet coolers." The reference to these coolers was inadvertently included in the original permit application, but removed in the revised application.*

The Department acknowledges that there will not be evaporative inlet coolers. All references to coolers in the final documents have been removed.

### **Technical Evaluation and Preliminary Determination (TEPD)**

*The reference to evaporative inlet coolers should be deleted from this section (page TE-4 of 10) for the above stated reason.*

*The reference to volatile organic compounds (VOC) in the "Significant emission rate increases" paragraph (page TE-4 of 10) should be deleted. Based on the emissions estimates provided in the revised permit application, VOC emission increases are less than the PSD significance level.*

*The "Project Emissions (TPY) and PSD Applicability" table (page TE-7 of 10) "PSD Review" column for "Ozone (VOC)" should be changed from "Yes" to "No" based on the above comment.*

The Department acknowledges these comments and has included them in the project file. The TEPD will not be re-issued, but the final Permit and BACT documents comport with TEC's comments.

## **Draft Permit**

### **Specific Condition 8:**

*Condition 8 (page 7 of 13) should be corrected from “higher heating value (LHV)” to “higher heating value (HHV)” or “lower heating value (LHV)”, which ever one is intended.*

The term has been corrected to reflect “lower heating value (LHV).”

### **Specific Condition No. 13**

*Condition 13 (page 7 of 13) should allow 876 hours per year on fuel oil, as this was the basis of the permit application and associated analysis. Also, this condition should be clarified to indicate that allowable hours of operation on gas and oil are both “per year” and based on “full load equivalent hours” since this was the basis for which the emission estimates and associated analysis were completed.*

This matter was fully addressed in both the draft and Final BACT determination as part of the rationale for requiring a NO<sub>x</sub> limit of 10.5 ppmvd @15 percent O<sub>2</sub> instead of 9 ppmvd. Also, because emissions on oil are relatively high (42 ppmvd), it is important to limit oil firing. The annual limit on hours of oil operation given in the permit is clearly within the description of the oil firing scenario given by TEC which is “these units will only burn oil as necessary for backup which is expected to be for short periods of time and fairly sporadic.” The hours on oil can still be increased if TEC agrees to the 9 ppmvd NO<sub>x</sub> limit on natural gas (such as the Oleander and Vandolah Projects). They can also be increased if emissions from fuel oil can be reduced to less than 42 ppmvd on oil. TEC is also a major supplier of gas and can certainly insure that operation on oil firing is limited without experiencing undue hardship.

### **Specific Condition No. 17:**

*Condition 17 (page 8 of 13) requires DLN systems to be maintained to minimize NO<sub>x</sub> and CO emissions and requires operation of the DLN combustor in the diffusion-firing mode to be minimized. These are broad, general requirements which could be open to differing interpretations. This condition should be re-written to simply require the DLN systems be properly maintained to comply with permitted NO<sub>x</sub> and CO emission rates.*

The Department reworded this condition as follows:

The permittee shall provide manufacturer’s emissions performance versus load diagrams for the DLN and wet injection systems prior to their installation. DLN systems shall each be tuned upon initial operation to optimize emissions reductions consistent with normal operation and maintenance practices and shall be maintained to minimize NO<sub>x</sub> emissions and CO emissions, consistent with normal operation and maintenance practices. Operation of the DLN systems in the diffusion-firing mode shall be minimized when firing natural gas. [Rule 62-4.070, and 62-210.650, F.A.C.]

Specific Condition No. 18

*TEC request the following change: Condition 18 (page 8 of 13) should state emission limits for VOC, CO, SO<sub>2</sub>, SAM and NO<sub>x</sub> in terms of "pounds per hour" only, using the relevant ppm rate as the basis for these limits. VOC basis should be expressed as ppmv<sub>w</sub>.*

The Department's BACT limits for combustion turbines are expressed in "unit of the standard." In the case of NO<sub>x</sub> the unit is ppmvd (corrected to 15% oxygen as applicable). Proper permitting practice dictates both a technology-based BACT limit that reflects the capabilities of the selected technology (ppmvd) and a pounds per hour limit requirement to demonstrate protection of short term ambient standards and to calculate potential-to-emit. The NO<sub>x</sub> ppmvd units are clearly consistent with the guarantee provided by the General Electric and the value is actually higher than the guarantee.

*Natural gas sulfur content limit should be 2 gr S/100 ft<sup>3</sup> (missing "t").*

This typographical error was corrected as requested.

Specific Condition No. 19:

*The Condition.19 (page 8 of 13) requirement to substitute missing data per Title IV (40 CFR 75) is overly punitive when applied to averaging periods shorter than what is contained in Title IV (calendar year annual average). Missing data periods, as well as startup/shutdown (less than fifty percent load) and malfunction periods should be excluded from the calculation of short-term averages.*

The Department will delete the reference to missing data substitution from Title IV. In its place, the Department will add a new paragraph in accordance with 40CFR60.13 to address this issue under Specific Condition No. 29 as follows:

All continuous monitoring systems (CEMS) shall be in continuous operation except for breakdowns, repairs, calibration checks, and zero and span adjustments. These CEMS shall meet minimum frequency of operation requirements: one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period. Data recorded during periods of continuous monitoring system breakdowns, repairs, calibration checks, and zero and span adjustments shall not be included in the data average. Although recorded, emissions during period of start up, shutdown and malfunction are subject to the excess emissions conditions of this permit. [40CFR60.13]

*The NO<sub>x</sub> limits in this condition should be stated in terms of "pounds per hour" only, using the ppm rate as the basis.*

This comment is already addressed above (Specific Condition 18)

*The averaging period while firing fuel oil should be changed from "3 hr average" to "24 hour block average" similar to the requirement for gas firing.*

The Department has received input from EPA on similar projects recommending that emissions be averaged over shorter time periods rather than longer ones as requested by TEC. They would prefer that the averaging time be reduced for gas firing rather than extended for oil firing. The

Department has determined that it is not difficult to maintain the 42 ppmvd standard on a three hour basis by injecting steam or water as needed. It is much more difficult to continuously maintain the lower 10.5 ppmvd applicable when firing gas partly because it is not possible to add more of a reagent or inject water to quickly effect the necessary reduction. This condition will not be relaxed as requested by TEC or made stricter as suggested by EPA.

*The requirement to submit an engineering report related to lower NO<sub>x</sub> emission rate while burning oil should be removed. TEC feels this requirement is completely unwarranted based on the fact that the vendor will only guarantee oil fired NO<sub>x</sub> emissions rates at 42 ppm. In addition, these units will only burn oil as necessary for backup which is expected to be for short periods of time and fairly sporadic; therefore, it will be extremely difficult to determine an emission rate that can consistently be achieved while taking into account long-term performance expectations and good operating and maintenance practices.*

The Department accepts TEC statement that these units will only burn oil as necessary for back up which is expected to be for short periods of time and fairly sporadic. However, the Department feels as it was explained in the BACT determination rationale that it is conceivable that NO<sub>x</sub> emissions while firing oil may be reduced from 42 ppmvd by increasing the water injection rate or even by development of a DLN oil burner (Page BD-13 Appendix BD). Based on the above, will be modified as follows:

~~Within 18 months after the initial compliance test, the permittee shall prepare and submit for the Department's review and acceptance an engineering report regarding the lowest NO<sub>x</sub> emission rate that can consistently be achieved when firing distillate oil. This lowest recommended rate shall include a reasonable operating margin, taking into account long term performance expectations and good operating and maintenance practices. The Department may revise the NO<sub>x</sub> emission rate based upon this report. [BACT determination]~~

The permittee shall develop a NO<sub>x</sub> reduction plan when the hours of oil firing reach the allowable limit of 750 hour per year equivalent hours. This plan shall include a testing protocol designed to establish the maximum water injection rate and the lowest NO<sub>x</sub> emissions possible without affecting the actual performance of the gas turbine. The testing protocol shall set a range of water injection rates and attempt to quantify the corresponding NO<sub>x</sub> emissions for each rate and noting any problems with performance. Based on the test results, the plan shall recommend a new NO<sub>x</sub> emissions limiting standard and shall be submitted to the Department's Bureau of Air Regulation and Compliance Authority for review. If the Department determines that a lower NO<sub>x</sub> emissions standard is warranted for oil firing, this permit shall be revised. [BACT Determination]

#### *Specific Condition No. 20*

*The CO limits in Condition 20 (page 9 of 13) should be stated in terms of "pounds per hour" only, using the ppm rate as the basis. In addition, the only vendor guarantee received to-date has CO limit of 15 ppmvd for gas and 33 ppmvd for oil; therefore, these rates should be used as*

*the basis.*

The requested limits are substantially higher than measured values for other F-Class installations. For example, the DLN 2.0 combustors on the FPL Martin Plant units emitted less than 5 ppmvd of CO. Similarly tests at the FPC Hines Energy Complex Westinghouse 501F units indicted less than 5 ppmvd of CO. General Electric literature clearly describes as one of its options a DLN 2.6 technology with emissions of 9 ppmvd of NO<sub>x</sub> and 9 ppmvd of CO. Although emissions on oil may be higher, they will still be low particularly because of the very high firing temperature for F-Class units.

The Department will set a limit of 15(gas)/33(oil) ppmvd during the first 12 months of operation after start up. Thereafter this limit will be revised and lowered to 12 (gas)/20 (oil) ppmvd. This condition is modified as follows:

During the first 12 months after initial start up, the concentration of CO in the stack exhaust gas shall exceed neither 15 ppmvd nor 48 lb/hr while firing gas (at ISO conditions) and neither 33 ppmvd nor 106 lb/hr while firing oil (at ISO conditions) based on stack test. Thereafter, these limits will be revised and lowered to 12 ppmvd and 38 lb/hr while firing gas (at ISO conditions) and 20 ppmvd and 65 lb/hr while firing oil (at ISO conditions). The permittee shall demonstrate compliance with these limits by stack test using EPA Method 10.

*Concentrations should be expressed as ppmvd for both gas and oil firing. Mass (lb/hr) limits should be referenced to ISO conditions.*

Concentrations will be expressed as ppmvd if they are not already expressed this way. Mass (lb/hr) limits will be referenced to ISO conditions.

Specific Condition No. 21

*The VOC limits in Condition 21 (page 9 of 13) should be stated in terms of "pounds per hour" only, using the ppmvw rate as the basis. Concentration should be expressed as ppmvw. Mass (lb/hr) limits should be referenced to ISO conditions.*

This condition will not be changed to lbs/hr with ppmvw as a basis, this rationale is already explained in Specific Condition No. 18. Concentrations will be expressed as ppmvw if they are not already expressed this way. Mass (lb/hr) limits will be referenced to ISO conditions.

Specific Condition No. 22

*SO<sub>2</sub> lb/hr limits should be referenced to ISO conditions.*

The Department agrees with TEC and made the change as requested.

*In Condition 23 (page 9 of 13) the words "operating with or without the duct burner and" should be removed, as it does not apply here. The opacity limit for oil firing should be 20 percent.*

The Department agrees with TEC and made the change as requested. TEC subsequently retracted its request and accepted the Department's 10 percent BACT limitation.

*In Condition 24 (page 9 of 13), the wording "Operation below 50% output shall be limited to 2 hours per unit cycle (breaker closed to breaker open)" is unclear and should be changed to "Operation below 50% output shall be limited to 2 hours per startup or shutdown".*

By agreement with TECO, the condition will remain as drafted.

*In Condition 26 (page 10 of 13) the wording "for greater than 2 hours in a 24-hour period" should be inserted after the word "malfunction" in the first sentence.*

The Department agrees with TEC and changed this condition as requested.

*"Condition No. 26" should read "Condition No. 36." Condition 40 seems to be the same (but uncompleted version) as Condition 41, and can be eliminated.*

The Department agrees with TEC and corrected No.26 to No.36. Additionally Specific Conditions 39, 40 and 41 are modified as follows:

39. Continuous Monitoring System: The permittee shall install, calibrate, maintain, and operate a continuous emission monitor in the stack to measure and record the nitrogen oxides emissions from each CT in accordance with the requirements of 40 CFR 75. ~~Periods when NO<sub>x</sub> emissions (ppmvd at 15% oxygen) are above the standards, listed in Specific Conditions No. 18 and 19, shall be provided to the DEP Southwest District Office within one working day (verbally) followed up by a written explanation not later than three (3) working days (alternately by facsimile).~~ Upon request from EPA or DEP, the CEMS emission rates for NO<sub>x</sub> on each CT shall be corrected to ISO conditions to demonstrate compliance with the NO<sub>x</sub> standard established in 40 CFR 60.332.

[Rules 62-4.130., 62-4.160(8), 62.210.700, 62-204.800 F.A.C., 40CFR75 and 40 CFR 60.7]

40. CEMS Excess Emissions Reports: ~~Subject to EPA approval the NO<sub>x</sub> CEMS shall be used in lieu of the water/fuel monitoring system for reporting excess emissions in accordance with 40 CFR 60.334(c)(1), Subpart GG (1998 version). Upon request from EPA or DEP, the CEMS emission rates for NO<sub>x</sub> on each CT shall be corrected to ISO conditions to demonstrate compliance with the NO<sub>x</sub> standard established in 40 CFR 60.332. [Rule 62-204.800 F.A.C., 40CFR75 and 40 CFR 60.7]~~ Excess Emissions and Monitoring System Performance Reports shall be submitted as specified in 40 CFR 60.7(c). CEM monitor downtime shall be calculated and reported according to the requirements of 40 CFR 60.7(c)(3) and 40 CFR 60.7(d)(2). Periods when NO<sub>x</sub> emissions (ppmvd at 15% oxygen) are above the standards, listed in Specific Conditions No. 18 and 19, shall be provided to the DEP Southwest District Office within one working day (verbally) followed up by a written explanation not later than three (3) working days (alternately by facsimile).

41. CEMS in lieu of Water to Fuel Ratio: The NO<sub>x</sub> CEMS shall be used in lieu of the water/fuel monitoring system for reporting excess emissions in accordance with 40 CFR 60.334(c)(1), Subpart GG (1998 version). The calibration of the water/fuel monitoring device required in 40 CFR 60.335(c) (2) (1998 version) will be replaced by the 40 CFR 75 certification tests of the NO<sub>x</sub> CEMS. ~~Upon request from EPA or DEP, the CEMS emission rates for NO<sub>x</sub> on each~~

~~CT shall be corrected to ISO conditions to demonstrate compliance with the NO<sub>x</sub> standard established in 40 CFR 60.332.~~

42. The title of this condition was change from Continuous Monitoring System Report to Continuous Monitoring Certification and Quality Assurance Requirements.

### **Appendix BD.**

*The BACT determination should be modified to reflect the changes referenced above, such as stating the proposed limits in terms of "pounds per hour" and removing the determination requiring a follow-up report on NO<sub>x</sub> limits while firing oil, for example*

BACT for combustion turbines are expressed in unit of the standard. This is ppmvd (corrected to 15% oxygen). The follow-up report requirements were revised as previously discussed.

*Although the SCR vendor specified a guarantee of 3 years, 5 years was conservatively used in the submitted permit application BACT cost-analysis; reference Page 5-16, Table 5-7 of the permit application.*

The Department acknowledges TEC comments and will delete the reference to the 3 year life guarantee.

*Basis for lower CO limits is the proposed Oleander project levels. GE needs to confirm that these lower limits are attainable.*

This comment was addressed above. The Department has reasonable assurance from GE and from test results for very similar units that the BACT limits for CO are easily attainable.

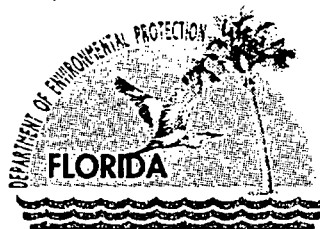
*FDEP lowers the oil-firing hours from 876 to 750 per year without any explanation for the decrease.*

EPA and the Fish and Wildlife Service have commented that the NO<sub>x</sub> BACT limit while firing natural gas should be 9 ppmvd (based on the Oleander BACT determination) and not 10.5 ppmvd as requested by JEA and TEC for the identical units. The Department has reduced hours on fuel oil to justify the 10.5 ppmvd value with limited fuel oil firing as BACT. The Department would increase the hours of fuel oil to 876 as requested by TEC (or to 1000 as allowed for Oleander), if TEC accepts the lower 9 ppmvd NO<sub>x</sub> limit on gas.

### **CONCLUSION**

The final action of the Department will be to issue the permit with the changes noted above.





# Department of Environmental Protection

Jeb Bush  
Governor

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

David B. Struhs  
Secretary

## PERMITTEE:

Tampa Electric Company (TEC)  
6944 U.S. Highway 41 North  
Apollo Beach, Florida 33572-9200

File No.	PSD-FL-263 (PA92-32)
FID No.	1050233
SIC No.	4911
Expires:	December 31, 2002

## Authorized Representative:

Gregory M. Nelson, Manager, Environmental Planning

## PROJECT AND LOCATION:

Permit pursuant to the requirements for the Prevention of Significant Deterioration of Air Quality (PSD Permit) for the construction of: two dual-fuel nominal 165 megawatt (MW) General Electric PG7241FA combustion turbine-electrical generators and two 114-foot stacks. The units will operate in simple cycle mode and intermittent duty. The units will be equipped with Dry Low NO<sub>x</sub> (DLN-2.6) combustors and wet injection capability. They are designated by TEC as CTGs Nos. 2 and 3 and by the Department as ARMS Emissions Units 009 and 010.

The project will be located at the existing Polk Power Station, 9995 State Route 37 South, Mulberry, Folk County. UTM coordinates are: Zone 17; 402.45 km E; 3067.35 km N.

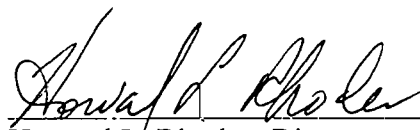
## STATEMENT OF BASIS:

This PSD permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.) and 40CFR52.21. The above named permittee is authorized to modify the facility in accordance with the conditions of this permit and as described in the application, approved drawings, plans, and other documents on file with the Department of Environmental Protection (Department).

Attached Appendices and Tables made a part of this permit:

Appendix BD  
Appendix GC

BACT Determination  
Construction Permit General Conditions

  
Howard L. Rhodes, Director  
Division of Air Resources  
Management

# PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-263

## SECTION I - FACILITY INFORMATION

### FACILITY DESCRIPTION

This facility presently generates electric power from a 260 megawatt (MW) integrated coal gasification and combined cycle turbine unit. The primary mover is a General Electric MS 7001F combustion turbine capable of firing syngas or No. 2 fuel oil. Associated support facilities include: a solid fuel gasification system; a hydrogen sulfide to sulfur dioxide converter; a sulfuric acid plant; solid fuel handling and storage; and fuel oil handling and storage.

This permitting action is to install two dual-fuel nominal 165 megawatt (MW) General Electric PG7241FA combustion turbine-electrical generators with two 114-foot stacks. The project will utilize existing infrastructure including oil storage and auxiliary equipment.

Emissions from the new units will be controlled by Dry Low NO<sub>x</sub> (DLN-2.6) combustors when operating on natural gas and wet injection when firing fuel oil. Inherently clean fuels and good combustion practices will be employed to control all pollutants.

### EMISSION UNITS

This permit addresses the following emission units:

ARMS EMISSIONS UNIT	SYSTEM	EMISSION UNIT DESCRIPTION
009 (CTG-2)	Power Generation	One nominal 165 Megawatt Gas Simple Cycle Combustion Turbine-Electrical Generator
010 (CTG-3)	Power Generation	One nominal 165 Megawatt Simple Cycle Gas Combustion Turbine-Electrical Generator

### REGULATORY CLASSIFICATION

The facility is classified as a Major or Title V Source of air pollution because emissions of at least one regulated air pollutant, such as particulate matter (PM/PM<sub>10</sub>), sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), or volatile organic compounds (VOC) exceeds 100 tons per year (TPY).

This facility is within an industry included in the list of the 28 Major Facility Categories per Table 212.400-1, F.A.C. Because emissions are greater than 100 TPY for at least one criteria pollutant, the facility is also a Major Facility with respect to Rule 62-212.400, Prevention of Significant Deterioration (PSD). Pursuant to Table 62-212.400-2, modifications at this facility resulting in emissions increases greater than any of the following values require review per the PSD rules as well as a determination of Best Available Control Technology (BACT): 40 TPY of NO<sub>x</sub>, SO<sub>2</sub>, or VOC; 25/15 TPY of PM/PM<sub>10</sub>; 100 TPY of CO; or 7 TPY of sulfuric acid mist (SAM).

This project is subject to certain requirements of Chapter 403, Part II, F.S., Electric Power Plant and Transmission Line Siting, including a modification of the Conditions of Certification (reference Site Certification PA92-32).

# PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-263

## SECTION I - FACILITY INFORMATION

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This facility and the project are also subject to applicable provisions of Title IV, Acid Rain, of the Clean Air Act..

### PERMIT SCHEDULE

- xx/xx/99 Modification of Conditions of Certification Approved.
- 07/10/99 Notice of Intent to Issue PSD Permit published in the Lakeland Ledger.
- 06/30/99 Distributed Intent to Issue Permit.
- 06/10/99 Application deemed complete for PSD review.
- 02/08/99 Received revised PSD Application.

### RELEVANT DOCUMENTS:

The documents listed below are the basis of the permit. They are specifically related to this permitting action, but not all are incorporated into this permit. These documents are on file with the Department.

- Application received on February 8, 1999
- Department/ Siting Coordination Office incompleteness letter dated February 11, 1999
- Department/BAR memo to Siting Coordination Office dated March 9, 1999
- Comments and letter from the U. S. Fish and Wildlife Service dated March 19, 1999
- Site Certification and Revised PSD Application received May 10, 1999
- Department/BAR comments on Modeling dated May 20, 1999
- Comments from Hillsborough County EPC dated June 7, 1999
- Response from TEC/ECT received June 10, 1999
- Department's Intent to Issue PSD Permit and Public Notice Package dated June 30, 1999
- Department's Final Determination and Best Available Control Technology Determination issued concurrently with this Final Permit.
- Comments from TEC dated August 9, September 10, and 14, 1999.

# PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-263

## SECTION II - ADMINISTRATIVE REQUIREMENTS

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### GENERAL AND ADMINISTRATIVE REQUIREMENTS

1. Regulating Agencies: All documents related to applications for permits to construct, operate or modify an emissions unit should be submitted to the Bureau of Air Regulation (BAR), Florida Department of Environmental Protection (FDEP), at 2600 Blirstone Road, Tallahassee, Florida 32399-2400 and phone number (850)488-0114. All documents related to reports, tests, and notifications should be submitted to the DEP Southwest District, 3804 Coconut Palm Drive, Tampa, Fl 33619-8218 and phone number 813/744-6100.
2. General Conditions: The owner and operator is subject to and shall operate under the attached General Permit Conditions G.1 through G.15 listed in Appendix GC of this permit. General Permit Conditions are binding and enforceable pursuant to Chapter 403 of the Florida Statutes. [Rule 62-4.160, F.A.C.]
3. Terminology: The terms used in this permit have specific meanings as defined in the corresponding chapters of the Florida Administrative Code.
4. Forms and Application Procedures: The permittee shall use the applicable forms listed in Rule 62-210.900, F.A.C. and follow the application procedures in Chapter 62-4, F.A.C. [Rule 62-210.900, F.A.C.]
5. Modifications: The permittee shall give written notification to the Department when there is any modification to this facility. This notice shall be submitted sufficiently in advance of any critical date involved to allow sufficient time for review, discussion, and revision of plans, if necessary. Such notice shall include, but not be limited to, information describing the precise nature of the change; modifications to any emission control system; production capacity of the facility before and after the change; and the anticipated completion date of the change. [Chapters 62-210 and 62-212, F.A.C.]
6. Expiration: Approval to construct shall become invalid if construction is not commenced within 18 months after receipt of such approval, or if construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable time. The Department may extend the 18-month period upon a satisfactory showing that an extension is justified. [40 CFR 52.21(r)(2)]
7. BACT Determination: In conjunction with extension of the 18 month periods to commence or continue construction, or extension of the December 31, 2002 permit expiration date, the permittee may be required to demonstrate the adequacy of any previous determination of best available control technology for the source. In accordance with paragraph (4) of 40 CFR 52.21(j) the Best Available Control Technology (BACT) determination shall be reviewed and modified as appropriate in the event of a plant conversion. This paragraph states: "For phased construction project, the determination of best available control technology shall be reviewed and modified as appropriate at the latest reasonable time which occurs no later than 18 months prior to commencement of construction of each independent phase of the project. At such time, the owner or operator of the applicable stationary source may be required to demonstrate

## PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-263

### SECTION II - ADMINISTRATIVE REQUIREMENTS

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the adequacy of any previous determination of best available control technology for the source.” [40 CFR 52.21(j)(4), Rule 62-4.070 F.A.C.]

8. Permit Extension: The permittee, for good cause, may request that this PSD permit be extended. Such a request shall be submitted to the Bureau of Air Regulation prior to 60 days before the expiration of the permit (Rule 62-4.080, F.A.C.).
9. Application for Title IV Permit: An application for a Title IV Acid Rain Permit, must be submitted to the U.S. Environmental Protection Agency Region IV office in Atlanta, Georgia and a copy to the DEP’s Bureau of Air Regulation in Tallahassee 24 months before the date on which a new unit begins serving an electrical generator greater than 25 MW. [40 CFR 72]
10. Application for Title V Permit: An application for a Title V operating permit, pursuant to Chapter 62-213, F.A.C., must be submitted to the DEP’s Bureau of Air Regulation, and a copy to the Department’s Southwest District. [Chapter 62-213, F.A.C.]
11. New or Additional Conditions: Pursuant to Rule 62-4.080, F.A.C., for good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions, and on application of the permittee, the Department may grant additional time. [Rule 62-4.080, F.A.C.]
12. Annual Reports: Pursuant to Rule 62-210.370(2), F.A.C., Annual Operation Reports, the permittee is required to submit annual reports on the actual operating rates and emissions from this facility. Annual operating reports shall be sent to the DEP’s Southwest District by March 1st of each year.
13. Stack Testing Facilities: Stack sampling facilities shall be installed in accordance with Rule 62-297.310(6), F.A.C.
14. Quarterly Reports: Quarterly excess emission reports, in accordance with 40 CFR 60.7 (a)(7) (c) (1998 version), shall be submitted to the DEP’s Southwest District.

## PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-263

### SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

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#### APPLICABLE STANDARDS AND REGULATIONS:

1. Unless otherwise indicated in this permit, the construction and operation of the subject emission unit(s) shall be in accordance with the capacities and specifications stated in the application. The facility is subject to all applicable provisions of Chapter 403, F.S. and Florida Administrative Code Chapters 62-4, 62-17, 62-204, 62-210, 62-212, 62-213, 62-214, 62-296, and 62-297; and the applicable requirements of the Code of Federal Regulations Section 40, Parts 52, 60, 72, 73, and 75.
2. Issuance of this permit does not relieve the facility owner or operator from compliance with any applicable federal, state, or local permitting requirements or regulations. [Rule 62-210.300, F.A.C.]
3. These emission units shall comply with all applicable requirements of 40CFR60, Subpart A, General Provisions including:
  - 40CFR60.7, Notification and Recordkeeping
  - 40CFR60.8, Performance Tests
  - 40CFR60.11, Compliance with Standards and Maintenance Requirements
  - 40CFR60.12, Circumvention
  - 40CFR60.13, Monitoring Requirements
  - 40CFR60.19, General Notification and Reporting requirements
4. ARMS Emissions Unit 009. Direct Power Generation, consisting of a nominal 165 megawatt simple cycle combustion turbine-electrical generator, shall comply with all applicable provisions of 40CFR60, Subpart GG, Standards of Performance for Stationary Gas Turbines, adopted by reference in Rule 62-204.800(7)(b), F.A.C. The Subpart GG requirement to correct test data to ISO conditions applies. However, such correction is not used for compliance determinations with the BACT standard(s).
5. ARMS Emissions Unit 010. Direct Power Generation, consisting of a nominal 165 megawatt simple cycle combustion turbine-electrical generator, shall comply with all applicable provisions of 40CFR60, Subpart GG, Standards of Performance for Stationary Gas Turbines, adopted by reference in Rule 62-204.800(7)(b), F.A.C. The Subpart GG requirement to correct test data to ISO conditions applies. However, such correction is not used for compliance determinations with the BACT standard(s).
6. All notifications and reports required by the above specific conditions shall be submitted to the DEP's Southwest District.

#### GENERAL OPERATION REQUIREMENTS

7. Fuels: Only pipeline natural gas or maximum 0.05 percent sulfur fuel oil No. 2 or superior grade of distillate fuel oil shall be fired in this unit. [Applicant Request, Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)] {Note: The limitation of this specific condition is more stringent than the NSPS sulfur dioxide limitation and thus assures compliance with 40 CFR 60.333 and 60.334}

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8. Combustion Turbine Capacity: The maximum heat input rates, based on the lower heating value (LHV) of each fuel to each unit at ambient conditions of 59°F temperature, 60% relative humidity, 100% load, and 14.7 psi pressure shall not exceed 1,600 million Btu per hour (mmBtu/hr) when firing natural gas, nor 1,800 mmBtu/hr when firing No. 2 or superior grade of distillate fuel oil. These maximum heat input rates will vary depending upon ambient conditions and the combustion turbine characteristics. Manufacturer's curves corrected for site conditions or equations for correction to other ambient conditions shall be provided to the Department of Environmental Protection (DEP) within 45 days of completing the initial compliance testing. [Design, Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]
9. Unconfined Particulate Emissions: During the construction period, unconfined particulate matter emissions shall be minimized by dust suppressing techniques such as covering and/or application of water or chemicals to the affected areas, as necessary.
10. Plant Operation - Problems: If temporarily unable to comply with any of the conditions of the permit due to breakdown of equipment or destruction by fire, wind or other cause, the owner or operator shall notify the DEP Southwest District as soon as possible, but at least within (1) working day, excluding weekends and holidays. The notification shall include: pertinent information as to the cause of the problem; the steps being taken to correct the problem and prevent future recurrence; and where applicable, the owner's intent toward reconstruction of destroyed facilities. Such notification does not release the permittee from any liability for failure to comply with the conditions of this permit and the regulations. [Rule 62-4.130, F.A.C.]
11. Operating Procedures: Operating procedures shall include good operating practices and proper training of all operators and supervisors. The good operating practices shall meet the guidelines and procedures as established by the equipment manufacturers. All operators (including supervisors) of air pollution control devices shall be properly trained in plant specific equipment. [Rule 62-4.070(3), F.A.C.]
12. Circumvention: The owner or operator shall not circumvent the air pollution control equipment or allow the emission of air pollutants without this equipment operating properly. [Rules 62-210.650, F.A.C.]
13. Maximum allowable hours of operation for each unit are 4,380 hours per year on natural gas and 750 hours per year on fuel oil. [Rule 62-210.200, F.A.C., (Definitions - Potential Emissions), 62-212.400, F.A.C., (BACT Determination)]

### CONTROL TECHNOLOGY

14. Dry Low NO<sub>x</sub> (DLN) combustors shall be installed on the stationary combustion turbine to comply with the NO<sub>x</sub> emissions limits while firing natural gas. [Design, Rules 62-4.070 and 62-212.400, F.A.C. (BACT Determination)]
15. A water injection system shall be installed for use when firing No. 2 or superior grade distillate fuel oil for control of NO<sub>x</sub> emissions. [Design, Rules 62-4.070 and 62-212.400, F.A.C.]

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## SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

16. The permittee shall design these units to accommodate adequate testing and sampling locations for compliance with the applicable emission limits (per each unit) listed in Specific Conditions No. 19 through 24. [Rule 62-4.070, Rule 62-204.800, F.A.C., and 40 CFR 60.40a(b)]
17. The permittee shall provide manufacturer's emissions performance versus load diagrams for the DLN and wet injection systems prior to their installation. DLN systems shall each be tuned upon initial operation to optimize emissions reductions consistent with normal operation and maintenance practices and shall be maintained to minimize NO<sub>x</sub> emissions and CO emissions, consistent with normal operation and maintenance practices. Operation of the DLN systems in the diffusion-firing mode shall be minimized when firing natural gas. [Rule 62-4.070, and 62-210.650, F.A.C.]

### EMISSION LIMITS AND STANDARDS

18. Following is a summary of the emission limits and required technology. Values for NO<sub>x</sub> are corrected to 15 % O<sub>2</sub> on a dry basis. These limits or their equivalent in terms of lb/hr or NSPS units, as well as the applicable averaging times, are followed by the applicable specific conditions [Rules 62-212.400, 62-204.800(7)(b) (Subpart GG), 62-210.200 (Definitions-Potential Emissions) F.A.C.]

POLLUTANT	CONTROL TECHNOLOGY	EMISSION LIMIT
PM/PM <sub>10</sub> , VE	Pipeline Natural Gas Good Combustion	10 Percent Opacity (gas or oil)
VOC	As Above	1.4 ppmvw (Gas) 3.5 ppmvw (FO)
CO	As Above	12 ppmvd (Gas) 20 ppmvd (FO)
SO <sub>2</sub> and Sulfuric Acid Mist	Pipeline Natural Gas Low Sulfur Oil	2 gr S/100 ft <sup>3</sup> 0.05% S Fuel Oil
NO <sub>x</sub>	DLN, WI for F.O., limited fuel oil usage	10.5 ppmvd (DLN) 42 ppmvd (FO)

### 19. Nitrogen Oxides (NO<sub>x</sub>) Emissions:

- While firing Natural Gas: The emission rate of NO<sub>x</sub> in the exhaust gas shall not exceed 10.5 ppm @15% O<sub>2</sub> on a 24 hr block average as measured by the continuous emission monitoring system (CEMS). In addition, NO<sub>x</sub> emissions calculated as NO<sub>2</sub> shall not exceed 59 pounds per hour (at ISO conditions) and 9 ppmvd @15% O<sub>2</sub> to be demonstrated by the initial "new and clean" GE performance stack test. [Rule 62-212.400, F.A.C.]

Notwithstanding the applicable NO<sub>x</sub> limit during normal operation, reasonable measures shall be implemented to maintain the concentration of NO<sub>x</sub> in the exhaust gas at 9 ppmvd at 15% O<sub>2</sub> or lower. Any tuning of the combustors for Dry Low NO<sub>x</sub> operation while firing gas shall result in initial subsequent NO<sub>x</sub> concentrations of 9 ppmvd @15% O<sub>2</sub> or lower. [Rules 62-212.400 and 62-4.070, F.A.C.]



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- While firing Fuel oil: The concentration of NO<sub>x</sub> in the exhaust gas shall not exceed 42 ppmvd at 15% O<sub>2</sub> on the basis of a 3-hr average as measured by the continuous emission monitoring system (CEMS). In addition, NO<sub>x</sub> emissions calculated as NO<sub>2</sub> shall not exceed 319 lb/hr (at ISO conditions) and 42 ppmvd @15% O<sub>2</sub> to be demonstrated by stack test. [Rule 62-212.400, F.A.C.]

The permittee shall develop a NO<sub>x</sub> reduction plan when the hours of oil firing reach the allowable limit of 750 hours per year. This plan shall include a testing protocol designed to establish the maximum water injection rate and the lowest NO<sub>x</sub> emissions possible without affecting the actual performance of the gas turbine. The testing protocol shall set a range of water injection rates and attempt to quantify the corresponding NO<sub>x</sub> emissions for each rate and noting any problems with performance. Based on the test results, the plan shall recommend a new NO<sub>x</sub> emissions limiting standard and shall be submitted to the Department's Bureau of Air Regulation and Compliance Authority for review. If the Department determines that a lower NO<sub>x</sub> emissions standard is warranted for oil firing, this permit shall be revised. (BACT Determination).

20. Carbon Monoxide (CO) Emissions: During the first 12 months after initial start up, the concentration of CO in the stack exhaust gas shall exceed neither 15 ppmvd nor 48 lb/hr (at ISO conditions) while firing gas and neither 33 ppmvd nor 106 lb/hr (at ISO conditions) while firing oil based on stack test. Thereafter, these limits will be revised and lowered to 12 ppmvd and 38 lb/hr (at ISO conditions) while firing gas and 20 ppmvd and 65 lb/hr (at ISO conditions). The permittee shall demonstrate compliance with these limits by stack test using EPA Method 10. [Rule 62-212.400, F.A.C.]
21. Volatile Organic Compounds (VOC) Emissions: The concentration of VOC in the stack exhaust gas with the combustion turbine operating on natural gas shall exceed neither 1.4 ppmvw nor 2.8 lb/hr (ISO conditions) and neither 3.5 ppmvw nor 7 lb/hr (ISO conditions) while operating on oil to be demonstrated by initial stack test using EPA Method 18, 25 or 25A. [Applicant Request]
22. Sulfur Dioxide (SO<sub>2</sub>) emissions: SO<sub>2</sub> emissions shall be limited by firing pipeline natural gas (sulfur content less than 2 grains per 100 standard cubic foot) or by firing No. 2 or superior grade distillate fuel oil with a maximum 0.05 percent sulfur for 750 hours per year per unit. Emissions of SO<sub>2</sub> (at ISO conditions) shall not exceed 9.2 lb/hr (natural gas) and 98.1 lb/hr (fuel oil) as measured by applicable compliance methods described below. [40CFR60 Subpart GG and Rules 62-4.070, 62-212.400, and 62-204.800(7), F.A.C]
23. Visible Emissions (VE): VE emissions shall serve as a surrogate for PM/PM10 emissions and shall not exceed 10 opacity. Rules 62-4.070, 62-212.400, and 62-204.800(7), F.A.C.]

#### EXCESS EMISSIONS

24. Excess emissions resulting from startup, shutdown, or malfunction shall be permitted provided that best operational practices are adhered to and the duration of excess emissions shall be minimized. Excess emissions occurrences shall in no case exceed two hours in any 24-hour

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### SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

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period for other reasons unless specifically authorized by DEP for longer duration. Operation below 50% output shall be limited to 2 hours per unit cycle (breaker closed to breaker open).

25. Excess emissions entirely or in part by poor maintenance, poor operation, or any other equipment or process failure that may reasonably be prevented during startup, shutdown or malfunction, shall be prohibited pursuant to Rule 62-210.700, F.A.C. These emissions shall be included in the 24-hr average for NO<sub>x</sub>.
26. Excess Emissions Report: If excess emissions occur due to malfunction (for greater than 2 hours in a 24-hr period), the owner or operator shall notify DEP's Southwest District within (1) working day of: the nature, extent, and duration of the excess emissions; the cause of the excess emissions; and the actions taken to correct the problem. In addition, the Department may request a written summary report of the incident. Following the NSPS format, 40 CFR 60.7 Subpart A, periods of startup, shutdown, malfunction, shall be monitored, recorded, and reported as excess emissions when emission levels exceed the permitted standards listed in Specific Condition No. 18 and 19. [Rules 62-4.130, 62-204.800, 62-210.700(6), F.A.C., and 40 CFR 60.7 (1998 version)].

### COMPLIANCE DETERMINATION

27. Compliance with the allowable emission limiting standards shall be determined within 60 days after achieving the maximum production rate, but not later than 180 days of initial operation of the unit, and annually thereafter as indicated in this permit, by using the following reference methods as described in 40 CFR 60, Appendix A (1998 version), and adopted by reference in Chapter 62-204.800, F.A.C.
28. Initial (I) performance tests (for both fuels) shall be performed on each unit while firing natural gas as well as while firing oil. Initial tests shall also be conducted after any modifications (and shake down period not to exceed 100 days after re-starting the CT) of air pollution control equipment such as change or tuning of combustors. Annual (A) compliance tests shall be performed during every federal fiscal year (October 1 - September 30) pursuant to Rule 62-297.310(7), F.A.C., on each unit as indicated. The following reference methods shall be used. No other test methods may be used for compliance testing unless prior DEP approval is received in writing.
- EPA Reference Method 9, "Visual Determination of the Opacity of Emissions from Stationary Sources" (I, A).
  - EPA Reference Method 10, "Determination of Carbon Monoxide Emissions from Stationary Sources" (I, A).
  - EPA Reference Method 20, "Determination of Oxides of Nitrogen Oxide, Sulfur Dioxide and Diluent Emissions from Stationary Gas Turbines." Initial test only for compliance with 40CFR60 Subpart GG and (I, A) short-term NO<sub>x</sub> BACT limits (EPA reference Method 7E, "Determination of Nitrogen Oxides Emissions from Stationary Sources" or RATA test data may be used to demonstrate compliance for annual test requirements).

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- EPA Reference Method 18, 25 and/or 25A, "Determination of Volatile Organic Concentrations." Initial test only.
29. Continuous compliance with the NO<sub>x</sub> emission limits: Continuous compliance with the NO<sub>x</sub> emission limits shall be demonstrated with the CEM system based on the applicable averaging time of 24-hr block average (DLN). Based on CEMS data, a separate compliance determination is conducted at the end of each operating day and a new average emission rate is calculated from the arithmetic average of all valid hourly emission rates from the previous operating day. A valid hourly emission rate shall be calculated for each hour in which at least two NO<sub>x</sub> concentrations are obtained at least 15 minutes apart. Valid hourly emission rates shall not include periods of start up, shutdown, or malfunction unless prohibited by 62-210.700 F.A.C. These excess emissions periods shall be reported as required in Conditions 25 and 26. [Rules 62-4.070 F.A.C., 62-210.700, F.A.C., 40 CFR 75 and BACT]
- All continuous monitoring systems (CEMS) shall be in continuous operation except for breakdowns, repairs, calibration checks, and zero and span adjustments. These CEMS shall meet minimum frequency of operation requirements: one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period. Data recorded during periods of continuous monitoring system breakdowns, repairs, calibration checks, and zero and span adjustments shall not be included in the data average. [40CFR60.13]
30. Compliance with the SO<sub>2</sub> and PM/PM<sub>10</sub> emission limits: Notwithstanding the requirements of Rule 62-297.340, F.A.C., the use of pipeline natural gas, is the method for determining compliance for SO<sub>2</sub> and PM<sub>10</sub>. For the purposes of demonstrating compliance with the 40 CFR 60.333 SO<sub>2</sub> standard, ASTM methods D4084-82 or D3246-81 (or equivalent) for sulfur content of gaseous fuel shall be utilized in accordance with the EPA-approved custom fuel monitoring schedule or natural gas supplier data may be submitted or the natural gas sulfur content referenced in 40 CFR 75 Appendix D may be utilized. However, the applicant is responsible for ensuring that the procedures in 40 CFR 60.335 or 40 CFR 75 are used when determination of fuel sulfur content is made. Analysis may be performed by the owner or operator, a service contractor retained by the owner or operator, the fuel vendor, or any other qualified agency pursuant to 40 CFR 60.335(e) (1998 version).
31. Compliance with CO emission limit: An initial test for CO shall be conducted concurrently with the initial NO<sub>x</sub> test, as required. The initial NO<sub>x</sub> and CO test results shall be the average of three valid one-hour runs. Annual compliance testing for CO may be conducted at less than capacity when compliance testing is conducted concurrent with the annual RATA testing for the NO<sub>x</sub> CEMS required pursuant to 40 CFR 75
32. Compliance with the VOC emission limit: An initial test is required to demonstrate compliance with the VOC emission limit. Thereafter, the CO emission limit and periodic tuning data will be employed as surrogate and no annual testing is required.
33. Testing procedures: Testing of emissions shall be conducted with the combustion turbine operating at permitted capacity. Permitted capacity is defined as 90-100 percent of the maximum

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### SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

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heat input rate allowed by the permit, corrected for the average ambient air temperature during the test (with 100 percent represented by a curve depicting heat input vs. ambient temperature). If it is impracticable to test at permitted capacity, the source may be tested at less than permitted capacity. In this case, subsequent operation is limited by adjusting the entire heat input vs. ambient temperature curve downward by an increment equal to the difference between the maximum permitted heat input (corrected for ambient temperature) and 110 percent of the value reached during the test until a new test is conducted. Once the unit is so limited, operation at higher capacities is allowed for no more than 15 consecutive days for the purposes of additional compliance testing to regain the permitted capacity. Procedures for these tests shall meet all applicable requirements (i.e., testing time frequency, minimum compliance duration, etc.) of Chapters 62-204 and 62-297, F.A.C.

34. Test Notification: The DEP's Southwest District shall be notified, in writing, at least 30 days prior to the initial performance tests and at least 15 days before annual compliance test(s).
35. Special Compliance Tests: The DEP may request a special compliance test pursuant to Rule 62-297.310(7), F.A.C., when, after investigation (such as complaints, increased visible emissions, or questionable maintenance of control equipment), there is reason to believe that any applicable emission standard is being violated.
36. Test Results: Compliance test results shall be submitted to the DEP's Southwest District no later than 45 days after completion of the last test run. [Rule 62-297.310(8), F.A.C.].

#### NOTIFICATION, REPORTING, AND RECORDKEEPING

37. Records: All measurements, records, and other data required to be maintained by TEC shall be recorded in a permanent form and retained for at least five (5) years following the date on which such measurements, records, or data are recorded. These records shall be made available to DEP representatives upon request.
38. Compliance Test Reports: A test report indicating the results of the required compliance tests shall be filed as per Condition No.36 above. The test report shall provide sufficient detail on the tested emission unit and the procedures used to allow the Department to determine if the test was properly conducted and if the test results were properly computed. At a minimum, the test report shall provide the applicable information listed in Rule 62-297.310(8), F.A.C.

#### MONITORING REQUIREMENTS

39. Continuous Monitoring System: The permittee shall install, calibrate, maintain, and operate a continuous emission monitor in the stack to measure and record the nitrogen oxides emissions from these units. Upon request from EPA or DEP, the CEMS emission rates for NO<sub>x</sub> on these Units shall be corrected to ISO conditions to demonstrate compliance with the NO<sub>x</sub> standard established in 40 CFR 60.332. [Rules 62-204.800, 62-210.700, 62-4.130, 62-4.160(8), F.A.C., 40 CFR 75 and 40 CFR 60.7 (1998 version)].
40. CEMS for reporting excess emissions: Excess Emissions and Monitoring System Performance Reports shall be submitted as specified in 40 CFR 60.7(c). CEM monitor downtime shall be

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### SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

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calculated and reported according to the requirements of 40 CFR 60.7(c)(3) and 40CFR 60.7(d)(2). Periods when NO<sub>x</sub> emissions (ppmvd @ 15% oxygen) are above the BACT standards, listed in Specific Conditions No 18 and 19, shall be reported to the DEP Southwest District within one working day (verbally) followed up by a written explanation not later than three (3) working days (alternatively by facsimile within one working day).

41. CEMS in lieu of Water to Fuel Ratio: The NO<sub>x</sub> CEMS shall be used in lieu of the water/fuel monitoring system for reporting excess emissions in accordance with 40 CFR 60.334(c)(1), Subpart GG (1998 version). The calibration of the water/fuel monitoring device required in 40 CFR 60.335 (c)(2) (1998 version) will be replaced by the 40 CFR 75 certification tests of the NO<sub>x</sub> CEMS
42. Continuous Monitoring Certification and Quality Assurance Requirements: The monitoring devices shall comply with the certification and quality assurance, and any other applicable requirements of Rule 62-297.520, F.A.C., 40 CFR 60.13, including certification of each device in accordance with 40 CFR 60, Appendix B, Performance Specifications and 40 CFR 60.7(a)(5) or 40 CFR Part 75. Quality assurance procedures must conform to all applicable sections of 40 CFR 60, Appendix F or 40CFR75. The monitoring plan, consisting of data on CEM equipment specifications, manufacturer, type, calibration and maintenance needs, and its proposed location shall be provided to the DEP Emissions Monitoring Section Administrator and EPA for review no later than 45 days prior to the first scheduled certification test pursuant to 40 CFR 75.62.
43. Natural Gas Monitoring Schedule: A custom fuel monitoring schedule pursuant to 40 CFR 75 Appendix D for natural gas may be used in lieu of the daily sampling requirements of 40 CFR 60.334 (b)(2) provided the following requirements are met:
  - The permittee shall apply for an Acid Rain permit within the deadlines specified in 40 CFR 72.30.
  - The permittee shall submit a monitoring plan, certified by signature of the Designated Representative, that commits to using a primary fuel of pipeline supplied natural gas (sulfur content less than 20 gr/100 scf pursuant to 40 CFR 75.11(d)(2)).
  - Each unit shall be monitored for SO<sub>2</sub> emissions using methods consistent with the requirements of 40 CFR 75 and certified by the USEPA.

This custom fuel monitoring schedule will only be valid when pipeline natural gas is used as a primary fuel. If the primary fuel for these units is changed to a higher sulfur fuel, SO<sub>2</sub> emissions must be accounted for as required pursuant to 40 CFR 75.11(d).

44. Fuel Oil Monitoring Schedule: The following monitoring schedule for No. 2 or superior grade fuel oil shall be followed: For all bulk shipments of No. 2 fuel oil received at this facility an analysis which reports the sulfur content and nitrogen content of the fuel shall be provided by the fuel vendor. The analysis shall also specify the methods by which the analyses were conducted and shall comply with the requirements of 40 CFR 60.335(d).

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### SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

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#### 45. Determination of Process Variables:

- The permittee shall operate and maintain equipment and/or instruments necessary to determine process variables, such as process weight input or heat input, when such data is needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.
- Equipment and/or instruments used to directly or indirectly determine such process variables, including devices such as belt scales, weigh hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value [Rule 62-297.310(5), F.A.C]

**APPENDIX GC**  
GENERAL PERMIT CONDITIONS [F.A.C. 62-4.160]

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- G.1 The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.
- G.2 This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings or exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.
- G.3 As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey and vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.
- G.4 This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.
- G.5 This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.
- G.6 The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.
- G.7 The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:
- a) Have access to and copy and records that must be kept under the conditions of the permit;
  - b) Inspect the facility, equipment, practices, or operations regulated or required under this permit, and,
  - c) Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.
- Reasonable time may depend on the nature of the concern being investigated.
- G.8 If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:
- a) A description of and cause of non-compliance; and
  - b) The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

**APPENDIX GC**  
GENERAL PERMIT CONDITIONS [F.A.C. 62-4.160]

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

- G.9 In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.
- G.10 The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.
- G.11 This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 62-4.120 and 62-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.
- G.12 This permit or a copy thereof shall be kept at the work site of the permitted activity.
- G.13 This permit also constitutes:
- a) Determination of Best Available Control Technology (X)
  - b) Determination of Prevention of Significant Deterioration (X); and
  - c) Compliance with New Source Performance Standards (X).
- G.14 The permittee shall comply with the following:
- a) Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.
  - b) The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application or this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.
  - c) Records of monitoring information shall include:
    - 1. The date, exact place, and time of sampling or measurements;
    - 2. The person responsible for performing the sampling or measurements;
    - 3. The dates analyses were performed;
    - 4. The person responsible for performing the analyses;
    - 5. The analytical techniques or methods used; and
    - 6. The results of such analyses.
- G.15 When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.



**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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**Polk Power Station Combustion Turbine Project**  
**Tampa Electric Company**  
**PSD-FL-263 and PA92-33**  
**Polk County, Florida**

**BACKGROUND**

The applicant, Tampa Electric Company (TEC), proposes to install two nominal 165 megawatt (MW) General Electric PG 7241 FA combustion turbine-electrical generators at the existing Polk Power Station, located at 9995 State Road 37 South, Polk County. The proposed project will result in "significant increases" with respect to Table 62-212.400-2, Florida Administrative Code (F.A.C.) of emissions of particulate matter (PM and PM<sub>10</sub>), carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), and sulfuric acid mist (SAM). The project is therefore subject to review for the Prevention of Significant Deterioration (PSD) and a determination of Best Available Control Technology (BACT) in accordance with Rules 62-212.400, F.A.C.

The new units will operate in simple cycle mode and intermittent duty and exhaust through separate 114-foot stacks. TEC proposes to operate these units up to 4380 hours on natural gas and 876 hours on maximum 0.05 percent sulfur distillate fuel oil. Descriptions of the process, project, air quality effects, and rule applicability are given in the Technical Evaluation and Preliminary Determination dated June 30, 1999, accompanying the Department's Intent to Issue.

**DATE OF RECEIPT OF A BACT APPLICATION:**

The application was received on February 8, 1999 and included a proposed BACT proposal prepared by the applicant's consultant, Environmental Consulting & Technology (ECT). A revised application and BACT proposal were received on May 10, 1999.

**REVIEW GROUP MEMBERS:**

A. A. Linero, P.E. and Teresa Heron, Permit Engineer

**BACT DETERMINATION REQUESTED BY THE APPLICANT**

POLLUTANT	CONTROL TECHNOLOGY	PROPOSED BACT LIMIT
Nitrogen Oxides	Dry Low NO <sub>x</sub> Combustors Water Injection (Oil)	10.5 ppmvd @ 15% O <sub>2</sub> (gas) 42 ppmvd @ 15% O <sub>2</sub> (oil)
Particulate Matter	Pipeline Natural Gas No. 2 Distillate Oil (876 hr/yr) Combustion Controls	10% Opacity
Carbon Monoxide	As Above	15 ppm (gas, baseload) 33 ppm (oil baseload)
Sulfur Dioxide	As Above	2 gr S/100 scf of natural gas 0.05% S in fuel oil
Sulfuric Acid Mist	As Above	2 gr S/100 scf of natural gas 0.05% S in fuel oil

According to the application, the total maximum annualized emissions from the new units will be approximately 581 tons per year (TPY) of NO<sub>x</sub>, 303 TPY of CO, 54 TPY of PM/PM<sub>10</sub>, 126 TPY of SO<sub>2</sub>, 18 TPY of VOC, and 15 TPY of SAM.

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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**BACT DETERMINATION PROCEDURE:**

In accordance with Chapter 62-212, F.A.C., this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department of Environmental Protection (Department), on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that, in making the BACT determination, the Department shall give consideration to:

- Any Environmental Protection Agency determination of BACT pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 - Standards of Performance for New Stationary Sources or 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants.
- All scientific, engineering, and technical material and other information available to the Department.
- The emission limiting standards or BACT determination of any other state.
- The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine, for the emission unit in question, the most stringent control available for a similar or identical emission unit or emission unit category. If it is shown that this level of control is technically or economically unfeasible for the emission unit in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

**STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES:**

The minimum basis for a BACT determination is 40 CFR 60, Subpart GG, Standards of Performance for Stationary Gas Turbines (NSPS). The Department adopted subpart GG by reference in Rule 62-204.800, F.A.C. The key emission limits required by Subpart GG are 75 ppmvd NO<sub>x</sub> @ 15% O<sub>2</sub> (assuming 25 percent efficiency) and 150 ppm SO<sub>2</sub> @ 15% O<sub>2</sub> (or <0.8% sulfur in fuel). The BACT proposed by the TEC is within the NSPS limit, which allows NO<sub>x</sub> emissions, over 110 ppmvd for the high efficiency unit to be purchased for the Polk Power Station. No National Emission Standard for Hazardous Air Pollutants exists for stationary gas turbines.

**DETERMINATIONS BY EPA AND STATES:**

The following table is based primarily on "F" Class intermittent-duty simple cycle turbines recently permitted or still under review. One project (PREPA) based on smaller units but permitted to operate continuously is included as an example of a simple cycle unit with add-on control equipment. Another continuous-duty project (Lakeland) based on the larger "G" Class is also included. The proposed TEC project is included to facilitate comparison.

VOC determinations are included. However the TEC project does not trigger PSD and a BACT determination is not required for this pollutant.

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

Project Location	Power Output and Duty	NO <sub>x</sub> Limit ppmvd @ 15% O <sub>2</sub> and Fuel	Technology	Comments
Lakeland, FL	250 MW SC CON	9/9 - NG (by 2002) 42/15 - No. 2 FO	DLN/HSCR WI/HSCR	250 MW WH 501G CT Initially 25 ppm NO <sub>x</sub> limit on gas Issued 7/98. 250 hrs on oil.
Oleander Cocoa, FL	850 MW SC INT	9 - NG 42 - No. 2 FO	DLN WI	5x170 MW GE PG7241FA CTs Draft 4/99. 1000 hrs on oil
JEA Baldwin, FL	510 MW SC INT	12 - NG 42 - No. 2 FO	DLN WI	3x170 MW GE MS7241FA CTs Application 5/99. 800 hrs on oil
JEA Kennedy, FL	170 MW SC INT	15 - NG 42 - No. 2 FO	DLN WI	170 MW GE MS7241FA CT Issued 2/99. Not PSD/BACT
TEC Polk Power, FL	330 MW SC INT	10.5 - NG 42 - F.O.	DLN WI	2x165 MW GE MS7241FA CTs Application 2/99. 876 hrs on oil
Dynergy Heard, GA	510 MW SC INT	15 - NG	DLN	3x170 MW WH 501F CTs Application. Gas only
Tenaska Heard, GA	960 MW SC INT	15 - NG 42 - No. 2 FO	DLN WI	6x170 MW GE PG7241FA CTs Issued 12/98. 720 hrs on oil
Thomaston, GA	680 MW SC INT	15 - NG 42 - No. 2 FO	DLN WI	4x170 MW GE PG7241FA CTs Application. 1687 hrs on oil
Dynergy Reidsville, NC	900 MW SC INT	15 - NG (by 2002) 42 - FO	DLN WI	5x180 MW WH 501F CTs Initially 25 ppm NO <sub>x</sub> limit on gas Draft 5/98. 1000 hrs on oil.
RockGen Cristiana, WI	525 MW SC INT	15/12 - NG 42 - No. 2 FO	DLN WI	3x175 MW GE PG7241FA CTs 15/12 ppm are on 1/24 hr basis Issued 1/99. 800 hrs on oil
SEI Neenah, WI	330 MW SC INT	15/12 - NG 42 - No. 2 FO	DLN WI	2x165 MW GE PG7241FA CTs 15/12 ppm are on 1/24 hr basis Issued 1/99. 8760/699 hrs gas/oil
PREPA, PR	248 MW SC CON	10 - No. 2 FO	WI & HSCR	3x83 MW ABB GT11N CTs Issued 12/95.

CON = Continuous  
SC = Simple Cycle  
NG = Natural Gas  
INT = Intermittent

DLN = Dry Low NO<sub>x</sub> Combustion  
SCR = Selective Catalytic Reduction  
HSCR = Hot SCR  
CT = Combustion Turbine

FO = Fuel Oil  
ppm = parts per million  
WI = Water or Steam Injection  
MW = megawatts

GE = General Electric  
WH = Westinghouse  
ABB = Asea Brown Bovari

Project Location	CO - ppm (or as indicated)	VOC - ppm (or as indicated)	PM - lb/hr (or as indicated)	Technology and Comments
Lakeland, FL	25 - NG or 10 by Ox Cat 75 - FO @ 15% O <sub>2</sub>	4 - NG 10 - FO	10% Opacity	Clean Fuels Good Combustion
Oleander Cocoa, FL	12 - NG 20 - FO	3 - NG 6 - FO	10% Opacity	Clean Fuels Good Combustion
JEA Baldwin, FL	15 - NG 20/26 (part/full load) - FO	2.8 lb/hr - NG 3 lb/hr - FO	9 lb/hr - NG 17 lb/hr - FO	Clean Fuels Good Combustion
JEA Kennedy, FL	15 - NG 20 - FO	1.4 - NG 3.5 - FO	9 lb/hr - NG 17 lb/hr - FO	Clean Fuels Good Combustion.
TEC Polk Power, FL	15 - NG 33 - FO	1.6 - NG 4 - FO	10% Opacity	Clean Fuels Good Combustion
Dynergy Heard Co., GA	25 - NG	? - NG	? - NG	Clean Fuels Good Combustion
Tenaska Heard Co., GA	15 - NG 20 - FO	? - NG ? - FO	? - NG ? lb/hr - FO	Clean Fuels Good Combustion
Dynergy Reidsville, NC	25 - NG 50 - FO	6 lb/hr - NG 8 lb/hr - FO	6 lb/hr - NG 23 lb/hr - FO	Clean Fuels Good Combustion
RockGen Cristiana, WI	12@>50% load - NG 15@>75% 24@<75% - FO	2 - NG 5 - FO	18 lb/hr - NG 44 lb/hr - FO	Clean Fuels Good Combustion
SEI Neenah, WI	12@>50% load - NG 15@>75% 24@<75% - FO	2 - NG 5 - FO	18 lb/hr - NG 41 lb/hr - FO	Clean Fuels Good Combustion
PREPA, PR	9 - FO @15% O <sub>2</sub>	11 - FO @15% O <sub>2</sub>	0.0171 gr/dscf	Clean Fuels Good Combustion

TEC - Polk Power Station - CTGs 2 and 3  
Two 165 MW Simple Cycle Combustion Turbines

Permit No. PSD -FL-263  
Facility I.D. No. 1050233 (ARMS 009-010)

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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**OTHER INFORMATION AVAILABLE TO THE DEPARTMENT:**

Besides the information submitted by the applicant and that mentioned above, other information available to the Department consists of:

- Comments from the Fish and Wildlife Service dated March 19, 1999
- DOE website information on Advanced Turbine Systems Project
- Alternative Control Techniques Document - NO<sub>x</sub> Emissions from Stationary Gas Turbines
- General Electric 39th Turbine State-of-the-Art Technology Seminar Proceedings
- GE Guarantee for Jacksonville Electric Authority Kennedy Plant Project
- GE Power Generation - Speedtronic™ Mark V Gas Turbine Control System
- GE Combustion Turbine Startup Curves
- TEC Website – [www.teco-energy.com](http://www.teco-energy.com)
- Goal Line Environmental Technologies Website – [www.glet.com](http://www.glet.com)
- Catalytica Website – [www.catalytica-inc.com](http://www.catalytica-inc.com)

**REVIEW OF NITROGEN OXIDES CONTROL TECHNOLOGIES:**

Much of the discussion in this section is based on a 1993 EPA document on Alternative Control Techniques for NO<sub>x</sub> Emissions from Stationary Gas Turbines. Project-specific information is included where applicable.

**Nitrogen Oxides Formation**

Nitrogen oxides form in the gas turbine combustion process as a result of the dissociation of molecular nitrogen and oxygen to their atomic forms and subsequent recombination into seven different oxides of nitrogen. Thermal NO<sub>x</sub> forms in the high temperature area of the gas turbine combustor. Thermal NO<sub>x</sub> increases exponentially with increases in flame temperature and linearly with increases in residence time. Flame temperature is dependent upon the ratio of fuel burned in a flame to the amount of fuel that consumes all of the available oxygen.

By maintaining a low fuel ratio (lean combustion), the flame temperature will be lower, thus reducing the potential for NO<sub>x</sub> formation. Prompt NO<sub>x</sub> is formed in the proximity of the flame front as intermediate combustion products. The contribution of prompt to overall NO<sub>x</sub> is relatively small in lean, near-stoichiometric combustors and increases for leaner fuel mixtures. This provides a practical limit for NO<sub>x</sub> control by lean combustion.

Fuel NO<sub>x</sub> is formed when fuels containing bound nitrogen are burned. This phenomenon is not important when combusting natural gas. It is not important for the TEC project because natural gas will be the primary fuel and low sulfur fuel oil will be used only for 876 hours per year.

Uncontrolled emissions range from about 100 to over 600 parts per million by volume, dry, corrected to 15 percent oxygen (ppmvd @15% O<sub>2</sub>) for small turbines. For large modern turbines, the Department estimates uncontrolled emissions at approximately 200 ppmvd @15% O<sub>2</sub>.

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**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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## **NO<sub>x</sub> Control Techniques**

### Wet Injection

Injection of either water or steam directly into the combustor lowers the flame temperature and thereby reduces thermal NO<sub>x</sub> formation. Typical emissions achieved by wet injection are in the range of 15–25 ppmvd when firing gas and 42 ppmvd when firing fuel oil in large combustion turbines. These values often form the basis, particularly in combined cycle turbines, for further reduction to BACT limits by other techniques. Carbon monoxide (CO) and hydrocarbon (HC) emissions are relatively low for most gas turbines. However steam and (more so) water injection increase emissions of both of these pollutants.

### Combustion Controls

The excess air in lean combustion cools the flame and reduces the rate of thermal NO<sub>x</sub> formation. Lean premixing of fuel and air prior to combustion can further reduce NO<sub>x</sub> emissions. This is accomplished by minimizing localized fuel-rich pockets (and high temperatures) that can occur when trying to achieve lean mixing within the combustion zones.

The above principle is depicted in Figure 1 for a General Electric DLN-1 can-annular combustor operating on gas. For ignition, warm-up, and acceleration to approximately 20 percent load, the first stage serves as the complete combustor. Flame is present only in the first stage, which is operated as lean stable combustion will permit. With increasing load, fuel is introduced into the secondary stage, and combustion takes place in both stages. When the load reaches approximately 40 percent, fuel is cut off to the first stage and the flame in this stage is extinguished. The venturi ensures the flame in the second stage cannot propagate upstream to the first stage. When the fuel in the first-stage flame is extinguished (as verified by internal flame detectors), fuel is again introduced into the first stage, which becomes a premixing zone to deliver a lean, unburned, uniform mixture to the second stage. The second stage acts as the complete combustor in this configuration.

To further reduce NO<sub>x</sub> emissions, GE developed the DLN-2.0 (cross section shown in Figure 1) wherein air usage (other than for premixing) was minimized. The venturi and the centerbody assembly were eliminated and each combustor has a single burning zone. So-called “quaternary fuel” is introduced through pegs located on the circumference of the outward combustion casing.

GE has made further improvements in the DLN design. The most recent version is the DLN-2.6 (proposed for the TEC project). The combustor is similar to the DLN-2 with the addition of a sixth (center) fuel nozzle. The emission characteristics of the DLN-2.6 combustor while firing natural gas are given in Figure 2 for a unit tuned to meet a 15 ppmvd NO<sub>x</sub> limit (by volume, dry corrected to at 15 percent oxygen) at Jacksonville Electric Authority’s Kennedy Station.

NO<sub>x</sub> concentrations are higher in the exhaust at lower loads because the combustor does not operate in the lean pre-mix mode. Therefore such a combustor emits NO<sub>x</sub> at concentrations of 15 parts per million (ppmvd) at loads between 50 and 100 percent of capacity, but concentrations as high as 100 ppmvd at less than 50 percent of capacity. Note that VOC comprises a very small amount of the “unburned hydrocarbons” which in turn is mostly non-VOC methane.

The combustor can be tuned differently to achieve emissions as low as 9 ppmvd of NO<sub>x</sub> and 9 ppm of CO. Emissions characteristics while firing oil are expected to be similar for the DLN-2.6 as they are for those of the DLN-2.0 shown in Figure 3. Simplified cross sectional views of the totally premixed DLN-2.6 combustor to be installed at the TEC project are shown in Figure 4.

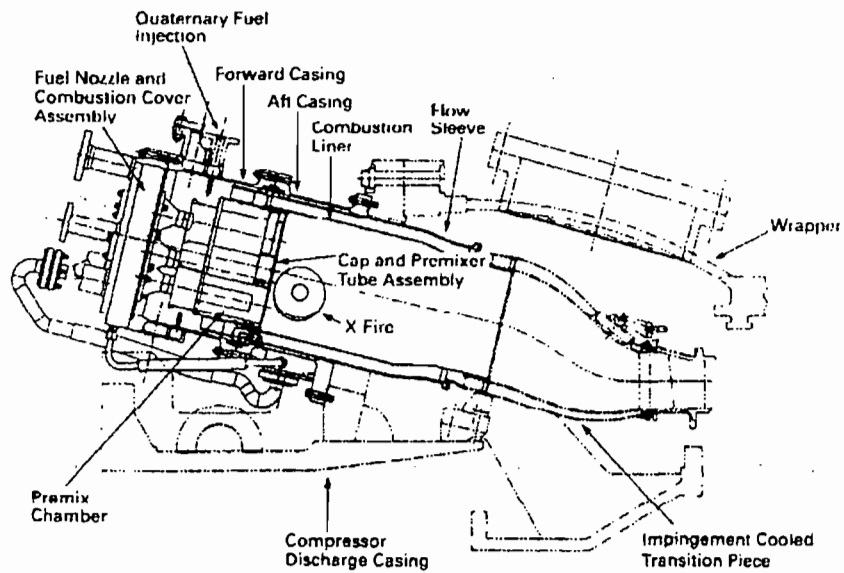
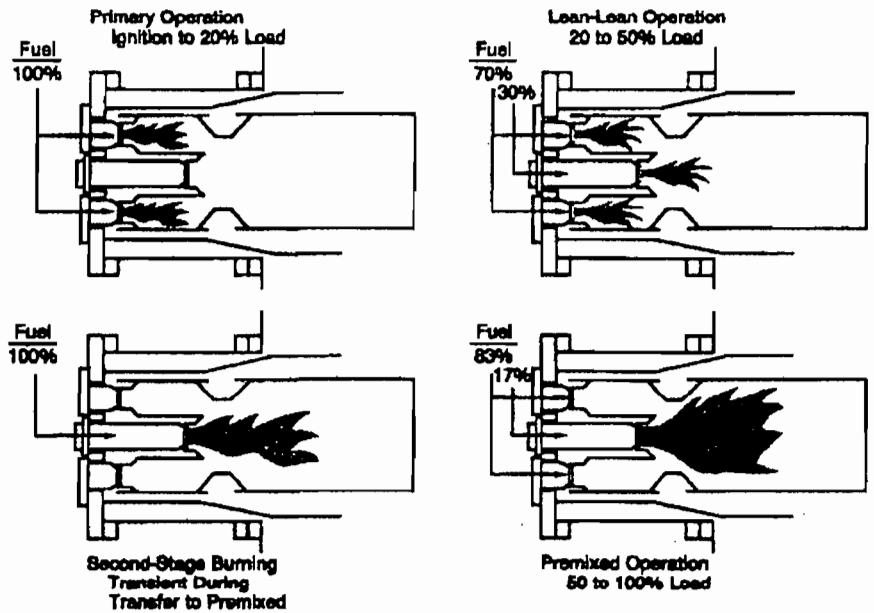


Figure 1 - Dry Low NOx Operating Modes - DLN-1

Cross Section of GE DLN-2

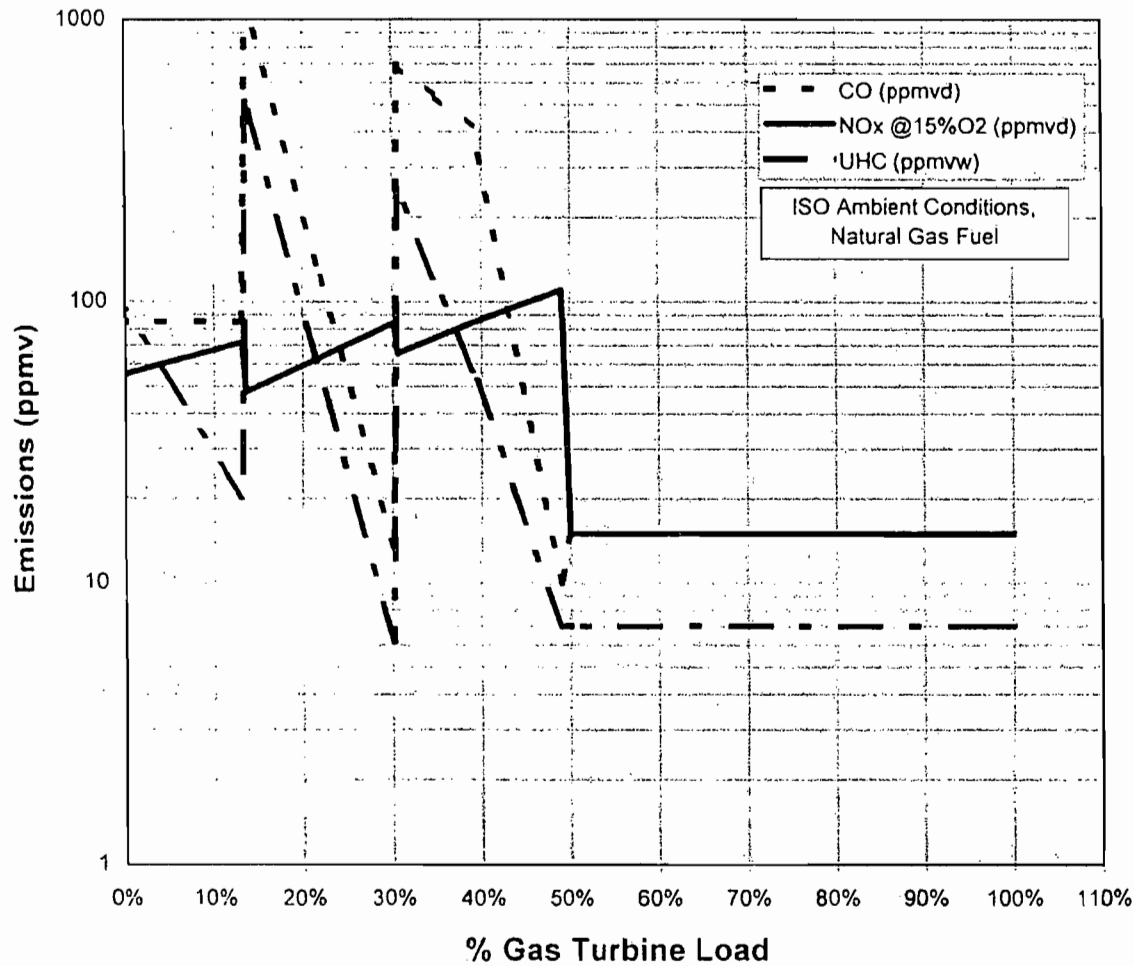


Figure 2 - Emissions Performance Curves for GE DLN-2.6 Combustor  
 Firing Natural Gas in a Dual Fuel GE 7FA Combustion Turbine

(Simple Cycle, Intermittent Duty - If Tuned to 15 ppm NOx)

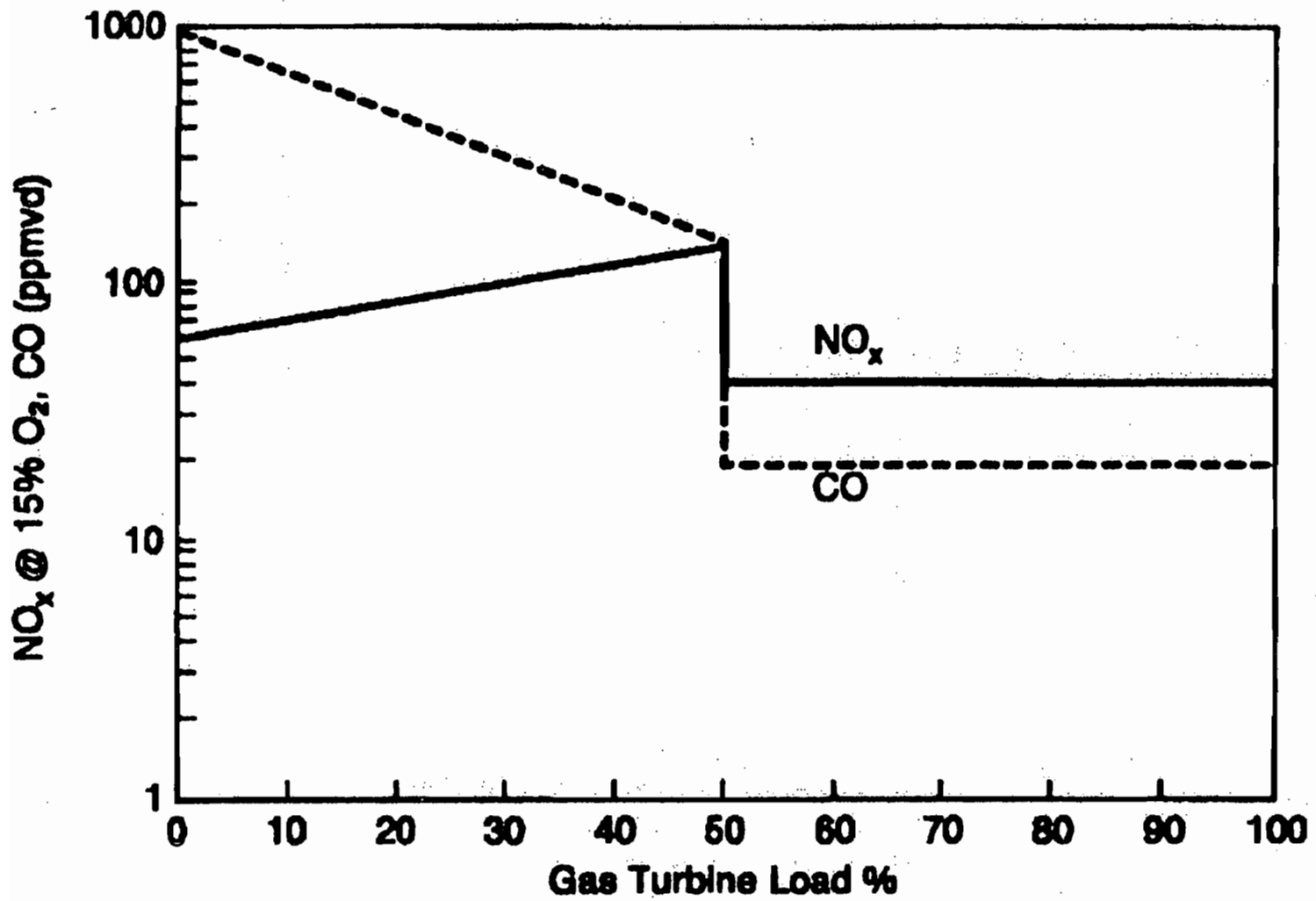


Figure 3 - Emissions Performance for DLN-2 Combustors  
Firing Fuel Oil in Dual Fuel GE 7FA Turbine



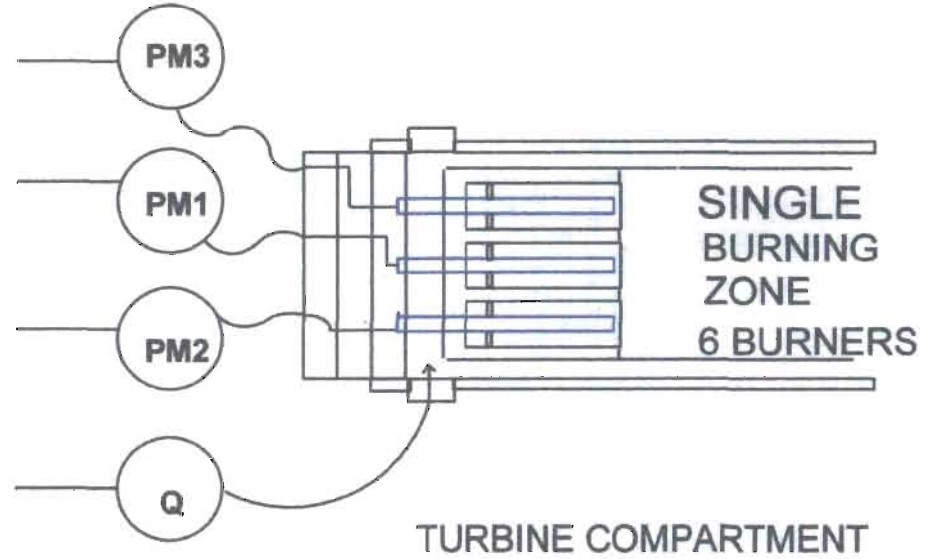
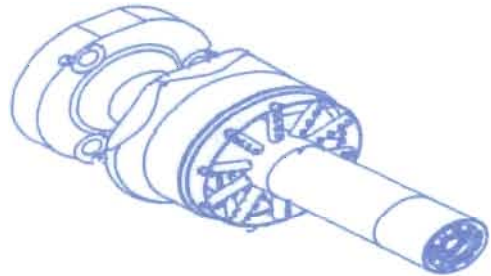
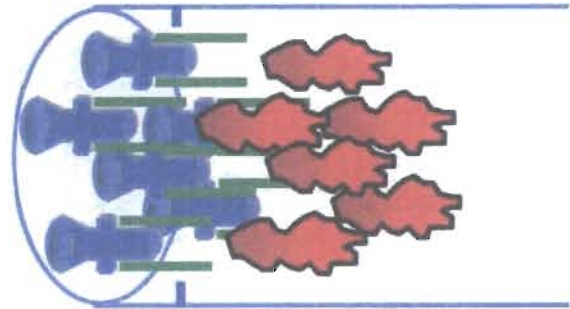
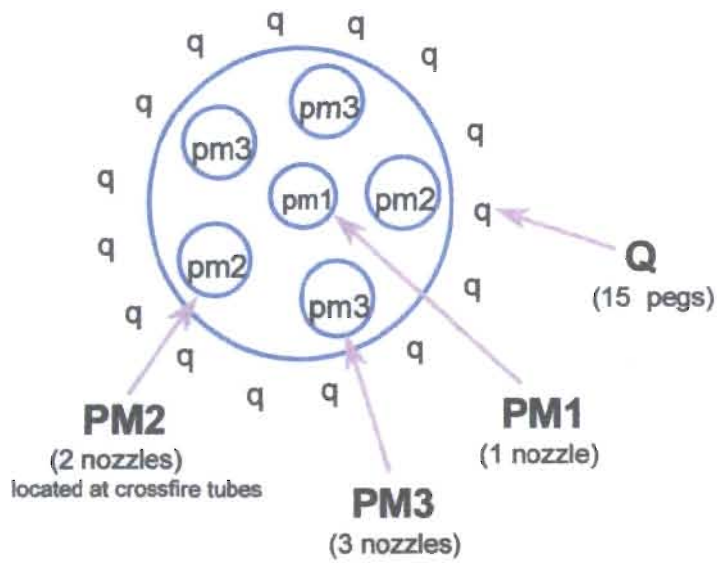


Figure 4 - DLN-2.6 Nozzle and Burner Arrangement

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### BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

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In all but the most recent gas turbine combustor designs, the high temperature combustion gases are cooled to an acceptable temperature with dilution air prior to entering the turbine (expansion) section. The sooner this cooling occurs, the lower the thermal NO<sub>x</sub> formation. Cooling is also required to protect the first stage nozzle. When this is accomplished by air cooling, the air is injected into the component and is ejected into the combustion gas stream, causing a further drop in combustion gas temperature. This, in turn, lowers achievable thermal efficiency for the unit.

Larger units, such as the Westinghouse 501 G or the planned General Electric 7H, use steam in a closed loop system to provide much of the cooling. The fluid is circulated through the internal portion of the nozzle component or around the transition piece between the combustor and the nozzle and does not enter the exhaust stream. Instead it is normally sent back to a steam generator. The difference between flame temperature and firing temperature into the first stage is minimized and higher efficiency is attained.

Another important result of steam cooling is that a higher firing temperature can be attained with no increase in flame temperature. Flame temperatures and NO<sub>x</sub> emissions can therefore be maintained at comparatively low levels even at high firing temperatures. At the same time, thermal efficiency should be greater when employing steam cooling. A similar analysis applies to steam cooling around the transition piece between the combustor and first stage nozzle.

The relationship between flame temperature, firing temperature, unit efficiency, and NO<sub>x</sub> formation can be appreciated from Figure 5 which is from a General Electric discussion on these principles. In addition to employing pre-mixing and steam cooling, further reductions are accomplished through design optimization of the burners, testing, further evaluation, etc.

At the present time, emissions achieved by combustion controls are low as 9 ppmvd from gas turbines smaller than 200 MW (simple cycle), such as GE "F Class" units. Even lower NO<sub>x</sub> emissions are achieved from certain units smaller than 100 MW, such as the GE 7EA line.

#### Selective Catalytic Combustion

Selective catalytic reduction (SCR) is an add-on NO<sub>x</sub> control technology that is employed in the exhaust stream following the gas turbine. SCR reduces NO<sub>x</sub> emissions by injecting ammonia into the flue gas in the presence of a catalyst. Ammonia reacts with NO<sub>x</sub> in the presence of a catalyst and excess oxygen yielding molecular nitrogen and water. The catalysts used in combined cycle, low temperature applications (conventional SCR), are usually vanadium or titanium oxide and account for almost all installations. For high temperature applications (Hot SCR up to 1100 °F), such as simple cycle turbines, zeolite catalysts are available but used in few applications to-date. SCR units are typically used in combination with wet injection or DLN combustion controls.

In the past, sulfur was found to poison the catalyst material. Sulfur-resistant catalyst materials are now available, however, and catalyst formulation improvements have proven effective in resisting performance degradation with fuel oil in Europe and Japan, where conventional SCR catalyst life in excess of 4 to 6 years has been achieved, versus 8 to 10 years with natural gas.

Excessive ammonia use tends to increase emissions of CO, ammonia (slip) and particulate matter (when sulfur bearing fuels are used).

As of early 1992, over 100 gas turbine installations already used SCR in the United States. Per the above table, only one combustion turbine project in Florida (FPC Hines Power Block 1) employs SCR (it is currently being started up). The equipment was installed on a temporary basis because Westinghouse had not yet demonstrated emissions as low as 12 ppmvd by DLN technology at the

## Gas Turbine - Hot Gas Path Parts

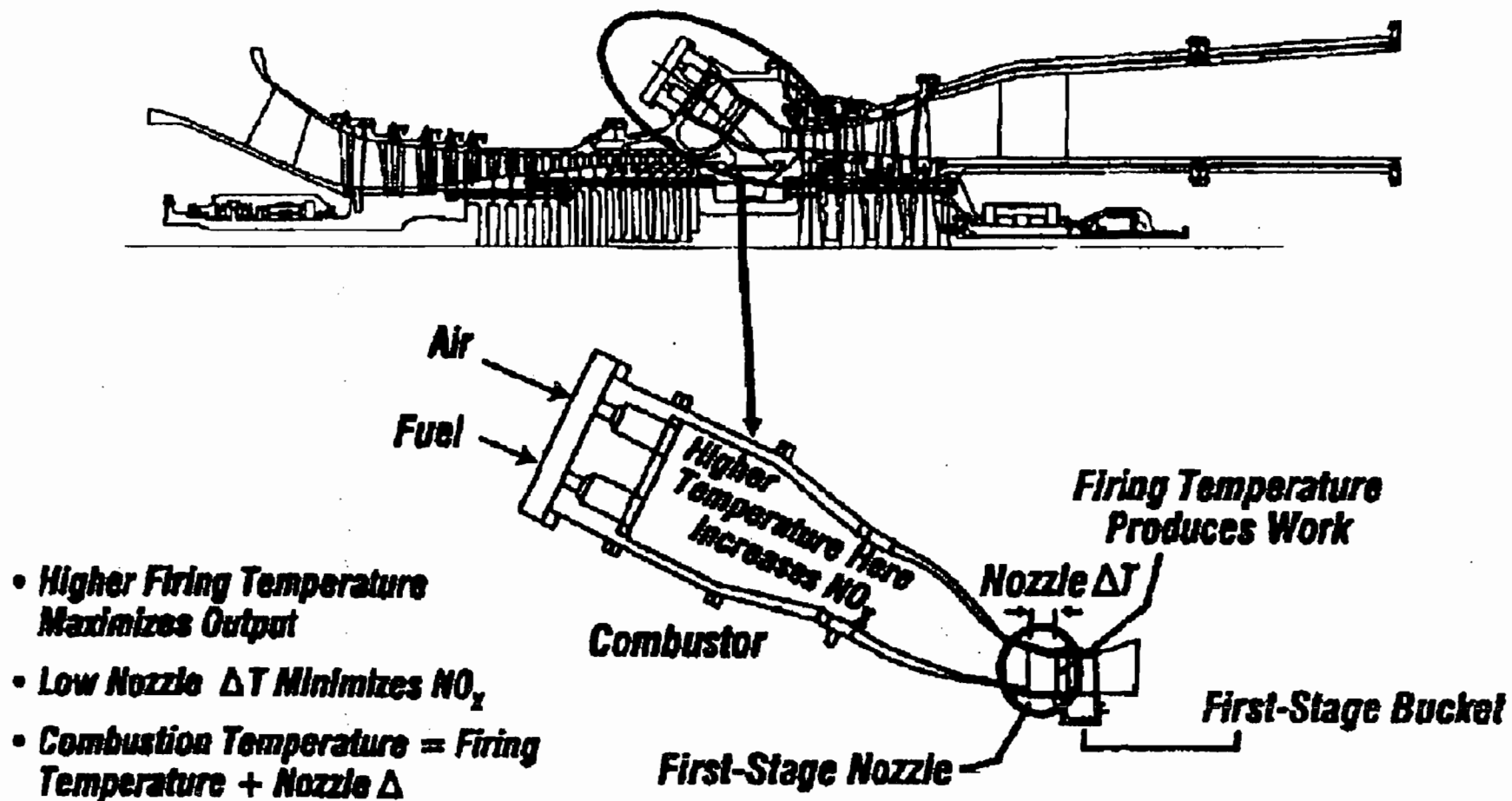


Figure 5 - Relation Between Flame Temperature and Firing Temperature

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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time the units were to start up in 1998. SCR is also proposed on a permanent basis for the expansion of the FPC Hines Facility (Power Block II). Seminole Electric will install SCR on a previously-permitted 501F unit at the Hardee Unit 3 project. The reasons are similar to those for the FPC Hines Power Block I.

Permit limits as low as 2.25 to 3.5 ppmvd NO<sub>x</sub> have been specified using SCR on combined cycle F Class projects throughout the country.

Selective Non-Catalytic Combustion

Selective non-catalytic reduction (SNCR) reduction works on the same principle as SCR. The differences are that it is applicable to hotter streams than conventional or hot SCR, no catalyst is required, and urea can be used as a source of ammonia. No applications have been identified wherein SNCR was applied to a gas turbine because the exhaust temperature of 1100 °F is too low to support the NO<sub>x</sub> removal mechanism.

The Department did, however, specify SNCR as one of the available options for the combined cycle Santa Rosa Energy Center. The project will incorporate a large 600 MMBtu/hr duct burner in the heat recovery steam generator (HRSG) and can provide the acceptable temperatures (between 1400 and 2000 °F) and residence times to support the reactions.

Emerging Technologies: SCONOX™ and XONON™

There are at least two technologies on the horizon that will influence BACT determinations. These, as usual, are prompted by the needs specific to non-attainment areas such as Southern California.

The first technology is called SCONOX™ and is a catalytic technology that achieves NO<sub>x</sub> control by oxidizing and then absorbing the pollutant onto a honeycomb structure coated with potassium carbonate. The pollutant is then released as harmless molecular nitrogen during a regeneration cycle that requires a dilute hydrogen reducing gas. The technology has been demonstrated on small units in California and has been purchased for a small source in Massachusetts.<sup>1</sup> California regulators and industry sources have stated that the first 250 MW block to install SCONOX™ will be at U.S. Generating's La Paloma Plant near Bakersfield.<sup>2</sup> The overall project includes several more 250 MW blocks with SCR for control.<sup>3</sup> USEPA has identified an "achieved in practice" BACT value of 2.0 ppmvd over a three-hour rolling average based upon the recent performance of a Vernon, California natural gas-fired 32 MW combined cycle turbine (without duct burners) equipped with the patented SCONOX™ system

SCONOX™ technology (at 2.0 ppmvd) is considered to represent LAER in non-attainment areas where cost is not a factor in setting an emission limit. It competes with less-expensive SCR in those areas, but has the advantages that it does not cause ammonia emissions in exchange for NO<sub>x</sub> reduction. Advantages of the SCONOX™ process include in addition to the reduction of NO<sub>x</sub>, the elimination of ammonia and the control of some CO emissions. SCONOX™ has not been applied on any major sources in ozone attainment areas.

In a letter dated March 23, 1998 to Goal Line Environmental Technologies, the SCONOX™ process was deemed as technically feasible for maintaining NO<sub>x</sub> emissions at 2 ppmvd on a combined cycle unit. ABB Environmental was announced on September 10, 1998 as the exclusive licensee for SCONOX™ for United States turbine applications larger than 100 MW. ABB Power Generation has stated that scale up and engineering work will be required before SCONOX™ can be offered with commercial guarantees for large turbines (based upon letter from Kreminski/Broemmelsiek of ABB Power Generation to the Massachusetts Department of Environmental Protection dated November 4,

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**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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1998). SCONOX requires a much lower temperature regime that is not available in simple cycle units and is therefore not feasible for this project. Therefore the SCONOX system cannot be considered as achievable or demonstrated in practice for this application.

The second technology is XONON™, which works by partially burning fuel in a low temperature pre-combustor and completing the combustion in a catalytic combustor. The overall result is low temperature partial combustion (and thus lower NO<sub>x</sub> combustion) followed by flameless catalytic combustion to further attenuate NO<sub>x</sub> formation. The technology has been demonstrated on combustors on the same order of size as SCONOX™ has. However GE has teamed with Catalytica to develop a combustor for gas turbines in the 80-90 MW range before continuing with development on a combustor for a larger unit.

XONON™ avoids the emissions of ammonia and the need to generate hydrogen. It is also extremely attractive from a mechanical point of view if it works.

Catalytica Combustion Systems, Inc. develops, manufactures and markets the XONON™ Combustion System. In a press release on October 8, 1998 Catalytica announced the first installation of a gas turbine equipped with the XONON™ Combustion System in a municipally owned utility for the production of electricity. The turbine was started up on that day at the Gianera Generating Station of Silicon Valley Power, a municipally owned utility serving the City of Santa Clara, Calif. The XONON™ Combustion System, deployed for the first time in a commercial setting, is designed to enable turbines to produce environmentally sound power without the need for expensive cleanup solutions. Previously, this XONON™ system had successfully completed over 1,200 hours of extensive full-scale tests which documented its ability to limit emissions of nitrogen oxides, a primary air pollutant, to less than 3 parts per million.

Catalytica's XONON™ system is represented as a powerful technology that essentially eliminates the formation of nitrogen oxides air emissions in gas turbines without impacting the turbine's operating performance. In a definitive agreement signed on November 19, 1998, GE Power Systems and Catalytica agreed to cooperate in the design, application, and commercialization of XONON™ systems for both new and installed GE E-class and F-class turbines used in power generation and mechanical drive applications. This appears to be an up-and-coming technology, the development of which will be watched closely by the Department for future applications. It is not yet available for fuel oil and cycling operation.

**REVIEW OF SULFUR DIOXIDE (SO<sub>2</sub>) AND SULFURIC ACID MIST (SAM)**

SO<sub>2</sub> control processes can be classified into five categories: fuel/material sulfur content limitation, absorption by a solution, adsorption on a solid bed, direct conversion to sulfur, or direct conversion to sulfuric acid. A review of the BACT determinations for combustion turbines contained in the BACT Clearinghouse shows that the exclusive use of low sulfur fuels constitutes the top control option for SO<sub>2</sub>.

For this project, the applicant has proposed as BACT the use of 0.05% sulfur oil and natural gas containing no more than 2 grains of sulfur per 100 standard cubic foot (gr S/100 ft<sup>3</sup>). This value is well below the "default" maximum value of 20 gr. S/100 ft<sup>3</sup>, but high enough to require a BACT determination. The applicant estimated total emissions for the project at 126 TPY of SO<sub>2</sub> and 15 TPY of SAM. However the Department expects the emissions to be lower because of the limited oil consumption and the typical natural gas in Florida which contains less than 1 gr S/100ft<sup>3</sup>.

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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**REVIEW OF PARTICULATE MATTER (PM/PM<sub>10</sub>) CONTROL TECHNOLOGIES:**

Particulate matter is generated by various physical and chemical processes during combustion and will be affected by the design and operation of the NO<sub>x</sub> controls. The particulate matter emitted from this unit will mainly be less than 10 microns in diameter (PM<sub>10</sub>).

Natural gas and 0.05 percent sulfur No. 2 (or superior grade) distillate fuel oil will be the only fuels fired and are efficiently combusted in gas turbines. Such fuels are necessary to avoid damaging turbine blades and other components already exposed to very high temperature and pressure. Natural gas is an inherently clean fuel and contains no ash. The fuel oil to be combusted contains a minimal amount of ash and its use is proposed for only 876 hours per year making any conceivable add-on control technique for PM/PM<sub>10</sub> either unnecessary or impractical.

A technology review indicated that the top control option for PM/PM<sub>10</sub> is a combination of good combustion practices, fuel quality, and filtration of inlet air. Total annual emissions of PM<sub>10</sub> for the project are expected to be approximately 54 tons per year.

**REVIEW OF CARBON MONOXIDE(CO) CONTROL TECHNOLOGIES**

CO is emitted from combustion turbines due to incomplete fuel combustion. Combustion design and catalytic oxidation are the control alternatives that are viable for the project. The most stringent control technology for CO emissions is the use of an oxidation catalyst.

All combustion turbines using catalytic oxidation appear to be combined cycle units. Among the most recently permitted ones are the 500 MW Wyandotte Energy project in Michigan, the El Dorado project in Nevada, Ironwood in Pennsylvania, Millenium in Massachusetts, and Sutter Calpine in California. The permitted CO values of these units are between 3 and 5 ppmvd. Catalytic oxidation was recently installed at a cogeneration plant at Reedy Creek (Walt Disney World), Florida to avoid PSD review which would have been required due to increased operation at low load. Seminole Electric recently proposed catalytic oxidation in order to meet the permitted CO limit at its planned 244 MW Westinghouse 501FD combined cycle unit in Hardee County, Florida.<sup>4</sup>

Most combustion turbines incorporate good combustion to minimize emissions of CO. So far this appears to be the only technology proposed at simple cycle turbine projects. These installations typically achieve emissions between 10 and 25 ppm at full load while firing gas. The values of 15 and 33 ppm for gas and oil respectively at baseload proposed in the TEC's original application are within the range of recent determinations for simple cycle CO BACT determinations. By comparison, values of 12 and 20 ppm for gas and oil respectively (at baseload) were proposed for the Oleander's project using identical equipment. Values given in GE-based applications are representative of operations between 50 and 100 percent of full load.

**REVIEW OF VOLATILE ORGANIC COMPOUND (VOC) CONTROL TECHNOLOGIES**

Volatile organic compound (VOC) emissions, like CO emissions, are formed due to incomplete combustion of fuel. There are no viable add-on control techniques as the combustion turbine itself is very efficient at destroying VOC. The applicant has proposed good combustion practices to control VOC. The limits proposed by TEC for this project are 1.4 and 3.5 ppm for gas and oil firing respectively. According to GE, VOC emissions less than 1.4 ppm were achieved during recent tests of the DLN-2.6 technology when firing natural gas.<sup>5</sup> At such low emission rates, the project does not trigger PSD and a requirement for a VOC BACT determination. Emissions as low as projected by TEC and GE would easily meet BACT requirements based on the above tables.

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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**BACKGROUND ON SELECTED GAS TURBINE**

TEC plans the purchase of two 165 MW (nominal) General Electric PG 7241FA simple cycle gas turbines. This is the most recent designation of GE's line of "F" Class units.

The first commercial GE 7F Class unit was installed in a combined cycle project at the Virginia Power Chesterfield Station in 1990.<sup>6</sup> The initial units had a firing temperature of 2300 °F and a combined cycle efficiency exceeding 50 percent. By the mid-90s, the line was improved by higher combustor pressure, a firing temperature of 2400 °F, and a combined cycle efficiency of approximately 56 percent based on a 167 MW combustion turbine. The line was redesignated as the 7FA Class.

The first GE 7F/FA project in Florida was at the FPL Martin Plant in 1993 and entered commercial service in 1994.<sup>7</sup> The units were equipped with DLN-2 combustors with a permitted NO<sub>x</sub> limit of 25 ppmvd. These actually achieved emissions of 13-25 ppmvd of NO<sub>x</sub>, 0-3 ppm of CO, and 0-0.17 ppm of VOC.<sup>8</sup> The City of Tallahassee recently received approval to install a GE 7FA Class unit at its Purdom Plant.<sup>9</sup> Although permitted emissions are 12 ppmvd of NO<sub>x</sub>, the City obtained a performance guarantee from GE of 9 ppmvd.<sup>10</sup> FPL also obtained a guarantee and permit limit of 9 ppmvd NO<sub>x</sub> for six GE 7241FA turbines to be installed at the Fort Myers Repowering project.<sup>11</sup> The Santa Rosa Energy Center in Pace, Florida, also received a permit with a 9 ppmvd NO<sub>x</sub> limit for a GE 7241 turbine with DLN-2.6 burners.<sup>12</sup>

Most recently, the Department issued draft BACT determinations for the simple cycle Oleander project in Brevard County and the combined cycle projects in Volusia (Duke Energy) and Osceola County (Kissimee Utilities). These three draft permits also include NO<sub>x</sub> limits of 9 ppmvd based on the DLN-2.6 technology installed on F Class units.

General Electric has primarily relied on further advancement and refinement of DLN technology to provide sufficient NO<sub>x</sub> control for their combined cycle turbines in Florida. Where required by BACT determinations of certain states, General Electric incorporates SCR in combined cycle projects.<sup>13</sup> In its recent permits, Florida has included separate and lower limits in the event that DLN emissions limits are not attainable or the applicant selects a manufacturer that does not provide combustors capable of meeting 9 ppmvd.

GE's approach of progressively refining such technology is a proven one, even on some relatively large units. Recently GE Frame 7FA units met performance guarantees of 9 ppmvd with "DLN-2.6" burners at Fort St. Vrain, Colorado and Clark County, Washington.<sup>14</sup> Although the permitted limit is 15 ppmvd, GE has already achieved emission levels of approximately 6-7 ppmvd on gas at a dual-fuel 7EA (120 MW combined cycle) KUA Cane Island Unit 2.<sup>15</sup> Unit 2 is equipped with DLN-2 combustors. According to GE, similar performance is expected soon on the 7FA line such as the one that will be installed for TEC Polk Power Station Project. Performance guarantees less than 9 ppmvd can be expected using the DLN-2.6 combustors for units delivered in a couple of years.<sup>16</sup>

The 10.5 ppmvd NO<sub>x</sub> limit on natural gas requested by TEC is clearly one of the most stringent BACT determinations for simple cycle F Class. In fact, the company obtained a guarantee from GE to achieve 9 ppmvd. However GE's guarantee is for a performance test on a "new and clean unit." The test must be conducted at a steady-state load of 50 to 100 percent and completed within the first 100 fired hours of operation as specified in the GE protocols.

With the frequent start-ups and shutdowns of the unit, TEC is concerned about the ability to maintain the low NO<sub>x</sub> values for long periods of time following the performance tests. The Department is not aware of the details of the GE guarantee for Oleander who proposed 9 ppmvd on a simple cycle unit.

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

However, the Department is aware from discussions with other applicants that a continuing guarantee is available at a substantial cost.<sup>17</sup>

The GE Speedtronic™ Mark V Gas Control System will be used. This control system is designed to fulfill all gas turbine control requirements. These include control of liquid, gas, or both fuels in accordance with the requirements of the speed, load control under part-load conditions, temperature control under maximum capability conditions, or during start-up conditions. Since emissions are controlled utilizing dry low NO<sub>x</sub> techniques, fuel staging and combustion mode are also controlled by the Mark V, which also monitors the process. Sequencing of the auxiliaries to allow fully automated start-up, shutdown and cool-down are also handled by the Mark V.<sup>18</sup>

**DEPARTMENT BACT DETERMINATION**

Following are the BACT limits determined for the TEC project assuming full load. Values for NO<sub>x</sub> are corrected to 15% O<sub>2</sub> on a dry volume basis. The emission limits or their equivalents in terms of pounds per hour and NSPS units, as well as the applicable averaging times, are given in the permit Specific Conditions No. 18 through 23.

POLLUTANT	CONTROL TECHNOLOGY	PROPOSED BACT LIMIT
PM/PM <sub>10</sub> , VE	Pipeline Natural Gas Good Combustion	10 Percent Opacity (gas or oil)
VOC	As Above	1.4 ppmvw – Gas (non-BACT) 3.5 ppmvw– Fuel Oil (non-BACT)
CO	As Above	12 ppmvd – Gas 20 ppmvd – Fuel Oil
SO <sub>2</sub> /SAM	As Above	2 grains of sulfur per 100 ft <sup>3</sup> gas 0.05 percent sulfur in fuel oil
NO <sub>x</sub>	Dry Low NO <sub>x</sub> , WI for F.O., limited oil use	10.5 ppmvd – Gas 42 ppmvd – Fuel Oil for 750 hours

**RATIONALE FOR DEPARTMENT’S DETERMINATION**

- General Electric has provided a “clean and new” guarantee of 9 ppmvd NO<sub>x</sub>.
- A level of 9 ppmvd NO<sub>x</sub> by DLN has been demonstrated on GE 7FA combustion turbines at Fort St. Vrain, Colorado and Clark County, Washington.
- The proposed 9 ppmvd limit at Oleander while firing natural gas is the lowest known Draft BACT value for an “F” frame combustion turbine operating in simple cycle mode and intermittent duty. The 42 ppmvd limit while firing fuel oil is typical.
- The proposed 10.5 ppmvd limit at TEC while firing natural gas is the next lowest Draft BACT value for an F Class simple cycle, intermittent duty unit. The Department will still require TEC to meet to meet the “clean and new” limit of 9 ppmvd during initial testing.
- The proposed BACT limit of 10.5 ppmvd is about one-tenth of the applicable NSPS limit per 40 CFR 60, Subpart GG for units as efficient as the 7FA.
- Typical permit limits nation-wide for these units while operating in simple cycle mode and intermittent duty are 12-15 ppmvd. Limits as high as 25 ppmvd have been recently proposed by some states. The lower limit at TEC will offset emissions while firing fuel oil. Also TEC will operate fewer hours of operation on oil than Oleander. This will help offset the slightly higher emissions on gas from the TEC project compared to Oleander.



**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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- The units will be operated in simple cycle mode. Therefore control options, which are feasible for combined cycle units, are not applicable. This rules out Low Temperature (conventional) SCR, which achieves 4.5 ppmvd NO<sub>x</sub> or lower. It also rules out the possibility of SCONO<sub>x</sub>. XONON is not available for F Class dual fuel projects.
- The simple cycle “F Class” turbines have very high exhaust temperatures of up to 1200 °F. This is at the higher limit of the present operational temperature of Hot SCR zeolite catalyst (around 1050 °F). The PREPA simple cycle turbines, which use Hot SCR, have exhaust temperatures ranging from 824 to 1024 °F.
- The levelized costs of NO<sub>x</sub> removal by Hot SCR for the TEC project were estimated by Environmental Consulting & Technology at \$9,717 per ton of NO<sub>x</sub> removed assuming 4,380 and 876 hours per year of operation on gas and oil respectively. This cost-effectiveness value assumes a NO<sub>x</sub> reduction from 10.5 ppmvd to 3.5 ppmvd @15% O<sub>2</sub> and a 3-year performance guarantee.
- Using much of the basic capital cost information developed by the City of Lakeland, The National Park Service estimated the cost of NO<sub>x</sub> removal by Hot SCR at \$3,802 per ton (excluding the energy penalty) for a *continuous duty* Westinghouse 501 G. A further refinement of the Park Service estimate by including the energy penalty, using the revised catalyst cost data obtained by the Department, and assuming a five year estimated life for the catalyst (per Engelhard’s Lakeland quote) would yield a cost-effectiveness closer to \$3,500 per ton of NO<sub>x</sub> removed for that application. However the cost at the Lakeland project was based on reducing NO<sub>x</sub> emissions by 16 ppmvd (from 25 ppmvd to 9 ppmvd). This fact and the difference in hours of operation are the main contributors to the difference in costs between the Lakeland and TEC projects.
- The cost effectiveness for NO<sub>x</sub> removal given for the PREPA simple cycle project is \$2,200 per ton. This is the only reasonably large project where Hot SCR has actually been installed. The main reason for the relatively low levelized cost is that total costs are applied over a reduction of 40 ppmvd and 8760 hours, whereas the reduction in the TEC case is over a reduction of 7 ppmvd and half the hours. The cost per ton of NO<sub>x</sub> removed by Hot SCR at the PREPA project or projected at Lakeland can be re-scaled for the TEC project. This would result in a value on the order of ECT’s projections.
- Although the Department does not have a “bright line” cost-effectiveness figure, the values projected by TEC indicate Hot SCR is not cost-effective for this project.
- Comments from the National Park Service on the Oleander project suggested that a reduction in the applicant’s proposed NO<sub>x</sub> emissions on oil from 42 ppmvd to 25ppmvd is possible based two reported oil-fired units listed in the BACT Clearinghouse. One of the two units cited is a Florida facility that initially had a limit of 25 ppmvd for gas firing. The present limits are 15 ppmvd on gas and 42 ppmvd on oil. The Department has been unable to confirm the report on the second unit. GE has advised that it only offers a 42 ppmvd NO<sub>x</sub> guarantee on F Class units when firing oil.

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- It is conceivable that NO<sub>x</sub> emissions while firing oil from may be reduced from 42 ppmvd by increasing the water injection rate or even by development of a DLN oil burner. In order to address this possibility, a specific condition will be added to conduct appropriate testing and prepare an engineering report. The report will be submitted for the Department's review to ensure that the lowest reliable NO<sub>x</sub> emission rates while firing oil are been achieved with the installed technology.
- The Department's overall BACT determination is equivalent to approximately 0.3 lb/MW-hr by Dry Low NO<sub>x</sub>. For reference, the new NSPS promulgated on September 3, 1998 requires that new conventional power plants (based on boilers, etc.) meet a limit of 1.6 lb/MW-hr.
- VOC emissions of 1.4 and 3.5 ppm while firing gas or oil proposed by the applicant clearly reflect BACT and, in fact, exempt the project from a BACT determination for VOC.
- The Department will set CO limits achievable by good combustion as 12 ppm (gas) and 20 ppm (oil). These values are equal to the lowest values from permitted or proposed simple cycle units. These limits are equal to those of the Oleander project.
- ECT evaluated the use of an oxidation catalyst with a 90 percent control efficiency and having a three-year catalyst life. The oxidation catalyst control system was estimated to increase the capital cost of the project by \$1,921,133 with an annualized cost of \$515,433 per year. Levelized costs for CO catalyst control were calculated at \$3,652 per ton to control CO emissions to 30.2 TPY (from a baseline of 303 TPY). This figure does not appear to be cost-effective for removal of CO.
- BACT for PM<sub>10</sub> was determined to be good combustion practices consisting of: inlet air filtering; use of pipeline natural gas; use of clean, low ash, low sulfur fuels, and operation of the unit in accordance with the manufacturer-provided manuals.
- PM<sub>10</sub> emissions will be very low and difficult to measure. Additionally, the higher emission mode will involve fuel oil firing which will occur only approximately 750 hours per year. It is not practical to require running the turbine on oil, simply to conduct tests. Therefore, the Department will set a Visible Emission standard of 10 percent opacity as BACT for both natural gas and fuel oil firing, consistent with the definition of BACT. Examples of installations with similar VE limits include the City of Lakeland, the City of Tallahassee, Santa Rosa Energy Center, FPL Fort Myers, and the Southern Company Barry projects.

**COMPLIANCE PROCEDURES**

<b>POLLUTANT</b>	<b>COMPLIANCE PROCEDURE</b>
Visible Emissions	Method 9
Volatile Organic Compounds	Method 18, 25, or 25A (initial tests only)
Carbon Monoxide	Annual Method 10 (can use RATA if at capacity)
NO <sub>x</sub> (performance)	Annual Method 20 (can use RATA if at capacity)
NO <sub>x</sub> (24-hr average)	NO <sub>x</sub> CEMS, O <sub>2</sub> or CO <sub>2</sub> diluent monitor, and flow device as needed
SO <sub>2</sub> and SAM	Custom Fuel Monitoring Schedule

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

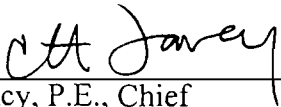
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**DETAILS OF THE ANALYSIS MAY BE OBTAINED BY CONTACTING:**

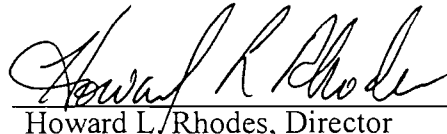
A. A. Linero, P.E. Administrator, New Source Review Section  
Teresa Heron, Review Engineer, New Source Review Section  
Department of Environmental Protection  
Bureau of Air Regulation  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

Recommended By:

Approved By:



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



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

10/6/99

Date:

10/6/99

Date:

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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**REFERENCES**



- <sup>1</sup> News Release. Goaline Environmental. Genetics Institute Buys SCONOX Clean Air System. August 20, 1999.
- <sup>2</sup> "Control Maker Strives to Sway Utility Skeptics." Air Daily. Volume 5, No. 199. October 14, 1998.
- <sup>3</sup> Telecom. Linero, A.A., FDEP, and Beckham, D., U.S. Generating. Circa November 1998.
- <sup>4</sup> Letter from Opalinski, M.P., SECI to Linero, A.A., FDEP. Turbines and Related Equipment at Hardee unit 3. December 9, 1998.
- <sup>5</sup> Telecom. Vandervort, C., GE, and Linero, A.A., DEP. "VOC Emissions from FA Gas Turbines with DLN-2.6 Combustors."
- <sup>6</sup> Brochure. General Electric. "GE Gas Turbines - MS7001FA." Circa 1993.
- <sup>7</sup> Davis, L.B., GE. "Dry Low NO<sub>x</sub> Combustion Systems for GE Heavy Duty Gas Turbines." 1994.
- <sup>8</sup> Report. Florida Power & Light. "Final Dry Low NO<sub>x</sub> Verification Testing at Martin Combine Cycle Plant." August 7, 1995.
- <sup>9</sup> Florida DEP. PSD Permit, City of Tallahassee Purdom Unit 8. May, 1998.
- <sup>10</sup> City of Tallahassee. PSD/Site Certification Application. April, 1997.
- <sup>11</sup> Florida DEP. Intent to Issue Permit. FPL Fort Myers Repowering Project. September, 1998.
- <sup>12</sup> Florida DEP. Final Permit. Santa Rosa Energy Center. December, 1998.
- <sup>13</sup> State of Alabama. PSD Permit, Alabama Power/Barry Sithe/IPP (GE 7FA).
- <sup>14</sup> Telecom. Schorr, M., GE, and Costello, M., Florida DEP. March 31, 1998. Status of DLN-2.6 Program
- <sup>15</sup> Florida DEP. Bureau of Air Regulation Monthly Report. June, 1998.
- <sup>16</sup> Telecom. Schorr, M., GE, and Linero, A.A., Florida DEP. August, 1998. Cost effectiveness of DLN versus SCR.
- <sup>17</sup> Telecom. Gianazza, N.B., JEA, and Linero, A.A., Florida DEP. Proposed NO<sub>x</sub> limits at Brandy Branch Project.
- <sup>18</sup> Rowen, W.I. "General Electric Speedtronic™ Mark V Gas Turbine Control System. 1994."

# Florida Department of Environmental Protection

## Memorandum

TO: Howard L. Rhodes

THRU: Clair Fancy

FROM: Al Linero   
Teresa Heron 

DATE: September 28, 1999

SUBJECT: **TEC Polk Power Station**  
**Two 165 MW Combustion Turbines**  
DEP File No. PSD-FL-263 and PA 92-32

BAR

Attached is the final permit package for construction of two dual-fuel, intermittent duty, simple cycle 165 MW combustion turbines at the TECO Polk Power Station

Nitrogen Oxides (NO<sub>x</sub>) emissions from the gas turbine will be controlled by Dry Low NO<sub>x</sub> (DLN-2.6). We propose to require that the unit meet the manufacturer's new and clean (one-shot) guarantee of 9 ppm, and a continuous (24-hour averaged) emission limit of 10.5 ppm. However, we will limit use of fuel oil from the 876 hours requested to 750 hours. We can raise the figure to the requested value if TECO subsequently demonstrates continuous operation at 9 ppm instead of 10.5 ppm.

NO<sub>x</sub> emissions will be controlled to 42 ppm during the limited fuel oil use. Emissions of carbon monoxide, volatile organic compounds, sulfur dioxide, sulfuric acid mist, and particulate matter (PM/PM<sub>10</sub>) will be very low because of the inherently clean pipeline quality natural gas, limited fuel oil use and, especially, the design of the GE unit.

Recent simple cycle emission limits in Region IV have typically been at 15 ppm for simple cycle "F Class" units. In fact, North Carolina recently issued a draft BACT to Dynegy for six dual-fuel Westinghouse "F Class" units with limits of 25 ppm. The Dynegy Westinghouse units must meet 15 ppm by early 2002.

For reference, the draft BACT requested by Oleander is a continuous limit of 9 ppm. Oleander will be allowed to operate on fuel oil for 1000 hours instead of the 2000 hours they requested (or the 750 hours to which TECO will be limited). Oleander is either more willing than TECO to take a risk on continuous compliance or more willing to pay for a continuing guarantee. Oleander's parent company, Constellation, included an identical simple cycle project for its planned High Desert Project in California where LAER is required. They undoubtedly tried to get them permitted for the lowest emission rate while avoiding SCR. When they shifted the simple cycle option to the Florida site, they decided to propose 9 ppm.

Our approach is sensible and our limit on fuel oil will provide some equity between the two determinations. It provides some flexibility in the way companies decide to manage the inherent risk in accepting low NO<sub>x</sub> limits on simple cycle intermittent duty units when there is no feasible "fall-back" technology alternative (such as conventional SCR for combined cycle units).

**We recommend your approval of the attached Intent to Issue.**

AAL/th

Attachments

Is your RETURN ADDRESS completed on the reverse side?

**SENDER:**

- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):

- 1.  Addressee's Address
- 2.  Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:

*Gregory M. Nelson, PE  
Manager, Encl. Planning  
Tampa Electric Co  
6944 US Hwy North  
Apollo Beach, FL  
33572-9200*

4a. Article Number

*Z 031 392 017*

4b. Service Type

- Registered  Certified
- Express Mail  Insured
- Return Receipt for Merchandise  COD

7. Date of Delivery

*10-12-99*

5. Received By: (Print Name)

*Nancy Foley*

6. Signature: (Addressee or Agent)

*X*

8. Addressee's Address (Only if requested and fee is paid)

PS Form 3811, December 1994.

102595-98-B-0229

Domestic Return Receipt

Thank you for using Return Receipt Service.

Z 031 392 017

US Postal Service

**Receipt for Certified Mail**

No Insurance Coverage Provided.

Do not use for International Mail (See reverse)

Sent to		<i>Greg Nelson</i>
Street & Number		<i>Tampa Electric</i>
Post Office, State, & ZIP Code		<i>Apollo Beach FL</i>
Postage	\$	
Certified Fee		
Special Delivery Fee		
Restricted Delivery Fee		
Return Receipt Showing to Whom & Date Delivered		
Return Receipt Showing to Whom, Date, & Addressee's Address		
TOTAL Postage & Fees	\$	
Postmark or Date		<i>10-8-99</i>
		<i>1050233 P50-FL-263</i>

PS Form 3800, April 1995

RECEIVED

JUL 26 1999

BUREAU OF AIR REGULATION



TAMPA ELECTRIC

July 23, 1999

Mr. A. A. Linero, P.E.  
Florida Department of Environmental Protection  
111 South Magnolia Drive, Suite 4  
Tallahassee, Florida 32301

Via FedEx  
Airbill No. 8132 1667 8077

**Re: Tampa Electric Company (TEC)  
Polk Power Station – CTG's 2 and 3  
Proof of Publication of the Intent to Issue (resubmittal)  
FDEP File No. PSD-FL-263 (PA92-32SA)**

Dear Mr. Linero:

Please find enclosed a clean copy of the proof of publication of the "Notice of Intent to Issue PSD Permit" to Tampa Electric Company for the construction of two combustion turbine-electrical generators. This copy is being sent to supplement the copy that was originally faxed to us by the Lakeland Ledger and submitted to the Department on July 16, 1999.

Thank you for your attention to this matter. If you have any concerns or questions feel free to contact me at (813) 641-5033.

Sincerely,

A handwritten signature in black ink, appearing to read "J. Hunter" followed by a flourish and the word "For" with a slash.

Jamie Hunter  
Administrator - Air Programs  
Environmental Planning

EPgmJJH902

Enclosure

cc: J. Hewson  
SWD  
B. Owen  
EPA

TAMPA ELECTRIC COMPANY  
P. O. BOX 111 TAMPA, FL 33601-0111

AN EQUAL OPPORTUNITY COMPANY  
[HTTP://WWW.TAMPAELECTRIC.COM](http://www.tampaelectric.com)

(813) 228-4111

CUSTOMER SERVICE:  
HILLSBOROUGH COUNTY (813) 223-0800  
OUTSIDE HILLSBOROUGH COUNTY 1 (888) 223-0800

STATE OF FLORIDA)  
COUNTY OF POLK)

Before the undersigned authority personally appeared Nelson Kirkland, who on oath says that he is Classified Advertising Manager of The Ledger, a daily newspaper published at Lakeland in Polk County, Florida; that the attached copy of advertisement, being a

Notice of Intent

DEP File No.: PSD-FL-263

in the matter of

in the

Court, was published in said newspaper in the issues of

July 10, 1999

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

Signed

*Nelson Kirkland*  
Nelson Kirkland  
Classified Advertising Manager  
Who is personally known to me.

Sworn to and subscribed before me this

12TH

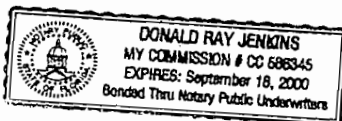
day of

July

A.D. 19 99

Notary Public

DONALD RAY JENKINS



(Seal)

My Commission Expires

197729

C 823

PUBLIC NOTICE OF INTENT TO ISSUE PSD PERMIT

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DEP File No. PSD-FL-263

Tampa Electric Company - Polk Power Station  
Polk County

The Department of Environmental Protection (Department) gives notice of its intent to issue a permit under the requirements for the Prevention of Significant Deterioration (PSD) of Air Quality to Tampa Electric Company (TEC). The permit is to construct two nominal 165 megawatt (MW) natural gas and distillate fuel oil-fired combustion turbine-electric generators with evaporative inlet coolers and two 114-foot stacks at the Polk Power Station at 9995 State Route 37 South, Mulberry, Polk County. A Best Available Control Technology (BACT) determination was required for particulate matter (PM/PM<sub>10</sub>), nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), sulfuric acid mist (SAM), and carbon monoxide (CO) pursuant to Rule 62-212.400, F.A.C. and 40 CFR 52.21. The applicant's name and address are Tampa Electric Company 6944 U.S. Highway 41 North, Apollo Beach, Florida 34741-6804.

The new units will be General Electric nominal 165 MW PG721FA combustion turbines-electric generators. The units will operate in simple cycle mode and intermittent duty. The units will operate primarily on natural gas and will be permitted to operate 4380 hours per year on gas and no more than 750 hours will be on maximum 0.05 percent sulfur distillate fuel oil.

NO<sub>x</sub> emissions will be controlled by Dry Low NO<sub>x</sub> (DLN) combustion. The units must achieve the manufacturer's initial "new and clean" performance guarantee of 9 parts per million by volume of 15 percent oxygen (ppmv) and meet a continuous emission limit of 10.5 ppmv. NO<sub>x</sub> will be controlled to 42 ppmv by wet oxygen injection using #2 fuel oil. Sulfuric acid mist, SO<sub>2</sub> and PM/PM<sub>10</sub> will be limited by use of clean fuels. Emissions of VOC and CO will be controlled by good combustion practices.

The maximum emissions in tons per year based on the original application are summarized below. CO emissions will be lower as a result of the Department's proposed BACT determination.

Pollutant	Maximum Potential Emissions	PSD Significant Emission Rate
PM/PM <sub>10</sub>	54	25/15
CO	303	100
NO <sub>x</sub>	581	40
VOC	18	40
SO <sub>2</sub>	126	40
Sulfuric Acid Mist	15	7

An air quality impact analysis was conducted. Maximum predicted impacts due to proposed emissions from the project are less than the applicable PSD Class I and Class II significant impact levels.

The Department will accept written comments and requests for a public hearing (meeting) concerning the proposed permit issuance action for a period of 30 (thirty) days from the date of publication of "Public Notice of Intent to Issue PSD Permit". Written comments should be provided to the Department's Bureau of Air Regulation at 2333 State Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit and require, if applicable, another Public Notice.

This PSD permitting action is being coordinated with a modification to the Site Certification Application submitted pursuant to the Power Plant Siting Act, Sections 403.501-519, F.S. If a petition for an administrative hearing on the Department's intent to issue PSD Permit is filed by a substantially affected person, that hearing shall be consolidated with any certification hearing pursuant to Section 403.507, F.S.

The Department will issue the permit with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to Sections 120.555 and 120.57, F.S., before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below. Mediation is not available in this proceeding.

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

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are no disputed issues of material fact, the petitioner must so indicate; (e) A concise statement of the ultimate facts alleged, as well as the rules and statutes which entitle the petitioner to relief; and (f) A demand for relief.

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

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

A complete project file is available for public inspection during normal business hours, 8:30 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

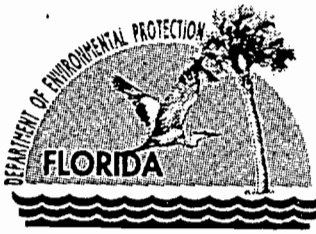
Dept. of Environmental Protection  
Bureau of Air Regulation  
111 S. Magnolia Drive, Suite 4  
Tallahassee, Florida 32301  
Telephone: 850/488-0114  
Fax: 850/922-6979

Dept. of Environmental Protection  
Southwest District Office  
3804 Coconut Palm Drive  
Tampa, Florida 33616-4218  
Telephone: 813/744-6100  
Fax: 813/744-6084

Polk County Environmental Services  
Natural Resources & Drainage Division  
4177 Ben Durance Road  
Barrow, Florida 33830  
941/534-7377  
941/534-7374

The complete project file includes the Draft Permit, the Technical Evaluation and Preliminary Determination, the BACT Determination, the application, and the information submitted by the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the New Resource Review Section at 111 South Magnolia Drive, Suite 4, Tallahassee, Florida 32301.





Jeb Bush  
Governor

# Department of Environmental Protection

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

David B. Struhs  
Secretary

June 30, 1999

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Gregory M. Nelson, P.E.  
Manager Environmental Planning  
Tampa Electric Company  
6944 U.S. Highway 41 North  
Apollo Beach, Florida 33572-9200

Re: DEP File No. PSD-FL-263  
Polk Power Station  
Two 165 Megawatt Combustion Turbines


Dear Mr. Nelson:

Enclosed is one copy of the Draft PSD Permit, Technical Evaluation and Preliminary Determination, and Draft BACT Determination, for the referenced project at the Polk Power Station located at 9995 State Route 37 South, Mulberry, Polk County. The Department's Intent to Issue PSD Permit and the "PUBLIC NOTICE OF INTENT TO ISSUE PSD PERMIT" are also included.

The "PUBLIC NOTICE OF INTENT TO ISSUE PSD PERMIT" must be published one time only as soon as possible in a newspaper of general circulation in the area affected, pursuant to Chapter 50, Florida Statutes. Proof of publication, i.e., newspaper affidavit, must be provided to the Department's Bureau of Air Regulation office within 7 (seven) days of publication. Failure to publish the notice and provide proof of publication within the allotted time may result in the denial of the permit.

Please submit any written comments you wish to have considered concerning the Department's proposed action to A. A. Linero, P.E., Administrator, New Source Review Section at the above letterhead address. If you have any questions, please call Ms. Teresa Heron at 850/921-9529.

Sincerely,

  
C. H. Fahey, P.E., Chief,  
Bureau of Air Regulation

CHF/th

Enclosures

**PUBLIC NOTICE OF INTENT TO ISSUE PSD PERMIT**

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DEP File No. PSD-FL-263

Tampa Electric Company - Polk Power Station  
Polk County

The Department of Environmental Protection (Department) gives notice of its intent to issue a permit under the requirements for the Prevention of Significant Deterioration (PSD) of Air Quality to Tampa Electric Company (TEC). The permit is to construct two nominal 165 megawatt (MW) natural gas and distillate fuel oil-fired combustion turbine-electrical generators with evaporative inlet coolers and two 114-foot stacks at the Polk Power Station at 9995 State Route 37 South, Mulberry, Polk County. A Best Available Control Technology (BACT) determination was required for particulate matter (PM/PM<sub>10</sub>), nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), sulfuric acid mist (SAM), and carbon monoxide (CO) pursuant to Rule 62-212.400, F.A.C. and 40 CFR 52.21. The applicant's name and address are Tampa Electric Company 6944 U.S. Highway 41 North, Apollo Beach, Florida 34741-6804.

The new units will be General Electric nominal 165 MW PG7241FA combustion turbines-electrical generators. The units will operate in simple cycle mode and intermittent duty. The units will operate primarily on natural gas and will be permitted to operate 4380 hours per year on gas and no more than 750 hours will be on maximum 0.05 percent sulfur distillate fuel oil.

NO<sub>x</sub> emissions will be controlled by Dry Low NO<sub>x</sub> (DLN) combustors. The units must achieve the manufacturer's initial "new and clean" performance guarantee of 9 parts per million by volume at 15 percent oxygen (ppm) and meet a continuous emission limit of 10.5 ppm. NO<sub>x</sub> will be controlled to 42 ppm by wet injection when firing fuel oil. Sulfuric acid mist, SO<sub>2</sub>, and PM/PM<sub>10</sub> will be limited by use of clean fuels. Emissions of VOC and CO will be controlled by good combustion practices.

The maximum emissions in tons per year based on the original application are summarized below. CO emissions will be lower as a result of the Department's proposed BACT determination.

<u>Pollutant</u>	<u>Maximum Potential Emissions</u>	<u>PSD Significant Emission Rate</u>
PM/PM <sub>10</sub>	54	25/15
CO	303	100
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VOC	18	40
SO <sub>2</sub>	126	40
Sulfuric Acid Mist	15	7

An air quality impact analysis was conducted. Maximum predicted impacts due to proposed emissions from the project are less than the applicable PSD Class I and Class II significant impact levels.

The Department will accept written comments and requests for a public hearing (meeting) concerning the proposed permit issuance action for a period of 30 (thirty) days from the date of publication of "Public Notice of Intent to Issue PSD Permit." Written comments should be provided to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit and require, if applicable, another Public Notice.

This PSD permitting action is being coordinated with a modification to the Site Certification Application submitted pursuant to the Power Plant Siting Act, Sections 403.501-519, F.S. If a petition for an administrative hearing on the Department's Intent to Issue PSD Permit is filed by a substantially affected person, that hearing shall be consolidated with any certification hearing pursuant to Section 403.507, F.S.

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

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

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

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

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

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

Department of Environmental Protection  
Bureau of Air Regulation  
111 S. Magnolia Drive, Suite 4  
Tallahassee, Florida 32301  
Telephone: 850/488-0114  
Fax: 850/922-6979

Department Environmental Protection  
Southwest District Office  
3804 Coconut Palm Drive  
Tampa, Florida 33619-8218  
Telephone: 813/744-6100  
Fax: 813/744-6084

Polk County Environmental Services  
Natural Resources & Drainage Division  
4177 Ben Durrance Road  
Bartow, Florida 33830  
941/534-7377  
941/534-7374

The complete project file includes the Draft Permit, the Technical Evaluation and Preliminary Determination, the BACT Determination, the application, and the information submitted by the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the New Resource Review Section at 111 South Magnolia Drive, Suite 4, Tallahassee, Florida 32301, or call 850/488-0114, for additional information.

In the Matter of an  
Application for Permit by:

Mr. Gregory M. Nelson, P.E.  
Manager, Environmental Planning  
Tampa Electric Company  
6944 U.S. Highway 41 North  
Apollo Beach, Florida 33572-9200

Facility I.D. No. 0530233  
DEP Permit No. PSD-FL-263  
Polk Power Station  
Polk County

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**INTENT TO ISSUE PSD PERMIT**

The Department of Environmental Protection (Department) gives notice of its intent to issue a permit under the requirements for the Prevention of Significant Deterioration of Air Quality (copy of Draft PSD Permit attached) for the proposed project, detailed in the application specified above and the attached Technical Evaluation and Preliminary Determination, for the reasons stated below.

The applicant, Tampa Electric Company, applied on February 8, 1999 to the Department for a PSD permit to construct two nominal 165-megawatt combustion turbines-electrical generators and two 114-foot stacks at the Polk Power Station, located at 9995 State Route 37 South, Mulberry, Polk County.

The Department has permitting jurisdiction under the provisions of Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code (F.A.C.) Chapters 62-4, 62-210, and 62-212. The above actions are not exempt from permitting procedures. The Department has determined that a permit under the provisions for the Prevention of Significant Deterioration (PSD) of Air Quality is required for the proposed work.

The Department intends to issue this PSD permit based on the belief that reasonable assurances have been provided to indicate that operation of these emission units will not adversely impact air quality, and the emission units will comply with all appropriate provisions of Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297, F.A.C. and 40 CFR 52.21.

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

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

The Department will accept written comments and requests for a public hearing (meeting) concerning the proposed permit issuance action for a period of 30 (thirty) days from the date of publication of "Public Notice of Intent to Issue PSD Permit." Written comments and requests for a public meeting should be provided to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit and require, if applicable, another Public Notice.

This PSD permitting action is being coordinated with a certification under the Power Plant Siting Act (Sections 403.501-519, F.S.). If a petition for an administrative hearing on the Department's Intent to Issue is filed by a substantially affected person, that hearing shall be consolidated with any certification hearing held pursuant to Section 403.507.

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

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

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

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

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

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

The application for a variance or waiver is made by filing a petition with the Office of General Counsel of the Department, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000. The petition must specify the following information: (a) The name, address, and telephone number of the petitioner; (b) The name, address, and telephone number of the attorney or qualified representative of the petitioner, if any; (c) Each

rule or portion of a rule from which a variance or waiver is requested; (d) The citation to the statute underlying (implemented by) the rule identified in (c) above; (e) The type of action requested; (f) The specific facts that would justify a variance or waiver for the petitioner; (g) The reason why the variance or waiver would serve the purposes of the underlying statute (implemented by the rule); and (h) A statement whether the variance or waiver is permanent or temporary and, if temporary, a statement of the dates showing the duration of the variance or waiver requested.

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

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

Executed in Tallahassee, Florida.



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

**CERTIFICATE OF SERVICE**

The undersigned duly designated deputy agency clerk hereby certifies that this INTENT TO ISSUE PSD PERMIT (including the PUBLIC NOTICE, Technical Evaluation and Preliminary Determination, Draft BACT Determination, and the DRAFT permit) was sent by certified mail (\*) and copies were mailed by U.S. Mail before the close of business on 6-29-99 to the person(s) listed:

Gregory .M. Nelson, TEC\*  
Gregg Worley, EPA  
John Bunyak, NPS  
Bill Thomas, DEP SWD  
Buck Oven, DEP PPSO  
Thomas W. Davis, P.E, ECT

Clerk Stamp

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

Keni Jones  
(Clerk)

6-29-99  
(Date)

TECHNICAL EVALUATION  
AND  
PRELIMINARY DETERMINATION

Tampa Electric Company

Polk Power Station  
Two 165 Megawatt Simple Cycle Combustion Turbines  
Mulberry, Polk County

DEP File No. PSD-FL-263 (PA92-32SA)

Department of Environmental Protection  
Division of Air Resources Management  
Bureau of Air Regulation

June 30, 1999

# TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

## 1. APPLICATION INFORMATION

### 1.1 Applicant Name and Address

Tampa Electric Company (TEC)  
9995 State Route 37 South  
Mulberry, Florida 33860-0775

*Authorized Representative: Mr. G. M. Nelson, Manager, Environmental Planning*

### 1.2 Reviewing and Processing Schedule

02-08-99: Receipt of PSD Application  
02-11-99: DEP/Siting Coordination Office Incompleteness Letter  
03-09-99: Preliminary DEP/BAR Incompleteness Letter  
05-10-99: Receipt of Site Certification Application and Revised PSD Application  
06-30-99: Intent to Issue PSD Permit

## 2. FACILITY INFORMATION

### 2.1 Facility Location

The Polk Power Station is located at 9995 State Road 37 South, in Mulberry, Polk County (see Figure 1). The general area is characterized primarily by phosphate mining, fertilizer plants, and electrical power plants. This site is approximately 120 kilometers southeast of the Chassahowitzka National Wilderness Area a Class I PSD Area. The UTM coordinates of this facility are Zone 17; 402.45 km E; 3067.35 km N.





## TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

The following photograph from TEC's website is a view looking east towards the existing facility.



### 2.2 Standard Industrial Classification Codes (SIC)

Industry Group No.	49	Electric, Gas, and Sanitary Services
Industry No.	4911	Electric Services

### 2.3 Facility Category

This facility presently generates electric power from a 260-megawatt (MW) integrated coal gasification and combined cycle turbine unit. The primary mover is a General Electric MS 7001F combustion turbine capable of firing syngas or No. 2 fuel oil. Associated support facilities include: a solid fuel gasification system; a hydrogen sulfide to sulfur dioxide converter; a sulfuric acid plant; solid fuel handling and storage; and fuel oil handling and storage.

The facility is classified as a Major or Title V Source of air pollution because emissions of at least one regulated air pollutant, such as particulate matter (PM/PM<sub>10</sub>), sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), or volatile organic compounds (VOC) exceeds 100 TPY. The facility is within an industry included in the list of the 28 Major Facility Categories per Table 212.400-1, F.A.C. Because present emissions are greater than 100 TPY for CO and NO<sub>x</sub>, the facility is also a Major Facility with respect to Rule 62-212.400, Prevention of Significant Deterioration (PSD).

As a Major Facility, project emissions greater than: Significant Emission Rates given in Table 212.400-2 (100 TPY of CO; 40 TPY of NO<sub>x</sub>, SO<sub>2</sub>, or VOC; 7 TPY of sulfuric acid mist (SAM); or 25/15 TPY of PM/PM<sub>10</sub>) require review per the PSD rules and a determination of Best Available Control Technology (BACT). This facility is also subject to the Title IV Acid Rain Program, 40 CFR 72 and must apply for an Acid Rain Permit at least 24 months prior to start up.

# TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

### 3. PROJECT DESCRIPTION

This permit addresses the following emissions units:

EMISSION UNIT	SYSTEM	Emission Unit Description
009 (CTG-2)	Power Generation	One nominal 165 Megawatt (nominal) Gas Combustion Turbine-Electrical Generator
010 (CTG-3)	Power Generation	One nominal 165 Megawatt (nominal) Gas Combustion Turbine-Electrical Generator

The Tampa Electric Company (TEC) proposes to construct two nominal 165 MW General Electric PG7241FA simple cycle, intermittent duty combustion turbine-electrical-generators with evaporative inlet coolers and two 114-foot stacks at the existing Polk Power Station. The project will use existing support facilities such as the 3,000,000-gallon fuel oil storage tank.

According to the application, the facility will emit approximately 581 tons per year (TPY) of NO<sub>x</sub>, 303 TPY of CO, 54 TPY of PM/PM<sub>10</sub>, 126 TPY of SO<sub>2</sub>, 18 TPY of VOC, and 15 TPY of SAM.

Significant emission rate increases per Table 212.400-2, F.A.C. will occur for carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), sulfuric acid mist (SAM), particulate matter (PM/PM<sub>10</sub>), volatile organic compounds (VOC) and nitrogen oxides (NO<sub>x</sub>). A BACT determination is required for each of these pollutants. An air quality impact review is also required for CO, PM/PM<sub>10</sub>, NO<sub>x</sub>, and SO<sub>2</sub>.

Each turbine will be equipped with Dry Low NO<sub>x</sub> (DLN-2.6) combustors for the control of NO<sub>x</sub> emissions to 9 - 10.5 ppmvd at 15% O<sub>2</sub> from 50% load up to 100% load conditions during normal operations. Each turbine will have a nominal heat input rating of 1,772 (gas) and 1,947 (oil) mmBtu/hr higher heating value (HHV) at 59 °F while operating at 100% load. The units are rated at 2,066 (oil) and 1,984 (gas) mmBtu/hr (HHV) at 20 °F. The main fuel will be natural gas and the units are proposed by TEC to operate up to 4,380 hours per year on natural gas and 876 hours per year on fuel oil.

Internal and external views of the GE MS7001FA (a predecessor of the PG7241FA) are shown in Figure 3 below. Each unit will be delivered with 14 can-annular design, DLN-2.6 combustors instead of the earlier-generation combustors supplied with the MS7001FA.

### 4. PROCESS DESCRIPTION

Much of the following discussion is from a 1993 EPA document on Alternative Control Techniques for NO<sub>x</sub> Emissions from Stationary Gas turbines. Project specific information is interspersed where appropriate.

A gas turbine is an internal combustion engine that operates with rotary rather than reciprocating motion. Ambient air is drawn into the 18-stage compressor of the GE 7FA where it is compressed by a pressure ratio of about 15 times atmospheric pressure. The compressed air is then directed to the combustor section, where fuel is introduced, ignited, and burned. The combustion section consists of 14 separate can-annular combustors.

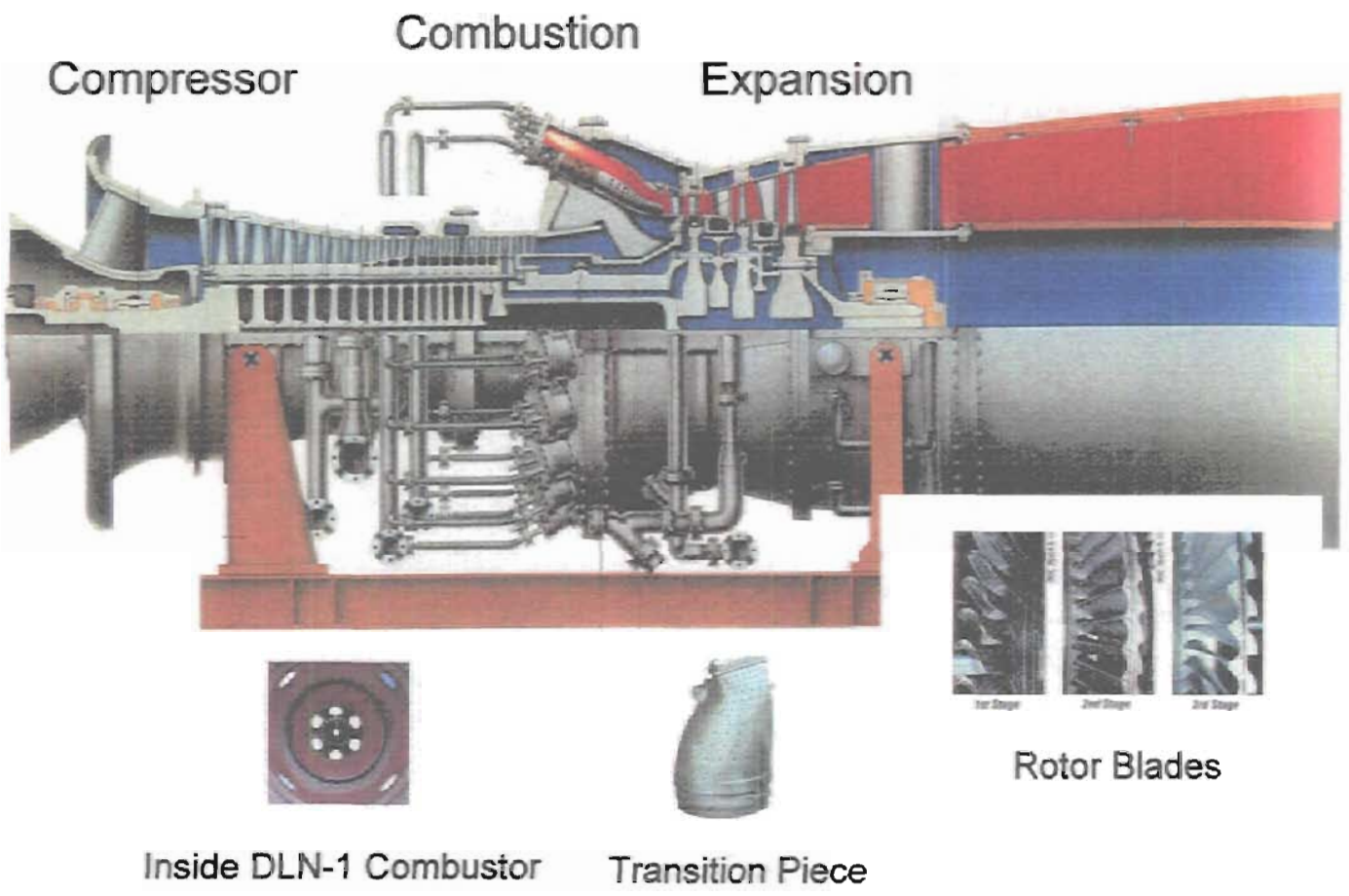


Figure 3 - Internal and External Views of GE MS7001FA

# TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

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Flame temperatures in a typical combustor section can reach 3600 degrees Fahrenheit (°F). Units such as the 7FA operate at lower flame temperatures, which minimize NO<sub>x</sub> formation. The hot combustion gases are then diluted with additional cool air and directed to the turbine section at temperatures of approximately 2400 °F. Energy is recovered in the turbine section in the form of shaft horsepower, of which typically more than 50 percent is required to drive the internal compressor section. The balance of recovered shaft energy is available to drive the external load unit such as an electrical generator.

In the TEC project, the units will operate as intermittent units in the simple cycle mode (see Figure 4). Cycle efficiency, defined as a percentage of useful shaft energy output to fuel energy input, is approximately 35 percent for F-Class combustion turbines in the simple cycle mode. In addition to shaft energy output, 1 to 2 percent of the heat input can be attributed to mechanical losses. The balance is exhausted from the turbine in the form of heat.

In combined cycle projects, the gas turbine drives an electric generator while the exhausted gases are used to raise additional steam in a heat recovery steam generator. The steam, in-turn, drives another electrical generator producing another 80-90 MW. In combined cycle mode, the thermal efficiency of the 7FA can exceed 56 percent.

At high ambient temperature, the units cannot generate as much power because of lower compressor inlet density. To compensate for the loss of output (which can be on the order of 20 MW compared to referenced temperatures), an evaporative inlet cooler can be installed ahead of the combustion turbine inlet. At an ambient temperature of 95 °F, roughly 7 – 14 MW of power can be regained per unit by using the foggers.

Additional process information related to the combustor design, and control measures to minimize pollutant emissions are given in the draft BACT determination distributed with this evaluation.

## 5. RULE APPLICABILITY

The proposed project is subject to preconstruction review requirements under the provisions of 40 CFR 52.21, Chapter 403, Florida Statutes, and Chapters 62-4, 62-204, 62-210, 62-212, 62-214, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.).

This facility is located in Polk County, an area designated as attainment for all criteria pollutants in accordance with Rule 62-204.360, F.A.C. The proposed project is subject to review under Rule 62-212.400, F.A.C., Prevention of Significant Deterioration (PSD), for the reasons given in Section 2.3, Facility category, above.

This PSD review consists of an evaluation of resulting ambient air pollutant concentrations, and increases with respect to the National Ambient Air Quality Standards and Increments as well as a determination of Best Available Control Technology (BACT) for PM/PM<sub>10</sub>, VOC, CO, SAM and NO<sub>x</sub>. An analysis of the air quality impact from proposed project upon soils, vegetation, and visibility is required along with air quality impacts resulting from associated commercial, residential, and industrial growth. This project will also be reviewed for Site Certification under the Power Plant Siting Act.

The emission units affected by this PSD permit shall comply with all applicable provisions of the Florida Administrative Code (including applicable portions of the Code of Federal Regulations incorporated therein) and, specifically, the following Chapters and Rules:

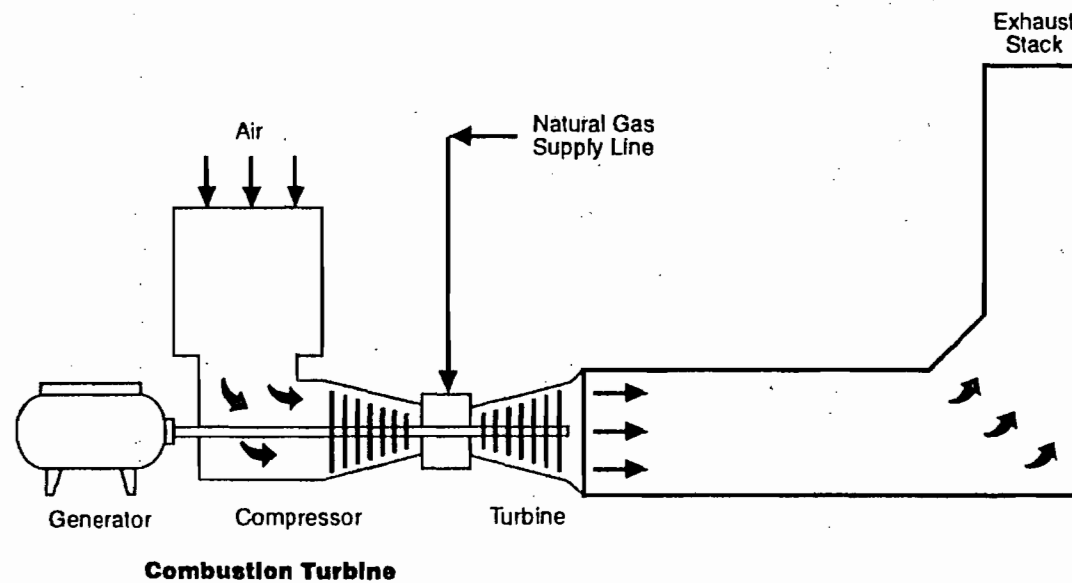


Figure 4 - Simple Cycle Combustion Turbine Process Flow Diagram

# TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

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## 5.1 State Regulations

Chapter 62-17	Electrical Power Siting
Chapter 62-4	Permits.
Rule 62-204.220	Ambient Air Quality Protection
Rule 62-204.240	Ambient Air Quality Standards
Rule 62-204.260	Prevention of Significant Deterioration Increments
Rule 62-204.800	Federal Regulations Adopted by Reference
Rule 62-210.300	Permits Required
Rule 62-210.350	Public Notice and Comments
Rule 62-210.370	Reports
Rule 62-210.550	Stack Height Policy
Rule 62-210.650	Circumvention
Rule 62-210.700	Excess Emissions
Rule 62-210.900	Forms and Instructions
Rule 62-212.300	General Preconstruction Review Requirements
Rule 62-212.400	Prevention of Significant Deterioration
Chapter 62-213	Operation Permits for Major Sources of Air Pollution
Chapter 62-214	Requirements For Sources Subject To The Federal Acid Rain Program
Rule 62-296.320	General Pollutant Emission Limiting Standards
Rule 62-297.310	General Test Requirements
Rule 62-297.401	Compliance Test Methods
Rule 62-297.520	EPA Continuous Monitor Performance Specifications

## 5.2 Federal Rules

40 CFR 52.21	Prevention of Significant Deterioration
40 CFR 60	NSPS Subpart GG
40 CFR 60	Applicable sections of Subpart A, General Requirements
40 CFR 72	Acid Rain Permits (applicable sections)
40 CFR 73	Allowances (applicable sections)
40 CFR 75	Monitoring (applicable sections including applicable appendices)
40 CFR 77	Acid Rain Program-Excess Emissions (future applicable requirements)

## 6. SOURCE IMPACT ANALYSIS

### 6.1 Emission Limitations

The proposed Units 1-3 will emit the following PSD pollutants (Table 212.400-2, F.A.C.): PM/PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub>, VOC, CO, SAM, and negligible quantities of fluorides (F), mercury (Hg) and lead (Pb). The applicant's proposed annual emissions are summarized in the Table below and form the basis of the source impact review. The Department's proposed permitted allowable emissions for these Units are summarized in the Draft BACT document and Specific Conditions Nos. xx through xx of Draft Permit PSD-FL-263.

### 6.2 Emission Summary

The annual emissions increases for all PSD pollutants as a result of the project are presented below:



# TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

## PROJECT EMISSIONS (TPY) AND PSD APPLICABILITY

Pollutant	Gas Firing <sup>1</sup>	Oil Firing <sup>1</sup>	Total <sup>1</sup>	PSD Significance	PSD REVIEW?
PM/PM <sub>10</sub>			54	25	Yes
SO <sub>2</sub>	40	86	126	40	Yes
NO <sub>x</sub>	301	280	581	40	Yes
CO	210	93	303	100	Yes
Ozone(VOC)			18	40	Yes
Sulfuric Acid Mist	5	10	15	7	Yes
Total Fluorides	<<3	<<3	<<3	3	No
Mercury	<<0.1	<<0.1	<0.1	0.1	No
Lead	<<0.6	<<0.6	<0.6	0.6	No

1. Based on 4380 hours of gas firing and 876 hours of fuel oil firing. Reference ambient temperature is 59 °F.

### 6.3 Control Technology

Emissions control will be primarily accomplished by good combustion of clean natural gas and limited use of low sulfur (0.05 percent) fuel oil. The gas turbine combustors will operate in lean pre-mixed mode to minimize the flame temperature and nitrogen oxides formation potential. A full discussion is given in the BACT Determination (see Permit Appendix BD). The Draft BACT is incorporated into this evaluation by reference.

### 6.4 Air Quality Analysis

#### 6.4.1 Introduction

The proposed project will increase emissions of five pollutants at levels in excess of PSD significant amounts: PM<sub>10</sub>, CO, NO<sub>x</sub>, SO<sub>2</sub>, and H<sub>2</sub>SO<sub>4</sub> mist. PM<sub>10</sub>, SO<sub>2</sub>, and NO<sub>x</sub> are criteria pollutants and have national and state ambient air quality standards (AAQS), PSD increments, and significant impact levels defined for them. CO is a criteria pollutant and has only AAQS and significant impact levels defined for it. There are no applicable PSD increments or AAQS for H<sub>2</sub>SO<sub>4</sub> mist.

The applicant's initial PM<sub>10</sub>, CO, NO<sub>x</sub>, and SO<sub>2</sub> air quality impact analyses for this project predicted no significant impacts; therefore, further applicable AAQS and PSD increment impact analyses for these pollutants were not required. Based on the preceding discussion the air quality analyses required by the PSD regulations for this project are the following:

- A significant impact analysis for PM<sub>10</sub>, CO, SO<sub>2</sub>, and NO<sub>x</sub>;
- An analysis of impacts on soils, vegetation, and visibility and of growth-related air quality modeling impacts.

Based on these required analyses, the Department has reasonable assurance that the proposed project, as described in this report and subject to the conditions of approval proposed herein, will not cause or significantly contribute to a violation of any AAQS or PSD increment. However, the following EPA-directed stack height language is included: "In approving this

## TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

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permit, the Department has determined that the application complies with the applicable provisions of the stack height regulations as revised by EPA on July 8, 1985 (50 FR 27892). Portions of the regulations have been remanded by a panel of the U.S. Court of Appeals for the D.C. Circuit in *NRDC v. Thomas*, 838 F. 2d 1224 (D.C. Cir. 1988). Consequently, this permit may be subject to modification if and when EPA revises the regulation in response to the court decision. This may result in revised emission limitations or may affect other actions taken by the source owners or operators." A more detailed discussion of the required analyses follows.

### 6.4.2 Models and Meteorological Data Used in the Significant Impact Analysis

The EPA-approved SCREEN3 (screening model) and Industrial Source Complex Short-Term (ISCST3) dispersion models were used to evaluate the pollutant emissions from the proposed project. These models determine ground-level concentrations of inert gases or small particles emitted into the atmosphere by point, area, and volume sources. They incorporate elements for plume rise, transport by the mean wind, Gaussian dispersion, and pollutant removal mechanisms such as deposition. The ISCST3 model allows for the separation of sources, building wake downwash, and various other input and output features. A series of specific model features, recommended by the EPA, are referred to as the regulatory options. The applicant used the EPA recommended regulatory options. Direction-specific downwash parameters were used for all sources for which downwash was considered. The stacks associated with this project all satisfy the good engineering practice (GEP) stack height criteria.

Meteorological data used in the ISCST3 model consisted of a concurrent 5-year period of hourly surface weather observations and twice-daily upper air soundings from the National Weather Service (NWS) stations at St. Petersburg/Clearwater, Florida (surface data) and Ruskin, Florida (upper air data). The 5-year period of meteorological data was from 1992 through 1996. These NWS stations were selected for use in the study because they are the closest primary weather stations to the study area and are most representative of the project site. The surface observations included wind direction, wind speed, temperature, cloud cover, and cloud ceiling.

For determining the project's significant impact area in the vicinity of the facility and if there are significant impacts from the project on any PSD Class I area, the highest predicted short-term concentrations and highest predicted annual averages were compared to their respective significant impact levels.

### 6.4.3 Significant Impact Analysis

Initially, the applicant conducts modeling using only the proposed project's emissions at worst load conditions. In order to determine worst-case load conditions the SCREEN3 model was used to evaluate dispersion of emissions from the combined cycle facility for three loads (50%, 75%, and 100%) and three seasonal operating conditions (summer, winter, and average). If this modeling at worst-case load conditions shows significant impacts, additional multi-source modeling is required to determine the project's impacts on the existing air quality and any applicable AAQS and PSD increments. Receptors were placed along the fence line of the facility, which is located in a PSD Class II area. They were also placed in the Chassahowitzka National Wilderness Area (CNWA), which is the closest PSD



## TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

Class I area. CNWA is located approximately 120 km northwest of the project. The receptor grid for predicting maximum concentrations in the vicinity of the project was a polar receptor grid that contained 24 rings and 10° spacing radials with dimensions centered on the simple-cycle facility stacks. The inner portion of the grid had rings at 500 m spacing out to 4,000m. A 1,000 m spacing was used out to 10,000 m; and a 2,500 m spacing was used out to 35,000m. From 35,000 m to 50,000 m, a 5,000 m spacing was used. For predicting impacts at the CNWA, thirteen discrete receptors along the border of the PSD Class I area were used. For each pollutant subject to PSD and also subject to PSD increment and/or AAQS analyses, this modeling compares maximum predicted impacts due to the project with PSD significant impact levels to determine whether significant impacts due to the project are predicted in the vicinity of the facility or in the CNWA. The tables below show the results of this modeling.

### MAXIMUM PROJECT AIR QUALITY IMPACTS FOR COMPARISON TO THE PSD CLASS II SIGNIFICANT IMPACT LEVELS IN THE VICINITY OF THE FACILITY

Pollutant	Averaging Time	Max Predicted Impact (ug/m <sup>3</sup> )	Significant Impact Level (ug/m <sup>3</sup> )	Significant Impact?
PM <sub>10</sub>	Annual	0.001	1	NO
	24-hour	0.08	5	NO
CO	8-hour	1.17	500	NO
	1-hour	2.78	2000	NO
NO <sub>2</sub>	Annual	0.008	1	NO
SO <sub>2</sub>	Annual	0.002	1	NO
	24-hour	0.31	5	NO
	3-hour	1.62	25	NO

### MAXIMUM PROJECT AIR QUALITY IMPACTS FOR COMPARISON TO THE PSD CLASS I SIGNIFICANT IMPACT LEVELS (CNWA)

Pollutant	Averaging Time	Max. Predicted Impact at Class I Area (ug/m <sup>3</sup> )	Proposed EPA Significant Impact Level (ug/m <sup>3</sup> )	Significant Impact?
PM <sub>10</sub>	Annual	0.0004	0.2	NO
	24-hour	0.03	0.3	NO
NO <sub>2</sub>	Annual	0.005	0.1	NO
SO <sub>2</sub>	Annual	0.001	0.1	NO
	24-hour	0.15	0.2	NO
	3-hour	0.89	1	NO

The results of the significant impact modeling show that there are no significant impacts predicted from emissions from this project; therefore, no further modeling was required.

# TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

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## 6.4.4 Impacts Analysis

### *Impact Analysis Impacts On Soils, Vegetation, And Wildlife*

Very low emissions are expected from this natural gas-fired combustion turbine in comparison with conventional power plant generating equal power. Emissions of acid rain and ozone precursors will be very low. The maximum ground-level concentrations predicted to occur for PM<sub>10</sub>, CO, NO<sub>x</sub>, SO<sub>2</sub> and sulfuric acid mist as a result of the proposed project, including background concentrations and all other nearby sources, will be less than the respective ambient air quality standards (AAQS). The project impacts are less than the significant impact levels which in-turn are less than the applicable allowable increments for each pollutant. Because the AAQS are designed to protect both the public health and welfare and the project impacts are less than significant, it is reasonable to assume the impacts on soils, vegetation, and wildlife will be minimal or insignificant.

### *Impact On Visibility*

Natural gas and low ash distillate fuel oil are clean fuels and produce little ash. This will minimize smoke formation. The low NO<sub>x</sub> and SO<sub>2</sub> emissions will also minimize plume opacity. Because no add-on control equipment and no reagents are required, there will be no steam plume or tendency to form ammoniated particulate species. A regional haze analysis was performed which shows that the proposed project will not result in adverse impacts on visibility in the nearest PSD Class I area.

### *Growth-Related Air Quality Impacts*

There will be short-term increases in the labor force to construct the project. These temporary increases will not result in significant commercial and residential growth in the vicinity of the project. Operation of the additional unit will require 10 more permanent employees which will cause no significant impact on the local area.

Over the past few years the Public Service Commission has determined that a number of power projects are needed will help meet the low electrical reserve capacity throughout the State of Florida. The project is a response to state-wide and regional growth and also accommodates more growth. There are no adequate procedures under the PSD rules to fully assess these impacts. However, the type of project proposed has a small overall physical "footprint," low water requirements, and the among the lowest air emissions per unit of electric power generating capacity for intermittent duty.

### *Hazardous Air Pollutants*

The project is not a major source of hazardous air pollutants (HAPs) and is not subject to any specific industry or HAP control requirements pursuant to Section 112 of the Clean Air Act.

## 7. CONCLUSION

Based on the foregoing technical evaluation of the application and additional information submitted by the applicant, the Department has made a preliminary determination that the proposed project will comply with all applicable state and federal air pollution regulations, provided the Department's BACT determination is implemented.

*A. A. Linero, P.E.*

*Teresa Heron, Engineer*

*Chris Carlson, Meteorologist*

**PERMITTEE:**

Tampa Electric Company (TEC)  
6944 U.S. Highway 41 North  
Apollo Beach, Florida 33572-9200

File No.	PSD-FL-263 (PA92-32)
FID No.	1050233
SIC No.	4911
Expires:	December 31, 2002

*Authorized Representative:*

Gregory M. Nelson, Manager, Environmental Planning

**PROJECT AND LOCATION:**

Permit pursuant to the requirements for the Prevention of Significant Deterioration of Air Quality (PSD Permit) for the construction of: two dual-fuel nominal 165 megawatt (MW) General Electric PG7241FA combustion turbine-electrical generators and two 114-foot stacks. The units will operate in simple cycle mode and intermittent duty. The units will be equipped with Dry Low NO<sub>x</sub> (DLN-2.6) combustors and wet injection capability. They are designated by TEC as CTGs Nos. 2 and 3 and by the Department as ARMS Emissions Units 009 and 010.

The project will be located at the existing Polk Power Station, 9995 State Route 37 South, Mulberry, Polk County. UTM coordinates are: Zone 17; 402.45 km E; 3067.35 km N.

**STATEMENT OF BASIS:**

This PSD permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.) and 40CFR52.21. The above named permittee is authorized to modify the facility in accordance with the conditions of this permit and as described in the application, approved drawings, plans, and other documents on file with the Department of Environmental Protection (Department).

Attached Appendices and Tables made a part of this permit:

Appendix BD	BACT Determination
Appendix GC	Construction Permit General Conditions

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Howard L. Rhodes, Director  
Division of Air Resources  
Management

**PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-263**

**SECTION I - FACILITY INFORMATION**

**FACILITY DESCRIPTION**

This facility presently generates electric power from a 260 megawatt (MW) integrated coal gasification and combined cycle turbine unit. The primary mover is a General Electric MS 7001F combustion turbine capable of firing syngas or No. 2 fuel oil. Associated support facilities include: a solid fuel gasification system; a hydrogen sulfide to sulfur dioxide converter; a sulfuric acid plant; solid fuel handling and storage; and fuel oil handling and storage.

This permitting action is to install two dual-fuel nominal 165 megawatt (MW) General Electric PG7241FA combustion turbine-electrical generators with two 114-foot stacks. The project will utilize existing infrastructure including oil storage and auxiliary equipment.

Emissions from the new units will be controlled by Dry Low NO<sub>x</sub> (DLN-2.6) combustors when operating on natural gas and wet injection when firing fuel oil. Inherently clean fuels and good combustion practices will be employed to control all pollutants.

**EMISSION UNITS**

This permit addresses the following emission units:

ARMS EMISSIONS UNIT	SYSTEM	EMISSION UNIT DESCRIPTION
009 (CTG-2)	Power Generation	One nominal 165 Megawatt Gas Simple Cycle Combustion Turbine-Electrical Generator
010 (CTG-3)	Power Generation	One nominal 165 Megawatt Simple Cycle Gas Combustion Turbine-Electrical Generator

**REGULATORY CLASSIFICATION**

The facility is classified as a Major or Title V Source of air pollution because emissions of at least one regulated air pollutant, such as particulate matter (PM/PM<sub>10</sub>), sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), or volatile organic compounds (VOC) exceeds 100 tons per year (TPY).

This facility is within an industry included in the list of the 28 Major Facility Categories per Table 212.400-1, F.A.C. Because emissions are greater than 100 TPY for at least one criteria pollutant, the facility is also a Major Facility with respect to Rule 62-212.400, Prevention of Significant Deterioration (PSD). Pursuant to Table 62-212.400-2, modifications at this facility resulting in emissions increases greater than any of the following values require review per the PSD rules as well as a determination of Best Available Control Technology (BACT): 40 TPY of NO<sub>x</sub>, SO<sub>2</sub>, or VOC; 25/15 TPY of PM/PM<sub>10</sub>; 100 TPY of CO; or 7 TPY of sulfuric acid mist (SAM).

This project is subject to certain requirements of Chapter 403, Part II, F.S., Electric Power Plant and Transmission Line Siting, including a modification of the Conditions of Certification (reference Site Certification PA92-32).

# PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-263

## SECTION I - FACILITY INFORMATION

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This facility and the project are also subject to applicable provisions of Title IV, Acid Rain, of the Clean Air Act..

### PERMIT SCHEDULE

- xx/xx/99 Modification of Conditions of Certification Approved
- xx/xx/99 Notice of Intent to Issue PSD Permit published in \_\_\_\_\_
- 06/30/99 Distributed Intent to Issue Permit
- 06/10/99 Application deemed complete for PSD review.
- 02/08/99 Received revised PSD Application

### RELEVANT DOCUMENTS:

The documents listed below are the basis of the permit. They are specifically related to this permitting action, but not all are incorporated into this permit. These documents are on file with the Department.

- Application received on February 8, 1999
- Department/ Siting Coordination Office incompleteness letter dated February 11, 1999
- Department/BAR memo to Siting Coordination Office dated March 9, 1999
- Comments and letter from the U. S. Fish and Wildlife Service dated March 19, 1999.
- Site Certification and Revised PSD Application received May 10, 1999
- Department/BAR comments on Modeling dated May 20, 1999
- Comments from Hillsborough County EPC dated June 7, 1999
- Response from TEC/ECT received June 10, 1999
- Department's Intent to Issue PSD Permit and Public Notice Package dated June 30, 1999.
- Department's Final Determination and Best Available Control Technology Determination issued concurrently with this Final Permit.

**PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-263**  
**SECTION II - ADMINISTRATIVE REQUIREMENTS**

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**GENERAL AND ADMINISTRATIVE REQUIREMENTS**

1. Regulating Agencies: All documents related to applications for permits to construct, operate or modify an emissions unit should be submitted to the Bureau of Air Regulation (BAR), Florida Department of Environmental Protection (FDEP), at 2600 Blirstone Road, Tallahassee, Florida 32399-2400 and phone number (850)488-0114. All documents related to reports, tests, and notifications should be submitted to the DEP Southwest District, 3804 Coconut Palm Drive, Tampa, Fl 33619-8218 and phone number 813/744-6100.
2. General Conditions: The owner and operator is subject to and shall operate under the attached General Permit Conditions G.1 through G.15 listed in Appendix GC of this permit. General Permit Conditions are binding and enforceable pursuant to Chapter 403 of the Florida Statutes. [Rule 62-4.160, F.A.C.]
3. Terminology: The terms used in this permit have specific meanings as defined in the corresponding chapters of the Florida Administrative Code.
4. Forms and Application Procedures: The permittee shall use the applicable forms listed in Rule 62-210.900, F.A.C. and follow the application procedures in Chapter 62-4, F.A.C. [Rule 62-210.900, F.A.C.]
5. Modifications: The permittee shall give written notification to the Department when there is any modification to this facility. This notice shall be submitted sufficiently in advance of any critical date involved to allow sufficient time for review, discussion, and revision of plans, if necessary. Such notice shall include, but not be limited to, information describing the precise nature of the change; modifications to any emission control system; production capacity of the facility before and after the change; and the anticipated completion date of the change. [Chapters 62-210 and 62-212, F.A.C.]
6. Expiration: Approval to construct shall become invalid if construction is not commenced within 18 months after receipt of such approval, or if construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable time. The Department may extend the 18-month period upon a satisfactory showing that an extension is justified. [40 CFR 52.21(r)(2)]
7. BACT Determination: In conjunction with extension of the 18 month periods to commence or continue construction, or extension of the December 31, 2002 permit expiration date, the permittee may be required to demonstrate the adequacy of any previous determination of best available control technology for the source. In accordance with paragraph (4) of 40 CFR 52.21(j) the Best Available Control Technology (BACT) determination shall be reviewed and modified as appropriate in the event of a plant conversion. This paragraph states: "For phased construction project, the determination of best available control technology shall be reviewed and modified as appropriate at the latest reasonable time which occurs no later than 18 months prior to commencement of construction of each independent phase of the project. At such time, the owner or operator of the applicable stationary source may be required to demonstrate

## PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-263

### SECTION II - ADMINISTRATIVE REQUIREMENTS

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the adequacy of any previous determination of best available control technology for the source.” [40 CFR 52.21(j)(4), Rule 62-4.070 F.A.C.]

8. Permit Extension: The permittee, for good cause, may request that this PSD permit be extended. Such a request shall be submitted to the Bureau of Air Regulation prior to 60 days before the expiration of the permit (Rule 62-4.080, F.A.C.).
9. Application for Title IV Permit: An application for a Title IV Acid Rain Permit, must be submitted to the U.S. Environmental Protection Agency Region IV office in Atlanta, Georgia and a copy to the DEP’s Bureau of Air Regulation in Tallahassee 24 months before the date on which a new unit begins serving an electrical generator greater than 25 MW. [40 CFR 72]
10. Application for Title V Permit: An application for a Title V operating permit, pursuant to Chapter 62-213, F.A.C., must be submitted to the DEP’s Bureau of Air Regulation, and a copy to the Department’s Southwest District. [Chapter 62-213, F.A.C.]
11. New or Additional Conditions: Pursuant to Rule 62-4.080, F.A.C., for good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions; and on application of the permittee, the Department may grant additional time. [Rule 62-4.080, F.A.C.]
12. Annual Reports: Pursuant to Rule 62-210.370(2), F.A.C., Annual Operation Reports, the permittee is required to submit annual reports on the actual operating rates and emissions from this facility. Annual operating reports shall be sent to the DEP’s Southwest District by March 1st of each year.
13. Stack Testing Facilities: Stack sampling facilities shall be installed in accordance with Rule 62-297.310(6), F.A.C.
14. Quarterly Reports: Quarterly excess emission reports, in accordance with 40 CFR 60.7 (a)(7) (c) (1998 version), shall be submitted to the DEP’s Southwest District.

# PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-263

## SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

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### APPLICABLE STANDARDS AND REGULATIONS:

1. Unless otherwise indicated in this permit, the construction and operation of the subject emission unit(s) shall be in accordance with the capacities and specifications stated in the application. The facility is subject to all applicable provisions of Chapter 403, F.S. and Florida Administrative Code Chapters 62-4, 62-17, 62-204, 62-210, 62-212, 62-213, 62-214, 62-296, and 62-297; and the applicable requirements of the Code of Federal Regulations Section 40, Parts 52, 60, 72, 73, and 75.
2. Issuance of this permit does not relieve the facility owner or operator from compliance with any applicable federal, state, or local permitting requirements or regulations. [Rule 62-210.300, F.A.C.]
3. These emission units shall comply with all applicable requirements of 40CFR60, Subpart A, General Provisions including:
  - 40CFR60.7, Notification and Recordkeeping
  - 40CFR60.8, Performance Tests
  - 40CFR60.11, Compliance with Standards and Maintenance Requirements
  - 40CFR60.12, Circumvention
  - 40CFR60.13, Monitoring Requirements
  - 40CFR60.19, General Notification and Reporting requirements
4. ARMS Emissions Unit 009. Direct Power Generation, consisting of a nominal 165 megawatt simple cycle combustion turbine-electrical generator, shall comply with all applicable provisions of 40CFR60, Subpart GG, Standards of Performance for Stationary Gas Turbines, adopted by reference in Rule 62-204.800(7)(b), F.A.C. The Subpart GG requirement to correct test data to ISO conditions applies. However, such correction is not used for compliance determinations with the BACT standard(s).
5. ARMS Emissions Unit 010. Direct Power Generation, consisting of a nominal 165 megawatt simple cycle combustion turbine-electrical generator, shall comply with all applicable provisions of 40CFR60, Subpart GG, Standards of Performance for Stationary Gas Turbines, adopted by reference in Rule 62-204.800(7)(b), F.A.C. The Subpart GG requirement to correct test data to ISO conditions applies. However, such correction is not used for compliance determinations with the BACT standard(s).
6. All notifications and reports required by the above specific conditions shall be submitted to the DEP's Southwest District.

### GENERAL OPERATION REQUIREMENTS

7. Fuels: Only pipeline natural gas or maximum 0.05 percent sulfur fuel oil No. 2 or superior grade of distillate fuel oil shall be fired in this unit. [Applicant Request, Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)] {Note: The limitation of this specific condition is more stringent than the NSPS sulfur dioxide limitation and thus assures compliance with 40 CFR 60.333 and 60.334}



## PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-263

### SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

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8. Combustion Turbine Capacity: The maximum heat input rates, based on the higher heating value (LHV) of each fuel to each unit at ambient conditions of 59°F temperature, 60% relative humidity, 100% load, and 14.7 psi pressure shall not exceed 1,600 million Btu per hour (mmBtu/hr) when firing natural gas, nor 1,800 mmBtu/hr when firing No. 2 or superior grade of distillate fuel oil. These maximum heat input rates will vary depending upon ambient conditions and the combustion turbine characteristics. Manufacturer's curves corrected for site conditions or equations for correction to other ambient conditions shall be provided to the Department of Environmental Protection (DEP) within 45 days of completing the initial compliance testing. [Design, Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]
9. Unconfined Particulate Emissions: During the construction period, unconfined particulate matter emissions shall be minimized by dust suppressing techniques such as covering and/or application of water or chemicals to the affected areas, as necessary.
10. Plant Operation - Problems: If temporarily unable to comply with any of the conditions of the permit due to breakdown of equipment or destruction by fire, wind or other cause, the owner or operator shall notify the DEP Southwest District as soon as possible, but at least within (1) working day, excluding weekends and holidays. The notification shall include: pertinent information as to the cause of the problem; the steps being taken to correct the problem and prevent future recurrence; and where applicable, the owner's intent toward reconstruction of destroyed facilities. Such notification does not release the permittee from any liability for failure to comply with the conditions of this permit and the regulations. [Rule 62-4.130, F.A.C.]
11. Operating Procedures: Operating procedures shall include good operating practices and proper training of all operators and supervisors. The good operating practices shall meet the guidelines and procedures as established by the equipment manufacturers. All operators (including supervisors) of air pollution control devices shall be properly trained in plant specific equipment. [Rule 62-4.070(3), F.A.C.]
12. Circumvention: The owner or operator shall not circumvent the air pollution control equipment or allow the emission of air pollutants without this equipment operating properly. [Rules 62-210.650, F.A.C.]
13. Maximum allowable hours of operation for each unit are 4,380 hours per year on natural gas and 750 hours on fuel oil. [Applicant Request, Rule 62-210.200, F.A.C., (Definitions - Potential Emissions), 62-212.400, F.A.C., (BACT Determination)]

### CONTROL TECHNOLOGY

14. Dry Low NO<sub>x</sub> (DLN) combustors shall be installed on the stationary combustion turbine to comply with the NO<sub>x</sub> emissions limits while firing natural gas. [Design, Rules 62-4.070 and 62-212.400, F.A.C. (BACT Determination)]
15. A water injection system shall be installed for use when firing No. 2 or superior grade distillate fuel oil for control of NO<sub>x</sub> emissions. [Design, Rules 62-4.070 and 62-212.400, F.A.C.]

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### SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

16. The permittee shall design these units to accommodate adequate testing and sampling locations for compliance with the applicable emission limits (per each unit) listed in Specific Conditions No. 19 through 24. [Rule 62-4.070, Rule 62-204.800, F.A.C., and 40 CFR60.40a(b)]
17. The permittee shall provide manufacturer's emissions performance versus load diagrams for the DLN and wet injection systems prior to their installation. DLN systems shall each be tuned upon initial operation to optimize emissions reductions and shall be maintained to minimize NO<sub>x</sub> emissions and CO emissions. Operation of the DLN systems in the diffusion-firing mode shall be minimized when firing natural gas. [Rule 62-4.070, and 62-210.650, F.A.C.]

#### EMISSION LIMITS AND STANDARDS

18. Following is a summary of the emission limits and required technology. Values for NO<sub>x</sub> are corrected to 15 % O<sub>2</sub> on a dry basis. These limits or their equivalent in terms of lb/hr or NSPS units, as well as the applicable averaging times, are followed by the applicable specific conditions [Rules 62-212.400, 62-204.800(7)(b) (Subpart GG), 62-210.200 (Definitions-Potential Emissions) F.A.C.]

POLLUTANT	CONTROL TECHNOLOGY	EMISSION LIMIT
PM/PM <sub>10</sub> , VE	Pipeline Natural Gas Good Combustion	10 Percent Opacity
VOC	As Above	1.4 ppm (Gas) 3.5 ppm (FO)
CO	As Above	12 ppm (Gas) 20 ppm (FO)
SO <sub>2</sub> and Sulfuric Acid Mist	Pipeline Natural Gas Low Sulfur Oil	2 gr S/100 F <sup>3</sup> 0.05% S Fuel Oil
NO <sub>x</sub>	DLN, WI for F.O., limited fuel oil usage	10.5 ppmvd (DLN) 42 ppmvd (FO)

#### 19. Nitrogen Oxides (NO<sub>x</sub>) Emissions:

- When NO<sub>x</sub> monitoring data is not available, substitution for missing data shall be handled as required by Title IV (40 CFR 75) to calculate any specified average time.
- While firing Natural Gas: The emission rate of NO<sub>x</sub> in the exhaust gas shall not exceed 10.5 ppm @15% O<sub>2</sub> (at ISO conditions) on a 24 hr block average as measured by the continuous emission monitoring system (CEMS). In addition, NO<sub>x</sub> emissions calculated as NO<sub>2</sub> (at ISO conditions) shall not exceed 59 pounds per hour and 9 ppm @15% O<sub>2</sub> to be demonstrated by the initial "new and clean" GE performance stack test. [Rule 62-212.400, F.A.C.]

Notwithstanding the applicable NO<sub>x</sub> limit during normal operation, reasonable measures shall be implemented to maintain the concentration of NO<sub>x</sub> in the exhaust gas at 9 ppmvd at 15% O<sub>2</sub> or lower. Any tuning of the combustors for Dry Low NO<sub>x</sub> operation while

## PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-263

### SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

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firing gas shall result in initial subsequent NO<sub>x</sub> concentrations of 9 ppmvd @15% O<sub>2</sub> or lower. [Rules 62-212.400 and 62-4.070, F.A.C.]

- While firing Fuel oil: The concentration of NO<sub>x</sub> in the exhaust gas shall not exceed 42 ppmvd at 15% O<sub>2</sub> on the basis of a 3 hr average as measured by the continuous emission monitoring system (CEMS). In addition, NO<sub>x</sub> emissions calculated as NO<sub>2</sub> (at ISO conditions) shall not exceed 319 lb/hr and 42 ppm @15% O<sub>2</sub> to be demonstrated by stack test. [Rule 62-212.400, F.A.C.]

Within 18 months after the initial compliance test, the permittee shall prepare and submit for the Department's review and acceptance an engineering report regarding the lowest NO<sub>x</sub> emission rate that can consistently be achieved when firing distillate oil. This lowest recommended rate shall include a reasonable operating margin, taking into account long-term performance expectations and good operating and maintenance practices. The Department may revise the NO<sub>x</sub> emission rate based upon this report. [BACT determination]

20. Carbon Monoxide (CO) Emissions: The concentration of CO in the stack exhaust gas (at ISO conditions) with the combustion turbine operating on natural gas shall exceed neither 12 ppm nor 38 lb/hr and 20 ppmvd nor 65 lb/hr when operating on fuel oil to be demonstrated by stack test using EPA Method 10. [Rule 62-212.400, F.A.C.]
21. Volatile Organic Compounds (VOC) Emissions: The concentration of VOC in the stack exhaust gas (at ISO conditions) with the combustion turbine operating on natural gas shall exceed neither 1.4 ppm nor 2.8 lb/hr and neither 3.5 ppm nor 7 lb/hr while operating on oil to be demonstrated by initial stack test using EPA Method 18, 25 or 25A. [Applicant Request]
22. Sulfur Dioxide (SO<sub>2</sub>) emissions: SO<sub>2</sub> emissions shall be limited by firing pipeline natural gas (sulfur content less than 2 grains per 100 standard cubic foot) or by firing No. 2 or superior grade distillate fuel oil with a maximum 0.05 percent sulfur for 750 hours per year. Emissions of SO<sub>2</sub> shall not exceed 9.2 lb/hr (natural gas) and 98.1 lb/hr (fuel oil) as measured by applicable compliance methods described below. [40CFR60 Subpart GG and Rules 62-4.070, 62-212.400, and 62-204.800(7), F.A.C.]
23. Visible emissions (VE): VE emissions shall serve as a surrogate for PM/PM<sub>10</sub> emissions from the combustion turbine operating with or without the duct burner and shall not exceed 10 percent opacity from the stack in use. [Rules 62-4.070, 62-212.400, and 62-204.800(7), F.A.C.]

#### EXCESS EMISSIONS

24. Excess emissions resulting from startup, shutdown, or malfunction shall be permitted provided that best operational practices are adhered to and the duration of excess emissions shall be minimized. Excess emissions occurrences shall in no case exceed two hours in any 24-hour period for other reasons unless specifically authorized by DEP for longer duration. Operation below 50% output shall be limited to 2 hours per unit cycle (breaker closed to breaker open).

## PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-263

### SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

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25. Excess emissions entirely or in part by poor maintenance, poor operation, or any other equipment or process failure that may reasonably be prevented during startup, shutdown or malfunction, shall be prohibited pursuant to Rule 62-210.700, F.A.C. These emissions shall be included in the 24-hr average for NO<sub>x</sub>.
26. Excess Emissions Report: If excess emissions occur due to malfunction, the owner or operator shall notify DEP's Southwest District within (1) working day of: the nature, extent, and duration of the excess emissions; the cause of the excess emissions; and the actions taken to correct the problem. In addition, the Department may request a written summary report of the incident. Following the NSPS format, 40 CFR 60.7 Subpart A, periods of startup, shutdown, malfunction, shall be monitored, recorded, and reported as excess emissions when emission levels exceed the permitted standards listed in Specific Condition No. 18 and 19. [Rules 62-4.130, 62-204.800, 62-210.700(6), F.A.C., and 40 CFR 60.7 (1998 version)].

#### COMPLIANCE DETERMINATION

27. Compliance with the allowable emission limiting standards shall be determined within 60 days after achieving the maximum production rate, but not later than 180 days of initial operation of the unit, and annually thereafter as indicated in this permit, by using the following reference methods as described in 40 CFR 60, Appendix A (1997 version), and adopted by reference in Chapter 62-204.800, F.A.C.
28. Initial (I) performance tests (for both fuels) shall be performed on each unit while firing natural gas as well as while firing oil. Initial tests shall also be conducted after any modifications (and shake down period not to exceed 100 days after re-starting the CT) of air pollution control equipment such as change or tuning of combustors. Annual (A) compliance tests shall be performed during every federal fiscal year (October 1 - September 30) pursuant to Rule 62-297.310(7), F.A.C., on each unit as indicated. The following reference methods shall be used. No other test methods may be used for compliance testing unless prior DEP approval is received in writing.
- EPA Reference Method 9, "Visual Determination of the Opacity of Emissions from Stationary Sources" (I, A).
  - EPA Reference Method 10, "Determination of Carbon Monoxide Emissions from Stationary Sources" (I, A).
  - EPA Reference Method 20, "Determination of Oxides of Nitrogen Oxide, Sulfur Dioxide and Diluent Emissions from Stationary Gas Turbines." Initial test only for compliance with 40CFR60 Subpart GG and (I, A) short-term NO<sub>x</sub> BACT limits (EPA reference Method 7E, "Determination of Nitrogen Oxides Emissions from Stationary Sources" or RATA test data may be used to demonstrate compliance for annual test requirements).
  - EPA Reference Method 18, 25 and/or 25A, "Determination of Volatile Organic Concentrations." Initial test only.

## PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-263

### SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

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29. Continuous compliance with the NO<sub>x</sub> emission limits: Continuous compliance with the NO<sub>x</sub> emission limits shall be demonstrated with the CEM system based on the applicable averaging time of 24-hr block average (DLN). Based on CEMS data, a separate compliance determination is conducted at the end of each operating day and a new average emission rate is calculated from the arithmetic average of all valid hourly emission rates from the previous operating day. Valid hourly emission rates shall not include periods of start up, shutdown, or malfunction unless prohibited by 62-210.700 F.A.C. A valid hourly emission rate shall be calculated for each hour in which at least two NO<sub>x</sub> concentrations are obtained at least 15 minutes apart. These excess emissions periods shall be reported as required in Conditions 25 and 26. [Rules 62-4.070 F.A.C., 62-210.700, F.A.C., 40 CFR 75 and BACT]
30. Compliance with the SO<sub>2</sub> and PM/PM<sub>10</sub> emission limits: Notwithstanding the requirements of Rule 62-297.340, F.A.C., the use of pipeline natural gas, is the method for determining compliance for SO<sub>2</sub> and PM<sub>10</sub>. For the purposes of demonstrating compliance with the 40 CFR 60.333 SO<sub>2</sub> standard, ASTM methods D4084-82 or D3246-81 (or equivalent) for sulfur content of gaseous fuel shall be utilized in accordance with the EPA-approved custom fuel monitoring schedule or natural gas supplier data may be submitted or the natural gas sulfur content referenced in 40 CFR 75 Appendix D may be utilized. However, the applicant is responsible for ensuring that the procedures in 40 CFR 60.335 or 40 CFR 75 are used when determination of fuel sulfur content is made. Analysis may be performed by the owner or operator, a service contractor retained by the owner or operator, the fuel vendor, or any other qualified agency pursuant to 40 CFR 60.335(e) (1998 version).
31. Compliance with CO emission limit: An initial test for CO shall be conducted concurrently with the initial NO<sub>x</sub> test, as required. The initial NO<sub>x</sub> and CO test results shall be the average of three valid one-hour runs. Annual compliance testing for CO may be conducted at less than capacity when compliance testing is conducted concurrent with the annual RATA testing for the NO<sub>x</sub> CEMS required pursuant to 40 CFR 75
32. Compliance with the VOC emission limit: An initial test is required to demonstrate compliance with the VOC emission limit. Thereafter, the CO emission limit and periodic tuning data will be employed as surrogate and no annual testing is required.
33. Testing procedures: Testing of emissions shall be conducted with the combustion turbine operating at permitted capacity. Permitted capacity is defined as 90-100 percent of the maximum heat input rate allowed by the permit, corrected for the average ambient air temperature during the test (with 100 percent represented by a curve depicting heat input vs. ambient temperature). If it is impracticable to test at permitted capacity, the source may be tested at less than permitted capacity. In this case, subsequent operation is limited by adjusting the entire heat input vs. ambient temperature curve downward by an increment equal to the difference between the maximum permitted heat input (corrected for ambient temperature) and 110 percent of the value reached during the test until a new test is conducted. Once the unit is so limited, operation at higher capacities is allowed for no more than 15 consecutive days for the purposes of additional compliance testing to regain the permitted capacity. Procedures for these tests shall meet all applicable requirements (i.e., testing time frequency, minimum compliance duration, etc.) of Chapters 62-204 and 62-297, F.A.C.

## PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-263

### SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

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34. Test Notification: The DEP's Southwest District shall be notified, in writing, at least 30 days prior to the initial performance tests and at least 15 days before annual compliance test(s).
35. Special Compliance Tests: The DEP may request a special compliance test pursuant to Rule 62-297.310(7), F.A.C., when, after investigation (such as complaints, increased visible emissions, or questionable maintenance of control equipment), there is reason to believe that any applicable emission standard is being violated.
36. Test Results: Compliance test results shall be submitted to the DEP's Southwest District no later than 45 days after completion of the last test run. [Rule 62-297.310(8), F.A.C.].

#### NOTIFICATION, REPORTING, AND RECORDKEEPING

37. Records: All measurements, records, and other data required to be maintained by TEC shall be recorded in a permanent form and retained for at least five (5) years following the date on which such measurements, records, or data are recorded. These records shall be made available to DEP representatives upon request.
38. Compliance Test Reports: A test report indicating the results of the required compliance tests shall be filed as per Condition No.26 above. The test report shall provide sufficient detail on the tested emission unit and the procedures used to allow the Department to determine if the test was properly conducted and if the test results were properly computed. At a minimum, the test report shall provide the applicable information listed in Rule 62-297.310(8), F.A.C.

#### MONITORING REQUIREMENTS

39. Continuous Monitoring System: The permittee shall install, calibrate, maintain, and operate a continuous emission monitor in the stack to measure and record the nitrogen oxides emissions from these units. Periods when NO<sub>x</sub> emissions (ppmvd @ 15% oxygen) are above the BACT standards, listed in Specific Conditions No 18 and 19, shall be reported to the DEP Southwest District within one working day (verbally) followed up by a written explanation not later than three (3) working days (alternatively by facsimile within one working day). [Rules 62-204.800, 62-210.700, 62-4.130, 62-4.160(8), F.A.C and 40 CFR 60.7 (1998 version)].
40. CEMS for reporting excess emissions: Subject to EPA approval, the NO<sub>x</sub> CEMS shall be used in lieu of the requirement for reporting excess emissions in accordance with 40 CFR 60.334(c)(1), Subpart GG (1997 version). Upon request from DEP, the CEMS emission rates for NO<sub>x</sub> on the CT shall be corrected to ISO conditions to demonstrate compliance with the NO<sub>x</sub> standard established in 40 CFR 60.332.
41. CEMS in lieu of Water to Fuel Ratio: Subject to EPA approval, the NO<sub>x</sub> CEMS shall be used in lieu of the water/fuel monitoring system for reporting excess emissions in accordance with 40 CFR 60.334(c)(1), Subpart GG (1997 version). The calibration of the water/fuel monitoring device required in 40 CFR 60.335 (c)(2) (1997 version) will be replaced by the 40 CFR 75 certification tests of the NO<sub>x</sub> CEMS. Upon request from DEP, the CEMS emission rates for NO<sub>x</sub> on this Unit shall be corrected to ISO conditions to demonstrate compliance with the NO<sub>x</sub> standard established in 40 CFR 60.332.

## PREVENTION OF SIGNIFICANT DETERIORATION PERMIT PSD-FL-263

### SECTION III - EMISSIONS UNIT(S) SPECIFIC CONDITIONS

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42. Continuous Monitoring System Reports: The monitoring devices shall comply with the certification and quality assurance, and any other applicable requirements of Rule 62-297.520, F.A.C., 40 CFR 60.13, including certification of each device in accordance with 40 CFR 60, Appendix B, Performance Specifications and 40 CFR 60.7(a)(5) or 40 CFR Part 75. Quality assurance procedures must conform to all applicable sections of 40 CFR 60, Appendix F or 40CFR75. The monitoring plan, consisting of data on CEM equipment specifications, manufacturer, type, calibration and maintenance needs, and its proposed location shall be provided to the DEP Emissions Monitoring Section Administrator and EPA for review no later than 45 days prior to the first scheduled certification test pursuant to 40 CFR 75.62.
43. Natural Gas Monitoring Schedule: A custom fuel monitoring schedule pursuant to 40 CFR 75 Appendix D for natural gas may be used in lieu of the daily sampling requirements of 40 CFR 60.334 (b)(2) provided the following requirements are met:
- The permittee shall apply for an Acid Rain permit within the deadlines specified in 40 CFR 72.30.
  - The permittee shall submit a monitoring plan, certified by signature of the Designated Representative, that commits to using a primary fuel of pipeline supplied natural gas (sulfur content less than 20 gr/100 scf pursuant to 40 CFR 75.11(d)(2)).
  - Each unit shall be monitored for SO<sub>2</sub> emissions using methods consistent with the requirements of 40 CFR 75 and certified by the USEPA.
- This custom fuel monitoring schedule will only be valid when pipeline natural gas is used as a primary fuel. If the primary fuel for these units is changed to a higher sulfur fuel, SO<sub>2</sub> emissions must be accounted for as required pursuant to 40 CFR 75.11(d).
44. Fuel Oil Monitoring Schedule: The following monitoring schedule for No. 2 or superior grade fuel oil shall be followed: For all bulk shipments of No. 2 fuel oil received at this facility an analysis which reports the sulfur content and nitrogen content of the fuel shall be provided by the fuel vendor. The analysis shall also specify the methods by which the analyses were conducted and shall comply with the requirements of 40 CFR 60.335(d).
45. Determination of Process Variables:
- The permittee shall operate and maintain equipment and/or instruments necessary to determine process variables, such as process weight input or heat input, when such data is needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.
  - Equipment and/or instruments used to directly or indirectly determine such process variables, including devices such as belt scales, weigh hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value [Rule 62-297.310(5), F.A.C]

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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**Polk Power Station Combustion Turbine Project**  
**Tampa Electric Company**  
**PSD-FL-263 and PA92-33**  
**Polk County, Florida**

**BACKGROUND**

The applicant, Tampa Electric Company (TEC), proposes to install two nominal 165 megawatt (MW) General Electric PG 7241 FA combustion turbine-electrical generators at the existing Polk Power Station, located at 9995 State Road 37 South, Polk County. The proposed project will result in "significant increases" with respect to Table 62-212.400-2, Florida Administrative Code (F.A.C.) of emissions of particulate matter (PM and PM<sub>10</sub>), carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), and sulfuric acid mist (SAM). The project is therefore subject to review for the Prevention of Significant Deterioration (PSD) and a determination of Best Available Control Technology (BACT) in accordance with Rules 62-212.400, F.A.C.

The new units will operate in simple cycle mode and intermittent duty and exhaust through separate 114-foot stacks. TEC proposes to operate these units up to 4380 hours on natural gas and 876 hours on maximum 0.05 percent sulfur distillate fuel oil. Descriptions of the process, project, air-quality effects, and rule applicability are given in the Technical Evaluation and Preliminary Determination dated June 30, 1999, accompanying the Department's Intent to Issue.

**DATE OF RECEIPT OF A BACT APPLICATION:**

The application was received on February 8, 1999 and included a proposed BACT proposal prepared by the applicant's consultant, Environmental Consulting & Technology (ECT). A revised application and BACT proposal were received on May 10, 1999.

**REVIEW GROUP MEMBERS:**

A. A. Linero, P.E. and Teresa Heron, Permit Engineer

**BACT DETERMINATION REQUESTED BY THE APPLICANT**

POLLUTANT	CONTROL TECHNOLOGY	PROPOSED BACT LIMIT
Nitrogen Oxides	Dry Low NO <sub>x</sub> Combustors Water Injection (Oil)	10.5 ppmvd @ 15% O <sub>2</sub> (gas) 42 ppmvd @ 15% O <sub>2</sub> (oil)
Particulate Matter	Pipeline Natural Gas No. 2 Distillate Oil (876 hr/yr) Combustion Controls	10% Opacity
Carbon Monoxide	As Above	15 ppm (gas, baseload) 33 ppm (oil baseload)
Sulfur Dioxide	As Above	2 gr S/100 scf of natural gas 0.05% S in fuel oil
Sulfuric Acid Mist	As Above	2 gr S/100 scf of natural gas 0.05% S in fuel oil

According to the application, the total maximum annualized emissions from the new units will be approximately 581 tons per year (TPY) of NO<sub>x</sub>, 303 TPY of CO, 54 TPY of PM/PM<sub>10</sub>, 126 TPY of SO<sub>2</sub>, 18 TPY of VOC, and 15 TPY of SAM.



**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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**BACT DETERMINATION PROCEDURE:**

In accordance with Chapter 62-212, F.A.C., this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department of Environmental Protection (Department), on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that, in making the BACT determination, the Department shall give consideration to:

- Any Environmental Protection Agency determination of BACT pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 - Standards of Performance for New Stationary Sources or 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants.
- All scientific, engineering, and technical material and other information available to the Department.
- The emission limiting standards or BACT determination of any other state.
- The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine, for the emission unit in question, the most stringent control available for a similar or identical emission unit or emission unit category. If it is shown that this level of control is technically or economically unfeasible for the emission unit in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

**STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES:**

The minimum basis for a BACT determination is 40 CFR 60, Subpart GG, Standards of Performance for Stationary Gas Turbines (NSPS). The Department adopted subpart GG by reference in Rule 62-204.800, F.A.C. The key emission limits required by Subpart GG are 75 ppmvd NO<sub>x</sub> @ 15% O<sub>2</sub> (assuming 25 percent efficiency) and 150 ppm SO<sub>2</sub> @ 15% O<sub>2</sub> (or <0.8% sulfur in fuel). The BACT proposed by the TEC is within the NSPS limit, which allows NO<sub>x</sub> emissions, over 110 ppmvd for the high efficiency unit to be purchased for the Polk Power Station. No National Emission Standard for Hazardous Air Pollutants exists for stationary gas turbines.

**DETERMINATIONS BY EPA AND STATES:**

The following table is based primarily on "F" Class intermittent-duty simple cycle turbines recently permitted or still under review. One project (PREPA) based on smaller units but permitted to operate continuously is included as an example of a simple cycle unit with add-on control equipment. Another continuous-duty project (Lakeland) based on the larger "G" Class is also included. The proposed TEC project is included to facilitate comparison.

VOC determinations are included. However the TEC project does not trigger PSD and a BACT determination is not required for this pollutant.

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

Project Location	Power Output and Duty	NO <sub>x</sub> Limit ppmvd @ 15% O <sub>2</sub> and Fuel	Technology	Comments
Lakeland, FL	250 MW SC CON	9/9 - NG (by 2002) 42/15 - No. 2 FO	DLN/HSCR WI/HSCR	250 MW WH 501G CT Initially 25 ppm NO <sub>x</sub> limit on gas Issued 7/98. 250 hrs on oil.
Oleander Cocoa, FL	850 MW SC INT	9 - NG 42 - No. 2 FO	DLN WI	5x170 MW GE PG7241FA CTs Draft 4/99. 1000 hrs on oil
JEA Baldwin, FL	510 MW SC INT	12 - NG 42 - No. 2 FO	DLN WI	3x170 MW GE MS7241FA CTs Application 5/99. 800 hrs on oil
JEA Kennedy, FL	170 MW SC INT	15 - NG 42 - No. 2 FO	DLN WI	170 MW GE MS7241FA CT Issued 2/99. Not PSD/BACT
TEC Polk Power, FL	330 MW SC INT	10.5 - NG 42 - F.O.	DLN WI	2x165 MW GE MS7241FA CTs Application 2/99. 876 hrs on oil
Dynegy Heard, GA	510 MW SC INT	15 - NG	DLN	3x170 MW WH 501F CTs Application. Gas only
Tenaska Heard, GA	960 MW SC INT	15 - NG 42 - No. 2 FO	DLN WI	6x170 MW GE PG7241FA CTs Issued 12/98. 720 hrs on oil
Thomaston, GA	680 MW SC INT	15 - NG 42 - No. 2 FO	DLN WI	4x170 MW GE PG7241FA CTs Application. 1687 hrs on oil
Dynegy Reidsville, NC	900 MW SC INT	15 - NG (by 2002) 42 - FO	DLN WI	5x180 MW WH 501F CTs Initially 25 ppm NO <sub>x</sub> limit on gas Draft 5/98. 1000 hrs on oil.
RockGen Cristiana, WI	525 MW SC INT	15/12 - NG 42 - No. 2 FO	DLN WI	3x175 MW GE PG7241FA CTs 15/12 ppm are on 1/24 hr basis Issued 1/99. 800 hrs on oil
SEI Neenah, WI	330 MW SC INT	15/12 - NG 42 - No. 2 FO	DLN WI	2x165 MW GE PG7241FA CTs 15/12 ppm are on 1/24 hr basis Issued 1/99. 8760/699 hrs gas/oil
PREPA, PR	248 MW SC CON	10 - No. 2 FO	WI & HSCR	3x83 MW ABB GT11N CTs Issued 12/95.

CON = Continuous      DLN = Dry Low NO<sub>x</sub> Combustion      FO = Fuel Oil      GE = General Electric  
 SC = Simple Cycle      SCR = Selective Catalytic Reduction      ppm = parts per million      WH = Westinghouse  
 NG = Natural Gas      HSCR = Hot SCR      WI = Water or Steam Injection      ABB = Asea Brown Bovari  
 INT = Intermittent      CT = Combustion Turbine      MW = megawatts

Project Location	CO - ppm (or as indicated)	VOC - ppm (or as indicated)	PM - lb/hr (or as indicated)	Technology and Comments
Lakeland, FL	25 - NG or 10 by Ox Cat 75 - FO @ 15% O <sub>2</sub>	4 - NG 10 - FO	10% Opacity	Clean Fuels Good Combustion
Oleander Cocoa, FL	12 - NG 20 - FO	3 - NG 6 - FO	10% Opacity	Clean Fuels Good Combustion
JEA Baldwin, FL	15 - NG 20/26 (part/full load) - FO	2.8 lb/hr - NG 3 lb/hr - FO	9 lb/hr - NG 17 lb/hr - FO	Clean Fuels Good Combustion
JEA Kennedy, FL	15 - NG 20 - FO	1.4 - NG 3.5 - FO	9 lb/hr - NG 17 lb/hr - FO	Clean Fuels Good Combustion
TEC Polk Power, FL	15 - NG 33 - FO	1.6 - NG 4 - FO	10% Opacity	Clean Fuels Good Combustion
Dynegy Heard Co., GA	25 - NG	? - NG	? - NG	Clean Fuels Good Combustion
Tenaska Heard Co., GA	15 - NG 20 - FO	? - NG ? - FO	? - NG ? lb/hr - FO	Clean Fuels Good Combustion
Dynegy Reidsville, NC	25 - NG 50 - FO	6 lb/hr - NG 8 lb/hr - FO	6 lb/hr - NG 23 lb/hr - FO	Clean Fuels Good Combustion
RockGen Cristiana, WI	12 @ >50% load - NG 15 @ >75% 24 @ <75% - FO	2 - NG 5 - FO	18 lb/hr - NG 44 lb/hr - FO	Clean Fuels Good Combustion
SEI Neenah, WI	12 @ >50% load - NG 15 @ >75% 24 @ <75% - FO	2 - NG 5 - FO	18 lb/hr - NG 41 lb/hr - FO	Clean Fuels Good Combustion
PREPA, PR	9 - FO @ 15% O <sub>2</sub>	11 - FO @ 15% O <sub>2</sub>	0.0171 gr/dscf	Clean Fuels Good Combustion

TEC - Polk Power Station - CTGs 2 and 3  
 Two 165 MW Simple Cycle Combustion Turbines

Permit No. PSD -FL-263  
 Facility I.D. No. 1050233 (ARMS 009-010)

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**OTHER INFORMATION AVAILABLE TO THE DEPARTMENT:**

Besides the information submitted by the applicant and that mentioned above, other information available to the Department consists of:

- Comments from the Fish and Wildlife Service dated March 19, 1999
- DOE website information on Advanced Turbine Systems Project
- Alternative Control Techniques Document - NO<sub>x</sub> Emissions from Stationary Gas Turbines
- General Electric 39th Turbine State-of-the-Art Technology Seminar Proceedings
- GE Guarantee for Jacksonville Electric Authority Kennedy Plant Project
- GE Power Generation - Speedtronic™ Mark V Gas Turbine Control System
- GE Combustion Turbine Startup Curves
- TEC Website – [www.teco-energy.com](http://www.teco-energy.com)
- Goal Line Environmental Technologies Website – [www.glet.com](http://www.glet.com)
- Catalytica Website – [www.catalytica-inc.com](http://www.catalytica-inc.com)

**REVIEW OF NITROGEN OXIDES CONTROL TECHNOLOGIES:**

Much of the discussion in this section is based on a 1993 EPA document on Alternative Control Techniques for NO<sub>x</sub> Emissions from Stationary Gas Turbines. Project-specific information is included where applicable.

**Nitrogen Oxides Formation**

Nitrogen oxides form in the gas turbine combustion process as a result of the dissociation of molecular nitrogen and oxygen to their atomic forms and subsequent recombination into seven different oxides of nitrogen. Thermal NO<sub>x</sub> forms in the high temperature area of the gas turbine combustor. Thermal NO<sub>x</sub> increases exponentially with increases in flame temperature and linearly with increases in residence time. Flame temperature is dependent upon the ratio of fuel burned in a flame to the amount of fuel that consumes all of the available oxygen.

By maintaining a low fuel ratio (lean combustion), the flame temperature will be lower, thus reducing the potential for NO<sub>x</sub> formation. Prompt NO<sub>x</sub> is formed in the proximity of the flame front as intermediate-combustion products. The contribution of prompt to overall NO<sub>x</sub> is relatively small in lean, near-stoichiometric combustors and increases for leaner fuel mixtures. This provides a practical limit for NO<sub>x</sub> control by lean combustion.

Fuel NO<sub>x</sub> is formed when fuels containing bound nitrogen are burned. This phenomenon is not important when combusting natural gas. It is not important for the TEC project because natural gas will be the primary fuel and low sulfur fuel oil will be used only for 876 hours per year.

Uncontrolled emissions range from about 100 to over 600 parts per million by volume, dry, corrected to 15 percent oxygen (ppmvd @15% O<sub>2</sub>) for small turbines. For large modern turbines, the Department estimates uncontrolled emissions at approximately 200 ppmvd @15% O<sub>2</sub>.

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## **NO<sub>x</sub> Control Techniques**

### Wet Injection

Injection of either water or steam directly into the combustor lowers the flame temperature and thereby reduces thermal NO<sub>x</sub> formation. Typical emissions achieved by wet injection are in the range of 15–25 ppmvd when firing gas and 42 ppmvd when firing fuel oil in large combustion turbines. These values often form the basis, particularly in combined cycle turbines, for further reduction to BACT limits by other techniques. Carbon monoxide (CO) and hydrocarbon (HC) emissions are relatively low for most gas turbines. However steam and (more so) water injection increase emissions of both of these pollutants.

### Combustion Controls

The excess air in lean combustion cools the flame and reduces the rate of thermal NO<sub>x</sub> formation. Lean premixing of fuel and air prior to combustion can further reduce NO<sub>x</sub> emissions. This is accomplished by minimizing localized fuel-rich pockets (and high temperatures) that can occur when trying to achieve lean mixing within the combustion zones.

The above principle is depicted in Figure 1 for a General Electric DLN-1 can-annular combustor operating on gas. For ignition, warm-up, and acceleration to approximately 20 percent load, the first stage serves as the complete combustor. Flame is present only in the first stage, which is operated as lean stable combustion will permit. With increasing load, fuel is introduced into the secondary stage, and combustion takes place in both stages. When the load reaches approximately 40 percent, fuel is cut off to the first stage and the flame in this stage is extinguished. The venturi ensures the flame in the second stage cannot propagate upstream to the first stage. When the fuel in the first-stage flame is extinguished (as verified by internal flame detectors), fuel is again introduced into the first stage, which becomes a premixing zone to deliver a lean, unburned, uniform mixture to the second stage. The second stage acts as the complete combustor in this configuration.

To further reduce NO<sub>x</sub> emissions, GE developed the DLN-2.0 (cross section shown in Figure 1) wherein air usage (other than for premixing) was minimized. The venturi and the centerbody assembly were eliminated and each combustor has a single burning zone. So-called “quaternary fuel” is introduced through pegs located on the circumference of the outward combustion casing.

GE has made further improvements in the DLN design. The most recent version is the DLN-2.6 (proposed for the TEC project). The combustor is similar to the DLN-2 with the addition of a sixth (center) fuel nozzle. The emission characteristics of the DLN-2.6 combustor while firing natural gas are given in Figure 2 for a unit tuned to meet a 15 ppmvd NO<sub>x</sub> limit (by volume, dry corrected to at 15 percent oxygen) at Jacksonville Electric Authority’s Kennedy Station.

NO<sub>x</sub> concentrations are higher in the exhaust at lower loads because the combustor does not operate in the lean pre-mix mode. Therefore such a combustor emits NO<sub>x</sub> at concentrations of 15 parts per million (ppmvd) at loads between 50 and 100 percent of capacity, but concentrations as high as 100 ppmvd at less than 50 percent of capacity. Note that VOC comprises a very small amount of the “unburned hydrocarbons” which in turn is mostly non-VOC methane.

The combustor can be tuned differently to achieve emissions as low as 9 ppmvd of NO<sub>x</sub> and 9 ppm of CO. Emissions characteristics while firing oil are expected to be similar for the DLN-2.6 as they are for those of the DLN-2.0 shown in Figure 3. Simplified cross sectional views of the totally premixed DLN-2.6 combustor to be installed at the TEC project are shown in Figure 4.

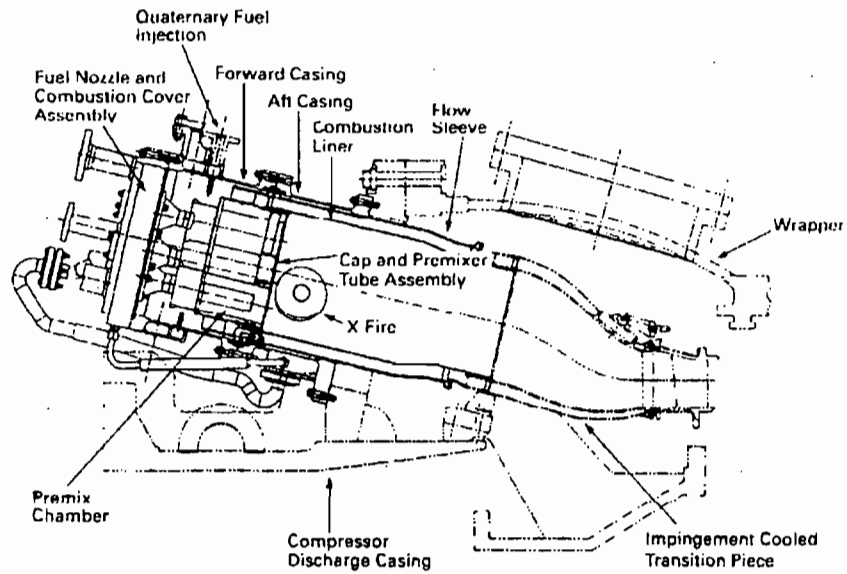
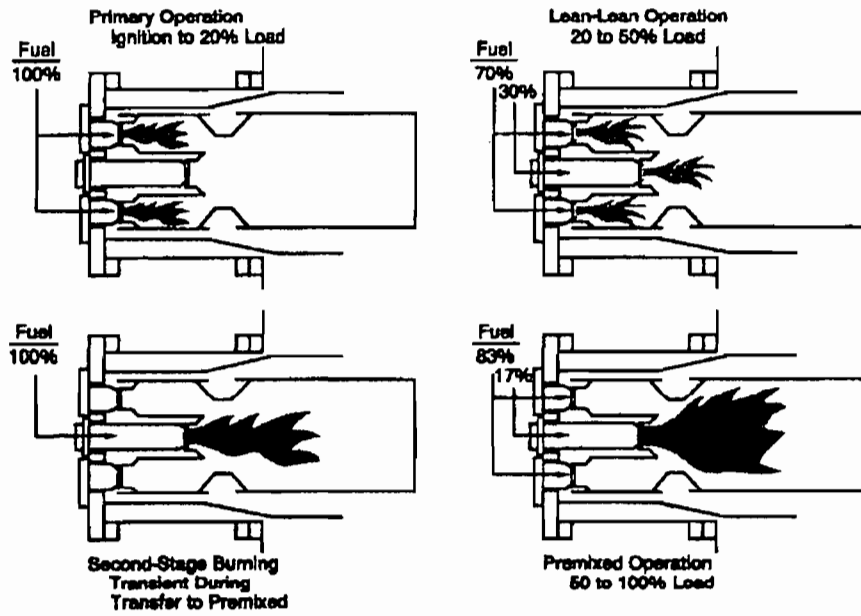


Figure 1 - Dry Low NOx Operating Modes - DLN-1  
 Cross Section of GE DLN-2

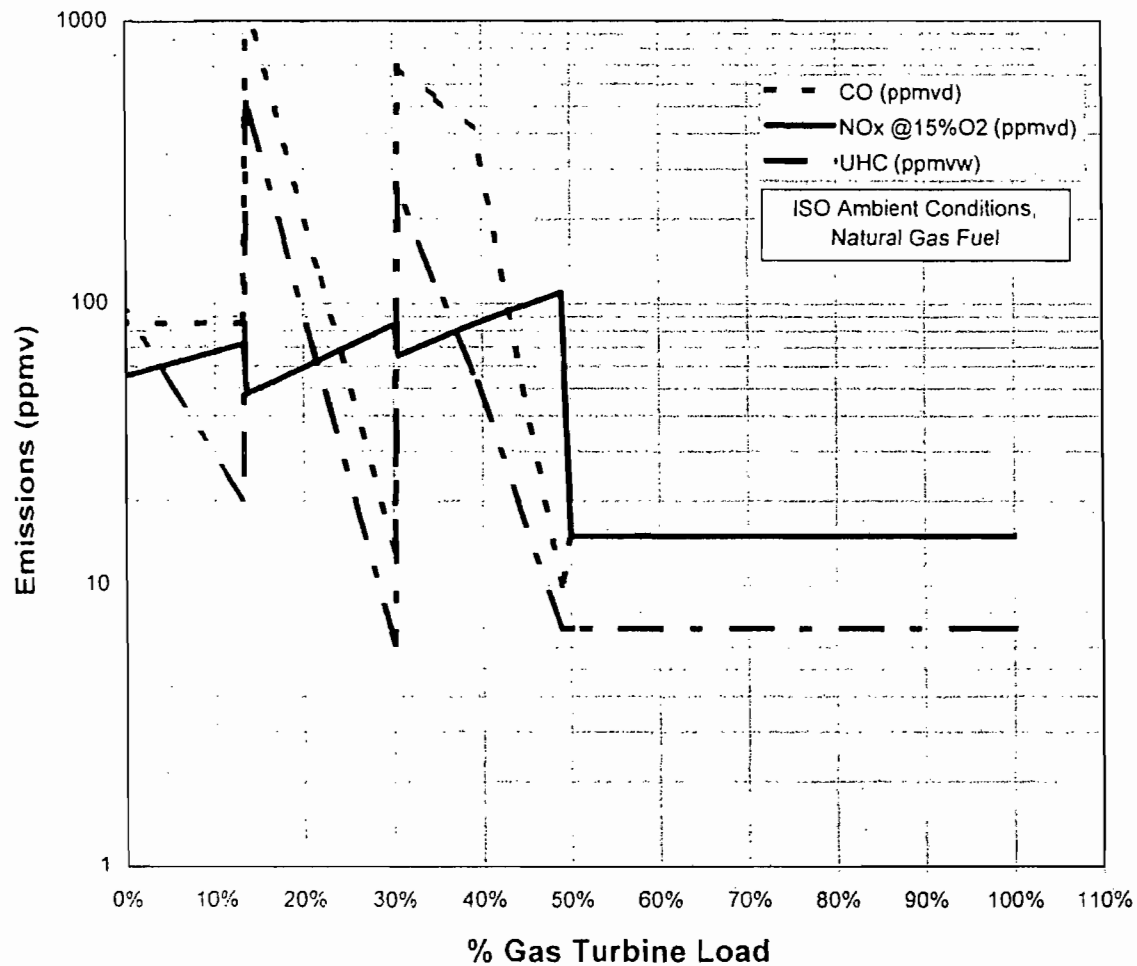


Figure 2 - Emissions Performance Curves for GE DLN-2.6 Combustor  
 Firing Natural Gas in a Dual Fuel GE 7FA Combustion Turbine

(Simple Cycle, Intermittent Duty - If Tuned to 15 ppm NOx)

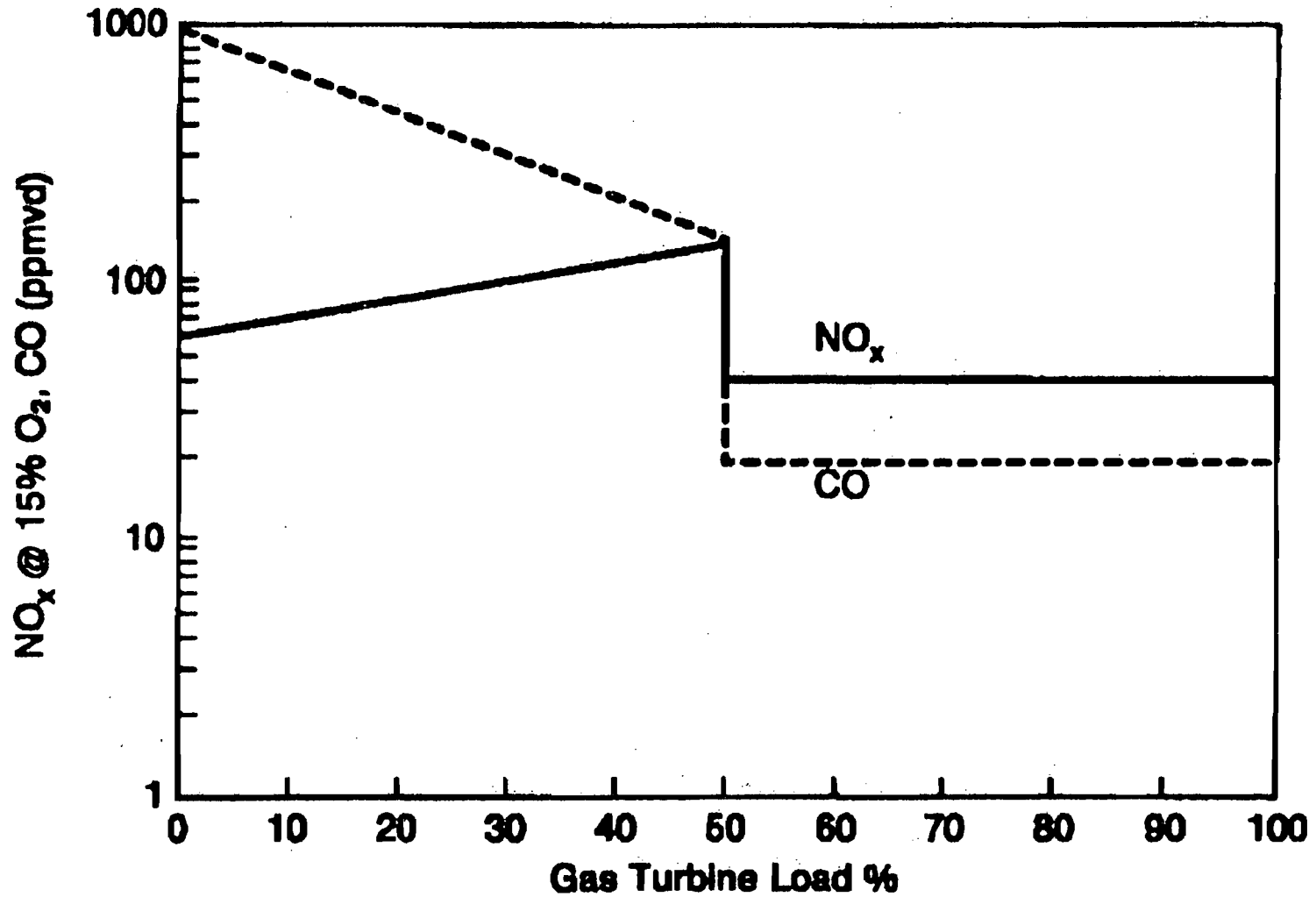


Figure 3 - Emissions Performance for DLN-2 Combustors

Firing Fuel Oil in Dual Fuel GE 7FA Turbine

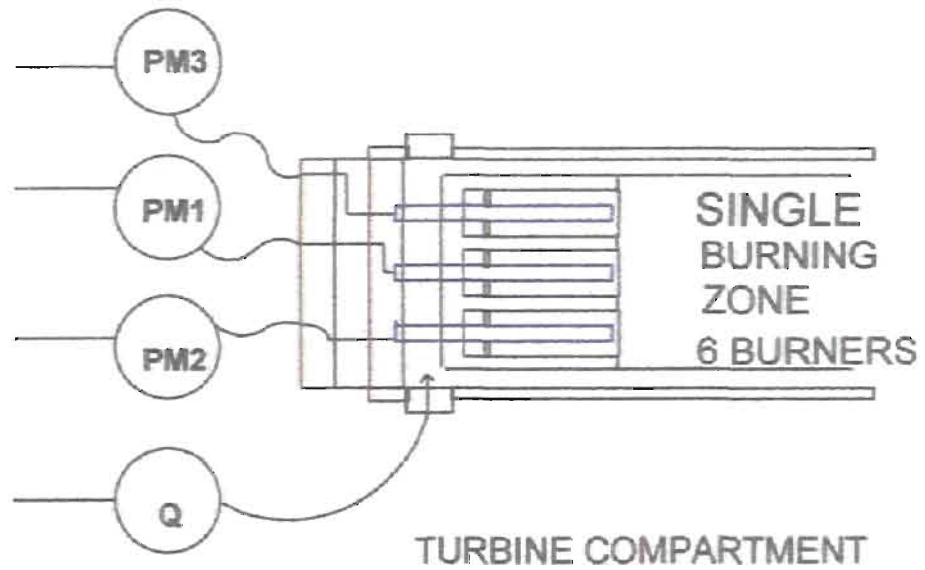
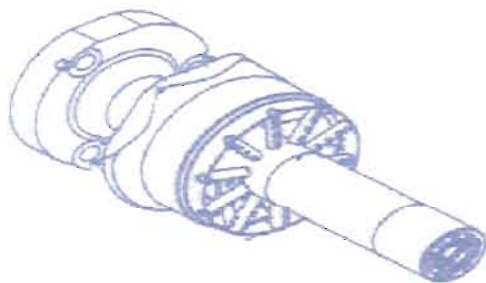
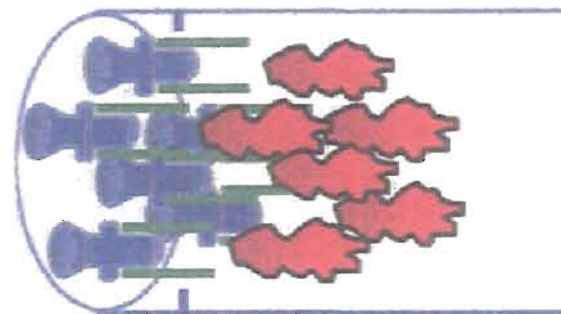
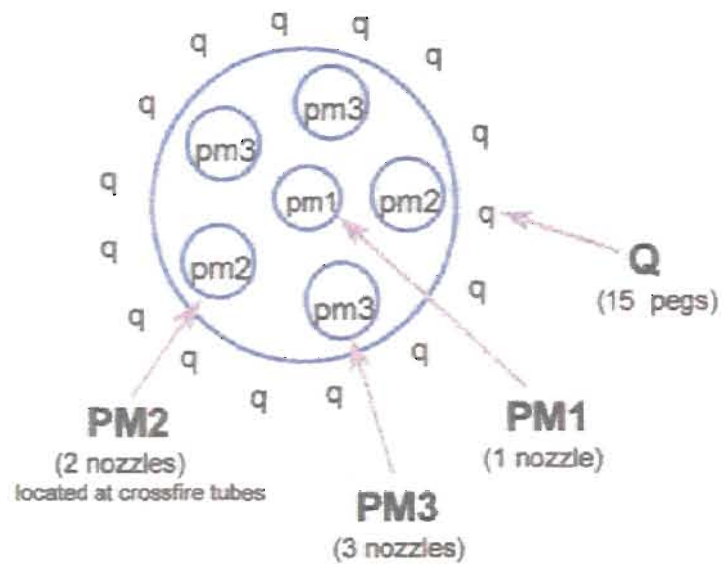


Figure 4 - DLN-2.6 Nozzle and Burner Arrangement



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In all but the most recent gas turbine combustor designs, the high temperature combustion gases are cooled to an acceptable temperature with dilution air prior to entering the turbine (expansion) section. The sooner this cooling occurs, the lower the thermal NO<sub>x</sub> formation. Cooling is also required to protect the first stage nozzle. When this is accomplished by air cooling, the air is injected into the component and is ejected into the combustion gas stream, causing a further drop in combustion gas temperature. This, in turn, lowers achievable thermal efficiency for the unit.

Larger units, such as the Westinghouse 501 G or the planned General Electric 7H, use steam in a closed loop system to provide much of the cooling. The fluid is circulated through the internal portion of the nozzle component or around the transition piece between the combustor and the nozzle and does not enter the exhaust stream. Instead it is normally sent back to a steam generator. The difference between flame temperature and firing temperature into the first stage is minimized and higher efficiency is attained.

Another important result of steam cooling is that a higher firing temperature can be attained with no increase in flame temperature. Flame temperatures and NO<sub>x</sub> emissions can therefore be maintained at comparatively low levels even at high firing temperatures. At the same time, thermal efficiency should be greater when employing steam cooling. A similar analysis applies to steam cooling around the transition piece between the combustor and first stage nozzle.

The relationship between flame temperature, firing temperature, unit efficiency, and NO<sub>x</sub> formation can be appreciated from Figure 5 which is from a General Electric discussion on these principles. In addition to employing pre-mixing and steam cooling, further reductions are accomplished through design optimization of the burners, testing, further evaluation, etc.

At the present time, emissions achieved by combustion controls are low as 9 ppmvd from gas turbines smaller than 200 MW (simple cycle), such as GE "F Class" units. Even lower NO<sub>x</sub> emissions are achieved from certain units smaller than 100 MW, such as the GE 7EA line.

Selective Catalytic Combustion

Selective catalytic reduction (SCR) is an add-on NO<sub>x</sub> control technology that is employed in the exhaust stream following the gas turbine. SCR reduces NO<sub>x</sub> emissions by injecting ammonia into the flue gas in the presence of a catalyst. Ammonia reacts with NO<sub>x</sub> in the presence of a catalyst and excess oxygen yielding molecular nitrogen and water. The catalysts used in combined cycle, low temperature applications (conventional SCR), are usually vanadium or titanium oxide and account for almost all installations. For high temperature applications (Hot SCR up to 1100 °F), such as simple cycle turbines, zeolite catalysts are available but used in few applications to-date. SCR units are typically used in combination with wet injection or DLN combustion controls.

In the past, sulfur was found to poison the catalyst material. Sulfur-resistant catalyst materials are now available, however, and catalyst formulation improvements have proven effective in resisting performance degradation with fuel oil in Europe and Japan, where conventional SCR catalyst life in excess of 4 to 6 years has been achieved, versus 8 to 10 years with natural gas.

Excessive ammonia use tends to increase emissions of CO, ammonia (slip) and particulate matter (when sulfur bearing fuels are used).

As of early 1992, over 100 gas turbine installations already used SCR in the United States. Per the above table, only one combustion turbine project in Florida (FPC Hines Power Block 1) employs SCR (it is currently being started up). The equipment was installed on a temporary basis because Westinghouse had not yet demonstrated emissions as low as 12 ppmvd by DLN technology at the

## Gas Turbine - Hot Gas Path Parts

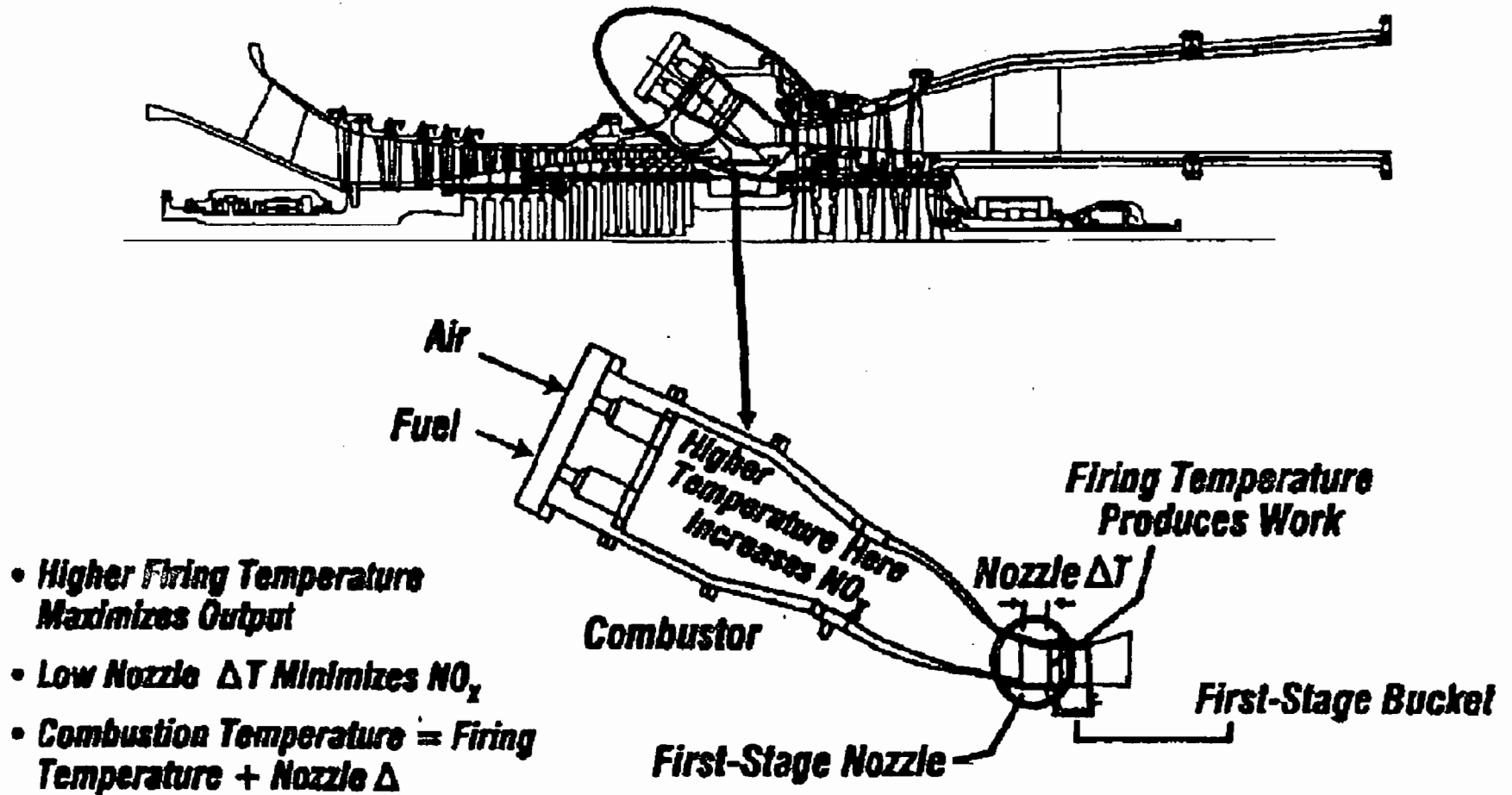


Figure 5 - Relation Between Flame Temperature and Firing Temperature

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time the units were to start up in 1998. SCR is also proposed on a permanent basis for the expansion of the FPC Hines Facility (Power Block II). Seminole Electric will install SCR on a previously-permitted 501F unit at the Hardee Unit 3 project. The reasons are similar to those for the FPC Hines Power Block I.

Permit limits as low as 2.25 to 3.5 ppmvd NO<sub>x</sub> have been specified using SCR on combined cycle F Class projects throughout the country.

Selective Non-Catalytic Combustion

Selective non-catalytic reduction (SNCR) reduction works on the same principle as SCR. The differences are that it is applicable to hotter streams than conventional or hot SCR, no catalyst is required, and urea can be used as a source of ammonia. No applications have been identified wherein SNCR was applied to a gas turbine because the exhaust temperature of 1100 °F is too low to support the NO<sub>x</sub> removal mechanism.

The Department did, however, specify SNCR as one of the available options for the combined cycle Santa Rosa Energy Center. The project will incorporate a large 600 MMBtu/hr duct burner in the heat recovery steam generator (HRSG) and can provide the acceptable temperatures (between 1400 and 2000 °F) and residence times to support the reactions.

Emerging Technologies: SCONOX™ and XONON™

There are at least two technologies on the horizon that will influence BACT determinations. These, as usual, are prompted by the needs specific to non-attainment areas such as Southern California.

The first technology is called SCONOX™ and is a catalytic technology that achieves NO<sub>x</sub> control by oxidizing and then absorbing the pollutant onto a honeycomb structure coated with potassium carbonate. The pollutant is then released as harmless molecular nitrogen during a regeneration cycle that requires a dilute hydrogen reducing gas. The technology has been demonstrated on small units in California and has been purchased for a small source in Massachusetts.<sup>1</sup> California regulators and industry sources have stated that the first 250 MW block to install SCONOX™ will be at U.S. Generating's La Paloma Plant near Bakersfield.<sup>2</sup> The overall project includes several more 250 MW blocks with SCR for control.<sup>3</sup> USEPA has identified an "achieved in practice" BACT value of 2.0 ppmvd over a three-hour rolling average based upon the recent performance of a Vernon, California natural gas-fired 32 MW combined cycle turbine (without duct burners) equipped with the patented SCONOX™ system.

SCONOX™ technology (at 2.0 ppmvd) is considered to represent LAER in non-attainment areas where cost is not a factor in setting an emission limit. It competes with less-expensive SCR in those areas, but has the advantages that it does not cause ammonia emissions in exchange for NO<sub>x</sub> reduction. Advantages of the SCONOX™ process include in addition to the reduction of NO<sub>x</sub>, the elimination of ammonia and the control of some CO emissions. SCONOX™ has not been applied on any major sources in ozone attainment areas.

In a letter dated March 23, 1998 to Goal Line Environmental Technologies, the SCONOX™ process was deemed as technically feasible for maintaining NO<sub>x</sub> emissions at 2 ppmvd on a combined cycle unit. ABB Environmental was announced on September 10, 1998 as the exclusive licensee for SCONOX™ for United States turbine applications larger than 100 MW. ABB Power Generation has stated that scale up and engineering work will be required before SCONOX™ can be offered with commercial guarantees for large turbines (based upon letter from Kreminski/Broemmelsiek of ABB Power Generation to the Massachusetts Department of Environmental Protection dated November 4,

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1998). SCONOx requires a much lower temperature regime that is not available in simple cycle units and is therefore not feasible for this project. Therefore the SCONOx system cannot be considered as achievable or demonstrated in practice for this application.

The second technology is XONON™, which works by partially burning fuel in a low temperature pre-combustor and completing the combustion in a catalytic combustor. The overall result is low temperature partial combustion (and thus lower NO<sub>x</sub> combustion) followed by flameless catalytic combustion to further attenuate NO<sub>x</sub> formation. The technology has been demonstrated on combustors on the same order of size as SCONO<sub>x</sub>™ has. However GE has teamed with Catalytica to develop a combustor for gas turbines in the 80-90 MW range before continuing with development on a combustor for a larger unit.

XONON™ avoids the emissions of ammonia and the need to generate hydrogen. It is also extremely attractive from a mechanical point of view if it works.

Catalytica Combustion Systems, Inc. develops, manufactures and markets the XONON™ Combustion System. In a press release on October 8, 1998 Catalytica announced the first installation of a gas turbine equipped with the XONON™ Combustion System in a municipally owned utility for the production of electricity. The turbine was started up on that day at the Gianera Generating Station of Silicon Valley Power, a municipally owned utility serving the City of Santa Clara, Calif. The XONON™ Combustion System, deployed for the first time in a commercial setting, is designed to enable turbines to produce environmentally sound power without the need for expensive cleanup solutions. Previously, this XONON™ system had successfully completed over 1,200 hours of extensive full-scale tests which documented its ability to limit emissions of nitrogen oxides, a primary air pollutant, to less than 3 parts per million.

Catalytica's XONON™ system is represented as a powerful technology that essentially eliminates the formation of nitrogen oxides air emissions in gas turbines without impacting the turbine's operating performance. In a definitive agreement signed on November 19, 1998, GE Power Systems and Catalytica agreed to cooperate in the design, application, and commercialization of XONON™ systems for both new and installed GE E-class and F-class turbines used in power generation and mechanical drive applications. This appears to be an up-and-coming technology, the development of which will be watched closely by the Department for future applications. It is not yet available for fuel oil and cycling operation.

**REVIEW OF SULFUR DIOXIDE (SO<sub>2</sub>) AND SULFURIC ACID MIST (SAM)**

SO<sub>2</sub> control processes can be classified into five categories: fuel/material sulfur content limitation, absorption by a solution, adsorption on a solid bed, direct conversion to sulfur, or direct conversion to sulfuric acid. A review of the BACT determinations for combustion turbines contained in the BACT Clearinghouse shows that the exclusive use of low sulfur fuels constitutes the top control option for SO<sub>2</sub>.

For this project, the applicant has proposed as BACT the use of 0.05% sulfur oil and natural gas containing no more than 2 grains of sulfur per 100 standard cubic foot (gr S/100 ft<sup>3</sup>). This value is well below the "default" maximum value of 20 gr. S/100 ft<sup>3</sup>, but high enough to require a BACT determination. The applicant estimated total emissions for the project at 126 TPY of SO<sub>2</sub> and 15 TPY of SAM. However the Department expects the emissions to be lower because of the limited oil consumption and the typical natural gas in Florida which contains less than 1 gr S/100ft<sup>3</sup>.

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**REVIEW OF PARTICULATE MATTER (PM/PM<sub>10</sub>) CONTROL TECHNOLOGIES:**

Particulate matter is generated by various physical and chemical processes during combustion and will be affected by the design and operation of the NO<sub>x</sub> controls. The particulate matter emitted from this unit will mainly be less than 10 microns in diameter (PM<sub>10</sub>).

Natural gas and 0.05 percent sulfur No. 2 (or superior grade) distillate fuel oil will be the only fuels fired and are efficiently combusted in gas turbines. Such fuels are necessary to avoid damaging turbine blades and other components already exposed to very high temperature and pressure. Natural gas is an inherently clean fuel and contains no ash. The fuel oil to be combusted contains a minimal amount of ash and its use is proposed for only 876 hours per year making any conceivable add-on control technique for PM/PM<sub>10</sub> either unnecessary or impractical.

A technology review indicated that the top control option for PM/PM<sub>10</sub> is a combination of good combustion practices, fuel quality, and filtration of inlet air. Total annual emissions of PM<sub>10</sub> for the project are expected to be approximately 54 tons per year.

**REVIEW OF CARBON MONOXIDE(CO) CONTROL TECHNOLOGIES**

CO is emitted from combustion turbines due to incomplete fuel combustion. Combustion design and catalytic oxidation are the control alternatives that are viable for the project. The most stringent control technology for CO emissions is the use of an oxidation catalyst.

All combustion turbines using catalytic oxidation appear to be combined cycle units. Among the most recently permitted ones are the 500 MW Wyandotte Energy project in Michigan, the El Dorado project in Nevada, Ironwood in Pennsylvania, Millenium in Massachusetts, and Sutter Calpine in California. The permitted CO values of these units are between 3 and 5 ppmvd. Catalytic oxidation was recently installed at a cogeneration plant at Reedy Creek (Walt Disney World), Florida to avoid PSD review which would have been required due to increased operation at low load. Seminole Electric recently proposed catalytic oxidation in order to meet the permitted CO limit at its planned 244 MW Westinghouse 501FD combined cycle unit in Hardee County, Florida.<sup>4</sup>

Most combustion turbines incorporate good combustion to minimize emissions of CO. So far this appears to be the only technology proposed at simple cycle turbine projects. These installations typically achieve emissions between 10 and 25 ppm at full load while firing gas. The values of 15 and 33 ppm for gas and oil respectively at baseload proposed in the TEC's original application are within the range of recent determinations for simple cycle CO BACT determinations. By comparison, values of 12 and 20 ppm for gas and oil respectively (at baseload) were proposed for the Oleander's project using identical equipment. Values given in GE-based applications are representative of operations between 50 and 100 percent of full load.

**REVIEW OF VOLATILE ORGANIC COMPOUND (VOC) CONTROL TECHNOLOGIES**

Volatile organic compound (VOC) emissions, like CO emissions, are formed due to incomplete combustion of fuel. There are no viable add-on control techniques as the combustion turbine itself is very efficient at destroying VOC. The applicant has proposed good combustion practices to control VOC. The limits proposed by TEC for this project are 1.4 and 3.5 ppm for gas and oil firing respectively. According to GE, VOC emissions less than 1.4 ppm were achieved during recent tests of the DLN-2.6 technology when firing natural gas.<sup>5</sup> At such low emission rates, the project does not trigger PSD and a requirement for a VOC BACT determination. Emissions as low as projected by TEC and GE would easily meet BACT requirements based on the above tables.

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**BACKGROUND ON SELECTED GAS TURBINE**

TEC plans the purchase of two 165 MW (nominal) General Electric PG 7241FA simple cycle gas turbines. This is the most recent designation of GE's line of "F" Class units.

The first commercial GE 7F Class unit was installed in a combined cycle project at the Virginia Power Chesterfield Station in 1990.<sup>6</sup> The initial units had a firing temperature of 2300 °F and a combined cycle efficiency exceeding 50 percent. By the mid-90s, the line was improved by higher combustor pressure, a firing temperature of 2400 °F, and a combined cycle efficiency of approximately 56 percent based on a 167 MW combustion turbine. The line was redesignated as the 7FA Class.

The first GE 7F/FA project in Florida was at the FPL Martin Plant in 1993 and entered commercial service in 1994.<sup>7</sup> The units were equipped with DLN-2 combustors with a permitted NO<sub>x</sub> limit of 25 ppmvd. These actually achieved emissions of 13-25 ppmvd of NO<sub>x</sub>, 0-3 ppm of CO, and 0-0.17 ppm of VOC.<sup>8</sup> The City of Tallahassee recently received approval to install a GE 7FA Class unit at its Purdom Plant.<sup>9</sup> Although permitted emissions are 12 ppmvd of NO<sub>x</sub>, the City obtained a performance guarantee from GE of 9 ppmvd.<sup>10</sup> FPL also obtained a guarantee and permit limit of 9 ppmvd NO<sub>x</sub> for six GE 7241FA turbines to be installed at the Fort Myers Repowering project.<sup>11</sup> The Santa Rosa Energy Center in Pace, Florida, also received a permit with a 9 ppmvd NO<sub>x</sub> limit for a GE 7241 turbine with DLN-2.6 burners.<sup>12</sup>

Most recently, the Department issued draft BACT determinations for the simple cycle Oleander project in Brevard County and the combined cycle projects in Volusia (Duke Energy) and Osceola County (Kissimee Utilities). These three draft permits also include NO<sub>x</sub> limits of 9 ppmvd based on the DLN-2.6 technology installed on F Class units.

General Electric has primarily relied on further advancement and refinement of DLN technology to provide sufficient NO<sub>x</sub> control for their combined cycle turbines in Florida. Where required by BACT determinations of certain states, General Electric incorporates SCR in combined cycle projects.<sup>13</sup> In its recent permits, Florida has included separate and lower limits in the event that DLN emissions limits are not attainable or the applicant selects a manufacturer that does not provide combustors capable of meeting 9 ppmvd.

GE's approach of progressively refining such technology is a proven one, even on some relatively large units. Recently GE Frame 7FA units met performance guarantees of 9 ppmvd with "DLN-2.6" burners at Fort St. Vrain, Colorado and Clark County, Washington.<sup>14</sup> Although the permitted limit is 15 ppmvd, GE has already achieved emission levels of approximately 6-7 ppmvd on gas at a dual-fuel 7EA (120 MW combined cycle) KUA Cane Island Unit 2.<sup>15</sup> Unit 2 is equipped with DLN-2 combustors. According to GE, similar performance is expected soon on the 7FA line such as the one that will be installed for TEC Polk Power Station Project. Performance guarantees less than 9 ppmvd can be expected using the DLN-2.6 combustors for units delivered in a couple of years.<sup>16</sup>

The 10.5 ppmvd NO<sub>x</sub> limit on natural gas requested by TEC is clearly one of the most stringent BACT determinations for simple cycle F Class. In fact, the company obtained a guarantee from GE to achieve 9 ppmvd. However GE's guarantee is for a performance test on a "new and clean unit." The test must be conducted at a steady-state load of 50 to 100 percent and completed within the first 100 fired hours of operation as specified in the GE protocols.

With the frequent start-ups and shutdowns of the unit, TEC is concerned about the ability to maintain the low NO<sub>x</sub> values for long periods of time following the performance tests. The Department is not aware of the details of the GE guarantee for Oleander who proposed 9 ppmvd on a simple cycle unit.

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However, the Department is aware from discussions with other applicants that a continuing guarantee is available at a substantial cost.<sup>17</sup>

The GE Speedtronic™ Mark V Gas Control System will be used. This control system is designed to fulfill all gas turbine control requirements. These include control of liquid, gas, or both fuels in accordance with the requirements of the speed, load control under part-load conditions, temperature control under maximum capability conditions, or during start-up conditions. Since emissions are controlled utilizing dry low NO<sub>x</sub> techniques, fuel staging and combustion mode are also controlled by the Mark V, which also monitors the process. Sequencing of the auxiliaries to allow fully automated start-up, shutdown and cool-down are also handled by the Mark V.<sup>18</sup>

**DEPARTMENT BACT DETERMINATION**

Following are the BACT limits determined for the TEC project assuming full load. Values for NO<sub>x</sub> are corrected to 15% O<sub>2</sub> on a dry volume basis. The emission limits or their equivalents in terms of pounds per hour and NSPS units, as well as the applicable averaging times, are given in the permit Specific Conditions No. xx through xx.

POLLUTANT	CONTROL TECHNOLOGY	PROPOSED BACT LIMIT
PM/PM <sub>10</sub> , VE	Pipeline Natural Gas Good Combustion	10 Percent Opacity
VOC	As Above	3 ppm – Gas (non-BACT) 6 ppm – Fuel Oil (non-BACT)
CO	As Above	12 ppm – Gas 20 ppm – Fuel Oil
SO <sub>2</sub> /SAM	As Above	2 grains of sulfur per 100 ft <sup>3</sup> gas 0.05 percent sulfur in fuel oil
NO <sub>x</sub>	Dry Low NO <sub>x</sub> , WI for F.O., limited oil use	10.5 ppmvd – Gas 42 ppmvd – Fuel Oil for 750 hours

**RATIONALE FOR DEPARTMENT'S DETERMINATION**

- General Electric has provided a “clean and new” guarantee of 9 ppmvd NO<sub>x</sub>.
- A level of 9 ppmvd NO<sub>x</sub> by DLN has been demonstrated on GE 7FA combustion turbines at Fort St. Vrain, Colorado and Clark County, Washington.
- The proposed 9 ppmvd limit at Oleander while firing natural gas is the lowest known Draft BACT value for an “F” frame combustion turbine operating in simple cycle mode and intermittent duty. The 42 ppmvd limit while firing fuel oil is typical.
- The proposed 10.5 ppmvd limit at TEC while firing natural gas is the next lowest Draft BACT value for an F Class simple cycle, intermittent duty unit. The Department will still require TEC to meet to meet the “clean and new” limit of 9 ppmvd during initial testing.
- The proposed BACT limit of 10.5 ppmvd is about one-tenth of the applicable NSPS limit per 40 CFR 60, Subpart GG for units as efficient as the 7FA.
- Typical permit limits nation-wide for these units while operating in simple cycle mode and intermittent duty are 12-15 ppmvd. Limits as high as 25 ppmvd have been recently proposed by some states. The lower limit at TEC will offset emissions while firing fuel oil. Also TEC will operate fewer hours of operation on oil than Oleander. This will help offset the slightly higher emissions on gas from the TEC project compared to Oleander.



**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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- The units will be operated in simple cycle mode. Therefore control options, which are feasible for combined cycle units, are not applicable. This rules out Low Temperature (conventional) SCR, which achieves 4.5 ppmvd NO<sub>x</sub> or lower. It also rules out the possibility of SCONOX. XONON is not available for F Class dual fuel projects.
- The simple cycle “F Class” turbines have very high exhaust temperatures of up to 1200 °F. This is at the higher limit of the present operational temperature of Hot SCR zeolite catalyst (around 1050 °F). The PREPA simple cycle turbines, which use Hot SCR, have exhaust temperatures ranging from 824 to 1024 °F.
- The levelized costs of NO<sub>x</sub> removal by Hot SCR for the TEC project were estimated by Environmental Consulting & Technology at \$9,717 per ton of NO<sub>x</sub> removed assuming 4,380 and 876 hours per year of operation on gas and oil respectively. This cost-effectiveness value assumes a NO<sub>x</sub> reduction from 10.5 ppmvd to 3.5 ppmvd @15% O<sub>2</sub> and a 3-year performance guarantee.
- Using much of the basic capital cost information developed by the City of Lakeland, The National Park Service estimated the cost of NO<sub>x</sub> removal by Hot SCR at \$3,802 per ton (excluding the energy penalty) for a *continuous duty* Westinghouse 501 G. A further-refinement of the Park Service estimate by including the energy penalty, using the revised catalyst cost data obtained by the Department, and assuming a five year estimated life for the catalyst (per Engelhard’s Lakeland quote) would yield a cost-effectiveness closer to \$3,500 per ton of NO<sub>x</sub> removed for that application. However the cost at the Lakeland project was based on reducing NO<sub>x</sub> emissions by 16 ppmvd (from 25 ppmvd to 9 ppmvd). This fact and the difference in hours of operation are the main contributors to the difference in costs between the Lakeland and TEC projects.
- The cost effectiveness for NO<sub>x</sub> removal given for the PREPA simple cycle project is \$2,200 per ton. This is the only reasonably large project where Hot SCR has actually been installed. The main reason for the relatively low levelized cost is that total costs are applied over a reduction of 40 ppmvd and 8760 hours, whereas the reduction in the TEC case is over a reduction of 7 ppmvd and half the hours. The cost per ton of NO<sub>x</sub> removed by Hot SCR at the PREPA project or projected at Lakeland can be re-scaled for the TEC project. This would result in a value on the order of ECT’s projections:
- Although the Department does not have a “bright line” cost-effectiveness figure, the values projected by TEC indicate Hot SCR is not cost-effective for this project. The conclusion would be the same even if the Department were to “correct” ECT’s cost-effectiveness calculation for estimated 5-7 year life versus the guaranteed 3-year life.
- Comments from the National Park Service on the Oleander project suggested that a reduction in the applicant’s proposed NO<sub>x</sub> emissions on oil from 42 ppmvd to 25ppmvd is possible based two reported oil-fired units listed in the BACT Clearinghouse. One of the two units cited is a Florida facility that initially had a limit of 25 ppmvd for gas firing. The present limits are 15 ppmvd on gas and 42 ppmvd on oil. The Department has been unable to confirm the report on the second unit. GE has advised that it only offers a 42 ppmvd NO<sub>x</sub> guarantee on F Class units when firing oil.



**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

- It is conceivable that NO<sub>x</sub> emissions while firing oil from may be reduced from 42 ppmvd by increasing the water injection rate or even by development of a DLN oil burner. In order to address this possibility, a specific condition will be added to conduct appropriate testing and prepare an engineering report. The report will be submitted for the Department's review to ensure that the lowest reliable NO<sub>x</sub> emission rates while firing oil are been achieved with the installed technology.
- The Department's overall BACT determination is equivalent to approximately 0.3 lb/MW-hr by Dry Low NO<sub>x</sub>. For reference, the new NSPS promulgated on September 3, 1998 requires that new conventional power plants (based on boilers, etc.) meet a limit of 1.6 lb/MW-hr.
- VOC emissions of 1.4 and 3.5 ppm while firing gas or oil proposed by the applicant clearly reflect BACT and, in fact, exempt the project from a BACT determination for VOC.
- The Department will set CO limits achievable by good combustion as 12 ppm (gas) and 20 ppm (oil). These values are equal to the lowest values from permitted or proposed simple cycle units. These limits are equal to those of the Oleander project.
- ECT evaluated the use of an oxidation catalyst with a 90 percent control efficiency and having a three-year catalyst life. The oxidation catalyst control system was estimated to increase the capital cost of the project by \$1,921,133 with an annualized cost of \$515,433 per year. Levelized costs for CO catalyst control were calculated at \$3,652 per ton to control CO emissions to 30.2 TPY (from a baseline of 303 TPY). This figure does not appear to be cost-effective for removal of CO.
- BACT for PM<sub>10</sub> was determined to be good combustion practices consisting of: inlet air filtering; use of pipeline natural gas; use of clean, low ash, low sulfur fuels, and operation of the unit in accordance with the manufacturer-provided manuals.
- PM<sub>10</sub> emissions will be very low and difficult to measure. Additionally, the higher emission mode will involve fuel oil firing which will occur only approximately 750 hours per year. It is not practical to require running the turbine on oil, simply to conduct tests. Therefore, the Department will set a Visible Emission standard of 10 percent opacity as BACT for both natural gas and fuel oil firing, consistent with the definition of BACT. Examples of installations with similar VE limits include the City of Lakeland, the City of Tallahassee, Santa Rosa Energy Center, FPL Fort Myers, and the Southern Company Barry projects.

**COMPLIANCE PROCEDURES**

<b>POLLUTANT</b>	<b>COMPLIANCE PROCEDURE</b>
Visible Emissions	Method 9
Volatile Organic Compounds	Method 18, 25, or 25A (initial tests only)
Carbon Monoxide	Annual Method 10 (can use RATA if at capacity)
NO <sub>x</sub> (performance)	Annual Method 20 (can use RATA if at capacity)
NO <sub>x</sub> (24-hr average)	NO <sub>x</sub> CEMS, O <sub>2</sub> or CO <sub>2</sub> diluent monitor, and flow device as needed
SO <sub>2</sub> and SAM	Custom Fuel Monitoring Schedule

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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**DETAILS OF THE ANALYSIS MAY BE OBTAINED BY CONTACTING:**

A. A. Linero, P.E. Administrator, New Source Review Section  
Teresa Heron, Review Engineer, New Source Review Section  
Department of Environmental Protection  
Bureau of Air Regulation  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

Recommended By:

Approved By:

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

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

\_\_\_\_\_  
Date:

\_\_\_\_\_  
Date:

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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**REFERENCES**

- <sup>1</sup> News Release. Goaline Environmental. Genetics Institute Buys SCONox Clean Air System. August 20, 1999.
- <sup>2</sup> "Control Maker Strives to Sway Utility Skeptics." Air Daily. Volume 5, No. 199. October 14, 1998.
- <sup>3</sup> Telecom. Linero, A.A., FDEP, and Beckham, D., U.S. Generating. Circa November 1998.
- <sup>4</sup> Letter from Opalinski, M.P., SECI to Linero, A.A., FDEP. Turbines and Related Equipment at Hardee unit 3. December 9, 1998.
- <sup>5</sup> Telecon. Vandervort, C., GE, and Linero, A.A., DEP. "VOC Emissions from FA Gas Turbines with DLN-2.6 Combustors."
- <sup>6</sup> Brochure. General Electric. "GE Gas Turbines - MS7001FA." Circa 1993.
- <sup>7</sup> Davis, L.B., GE. "Dry Low NO<sub>x</sub> Combustion Systems for GE Heavy Duty Gas Turbines." 1994.
- <sup>8</sup> Report. Florida Power & Light. "Final Dry Low NO<sub>x</sub> Verification Testing at Martin Combine Cycle Plant." August 7, 1995.
- <sup>9</sup> Florida DEP. PSD Permit, City of Tallahassee Purdom Unit 8. May, 1998.
- <sup>10</sup> City of Tallahassee. PSD/Site Certification Application. April, 1997.
- <sup>11</sup> Florida DEP. Intent to Issue Permit. FPL Fort Myers Repowering Project. September, 1998.
- <sup>12</sup> Florida DEP. Final Permit. Santa Rosa Energy Center. December, 1998.
- <sup>13</sup> State of Alabama. PSD Permit, Alabama Power/Barry Sithe/IPP (GE 7FA).
- <sup>14</sup> Telecon. Schorr, M., GE, and Costello, M., Florida DEP. March 31, 1998. Status of DLN-2.6 Program
- <sup>15</sup> Florida DEP. Bureau of Air Regulation Monthly Report. June, 1998.
- <sup>16</sup> Telecon. Schorr, M., GE, and Linero, A.A., Florida DEP. August, 1998. Cost effectiveness of DLN versus SCR.
- <sup>17</sup> Telecon. Gianazza, N.B., JEA, and Linero, A.A., Florida DEP. Proposed NO<sub>x</sub> limits at Brandy Branch Project.
- <sup>18</sup> Rowen, W.I. "General Electric Speedtronic™ Mark V Gas Turbine Control System." 1994."

**APPENDIX GC**  
GENERAL PERMIT CONDITIONS [F.A.C. 62-4.160]

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- G.1 The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.
- G.2 This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings or exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.
- G.3 As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey and vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.
- G.4 This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.
- G.5 This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.
- G.6 The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.
- G.7 The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:
- a) Have access to and copy and records that must be kept under the conditions of the permit;
  - b) Inspect the facility, equipment, practices, or operations regulated or required under this permit, and,
  - c) Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.
- Reasonable time may depend on the nature of the concern being investigated.
- G.8 If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:
- a) A description of and cause of non-compliance; and
  - b) The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

**APPENDIX GC**  
GENERAL PERMIT CONDITIONS [F.A.C. 62-4.160]

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

- G.9 In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.
- G.10 The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.
- G.11 This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 62-4.120 and 62-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.
- G.12 This permit or a copy thereof shall be kept at the work site of the permitted activity.
- G.13 This permit also constitutes:
- a) Determination of Best Available Control Technology (X)
  - b) Determination of Prevention of Significant Deterioration (X); and
  - c) Compliance with New Source Performance Standards (X).
- G.14 The permittee shall comply with the following:
- a) Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.
  - b) The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application or this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.
  - c) Records of monitoring information shall include:
    - 1. The date, exact place, and time of sampling or measurements;
    - 2. The person responsible for performing the sampling or measurements;
    - 3. The dates analyses were performed;
    - 4. The person responsible for performing the analyses;
    - 5. The analytical techniques or methods used; and
    - 6. The results of such analyses.
- G.15 When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

# Memorandum

# Florida Department of Environmental Protection

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TO: ~~Clair Faney~~

THRU: Al Linero *ajl 6/30*

FROM: Teresa Heron

DATE: June 28, 1999

SUBJECT: TEC Polk Power Station  
Two 165 MW Combustion Turbines  
DEP File No. PSD-FL-263 and PA 92-32

Attached is the public notice package for construction of two dual-fuel, intermittent duty, simple cycle 165 MW combustion turbines at the TECO Polk Power Station

Nitrogen Oxides (NO<sub>x</sub>) emissions from the gas turbine will be controlled by Dry Low NO<sub>x</sub> (DLN-2.6). We propose to require that the unit meet the manufacturer's new and clean (one-shot) guarantee of 9 ppm, and a continuous (24-hour averaged) emission limit of 10.5 ppm. However, we will limit use of fuel oil from the 876 hours requested to 750 hours. We can raise the figure to the requested value if TECO subsequently demonstrates continuous operation at 9 ppm instead of 10.5 ppm.

NO<sub>x</sub> emissions will be controlled to 42 ppm during the limited fuel oil use. Emissions of carbon monoxide, volatile organic compounds, sulfur dioxide, sulfuric acid mist, and particulate matter (PM/PM<sub>10</sub>) will be very low because of the inherently clean pipeline quality natural gas, limited fuel oil use and, especially, the design of the GE unit.

Recent simple cycle emission limits in Region IV have typically been at 15 ppm for simple cycle "F Class" units. In fact, North Carolina recently issued a draft BACT to Dynegy for six dual-fuel Westinghouse "F Class" units with limits of 25 ppm. The Dynegy Westinghouse units must meet 15 ppm by early 2002.

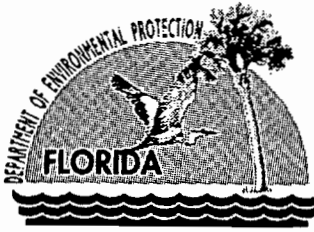
For reference, the draft BACT requested by Oleander is a continuous limit of 9 ppm. Oleander will be allowed to operate on fuel oil for 1000 hours instead of the 2000 hours they requested (or the 750 hours to which TECO will be limited). Oleander is either more willing than TECO to take a risk on continuous compliance or more willing to pay for a continuing guarantee. Oleander's parent company, Constellation, included an identical simple cycle project for its planned High Desert Project in California where LAER is required. They undoubtedly tried to get them permitted for the lowest emission rate while avoiding SCR. When they shifted the simple cycle option to the Florida site, they decided to propose 9 ppm.

Our approach is sensible and our limit on fuel oil will provide some equity between the two determinations. It provides some flexibility in the way companies decide to manage the inherent risk in accepting low NO<sub>x</sub> limits on simple cycle intermittent duty units when there is no feasible "fall-back" technology alternative (such as conventional SCR for combined cycle units).

I recommend your approval of the attached Intent to Issue.

AAL/th

Attachments



Jeb Bush  
Governor

# Department of Environmental Protection

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

David B. Struhs  
Secretary

## P.E. Certification Statement

**Permittee:**

**DEP File No. PSD-FL-263 (PA92-32)**

Tampa Electric Company (TEC)  
Polk County

**Project type:**

Project will be at the TEC Polk Power Station near Mulberry, Polk County. Project is construction of two 165-megawatt GE PG7241FA gas and oil-fired simple cycle combustion turbine-electrical generators and two 114-foot stacks. Fuel oil firing will be limited to 750 hours per year.

The units must meet the manufacturer's "new and clean" nitrogen oxides performance guarantee of 9 parts per million by volume, dry, at 15% oxygen (ppmvd) while burning natural gas. The continuous (24-hour) BACT NO<sub>x</sub> limits are 10.5 ppmvd when operating on natural gas and 42 ppmvd by wet injection when burning fuel oil. Other pollutants, including particulate matter (PM/PM<sub>10</sub>), carbon monoxide, volatile organic compounds, sulfur dioxide, and sulfuric acid mist will be controlled by good combustion and use of clean fuels.

Projected impacts from the proposed project emissions are all less than the applicable significant impact limits corresponding to the nearest PSD Class I (Chassahowitzka National Wilderness Areas) and Class II areas.

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

A A. Linero, P.E.  
Registration Number: 26032

6/30/99  
Date

Department of Environmental Protection  
Bureau of Air Regulation  
New Source Review Section  
111 South Magnolia Drive, Suite 4  
Tallahassee, Florida 32301  
Phone (850) 921-9523  
Fax (850) 922-6979



"Protect, Conserve and Manage Florida's Environment and Natural Resources"

Is your RETURN ADDRESS completed on the reverse side?

**SENDER:**

- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):

- 1.  Addressee's Address
- 2.  Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:

Mr. Gregory M. Nelson, PE  
 Manager Edu. Planning  
 Tampa Elect. Co.  
 6944 US Hwy 41 North  
 Apollo Beach, FL  
 33572-9200

4a. Article Number

2 333 618 185

4b. Service Type

- Registered  Certified
- Express Mail  Insured
- Return Receipt for Merchandise  COD

7. Date of Delivery

7-1-99

5. Received By: (Print Name)

Angelica Heath

6. Signature: (Addressee or Agent)

X

8. Addressee's Address (Only if requested and fee is paid)

Thank you for using Return Receipt Service.

Z 333 618 185

US Postal Service

**Receipt for Certified Mail**

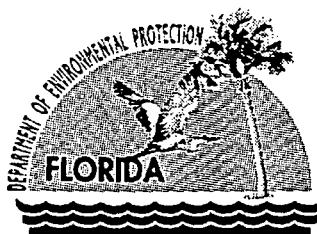
No Insurance Coverage Provided.

Do not use for International Mail (See reverse)

Sent to	Gregory Nelson
Street & Number	JECO
Post Office, State, & ZIP Code	Apollo Beach FL
Postage	\$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	\$
Postmark or Date	6-29-99
	PAK P.S. PSD-FL-263

PS Form 3800, April 1995





Jeb Bush  
Governor

# Department of Environmental Protection

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

David B. Struhs  
Secretary

**RECEIVED**

FEB 12 1999

**BUREAU OF  
AIR REGULATION**

February 11, 1999

Mr. James Hunter  
Tampa Electric  
Post Office Box 111  
Tampa, Florida 33601-0111

Re: Polk Power Station, PA 92-32

Dear Mr. Hunter:

I have received a copy of your February 5, 1999, letter to Mr. Clair Fancy and a copy of the Polk Power Station Simple-Cycle Combustion Turbines Air Construction Permit Application. Your application is incorrect and incomplete for the following reasons:

1. The proposed combustion turbines (CTs) are to be located on a site certified pursuant to the Florida Electrical Power Plant Siting Act, ss 403.501-518, F.S. The Conditions of Certification in Condition II state, "All discharges or emissions authorized herein shall be consistent with the terms and conditions of this certification. The discharge of any regulated pollutant not identified in the application, or more frequent than, or at a level in excess of that authorized herein, shall constitute a violation of the certification. Any anticipated facility expansions beyond the certified initial, nominal, net capacity of 260 MW, production increases, or process modifications which may result in new, different, or increased discharges of pollutants, change in type of fuel as described in XIII.D., or expansion in steam generation capacity shall be reported by submission of a supplemental application pursuant to Chapter 403, F.S."

2. The proposed CTs are a new source of air pollutants not described in the initial application. It is the Department's opinion that the new CTs must be reviewed as a modification to the certification of TEC Polk 1.

3. The form, copies and fee submitted are not complete nor sufficient as prescribed in DEP Rule 62-17, F.A.C. to initiate the modification process. The modification fee is \$10,000. Your initial filing was \$7,500, some \$2,500 short.

It is suggested that you contact your legal counsel prior to filing an appropriate modification with the Department and all parties.

Sincerely,

Hamilton S. Oven, P.E.  
Administrator, siting  
Coordination Office

CC: Scott Goorland  
Larry Curtin  
Al Linero ✓



# Department of Environmental Protection

Jeb Bush  
Governor

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

David B. Struhs  
Secretary

February 18, 1999

Mr. Gregg Worley, Chief  
Air, Radiation Technology Branch  
Preconstruction/HAP Section  
U.S. EPA - Region IV  
61 Forsyth Street  
Atlanta, Georgia 30303

Re: Tampa Electric Company - Polk Power Station  
PA 92-32, PSD-FL-263

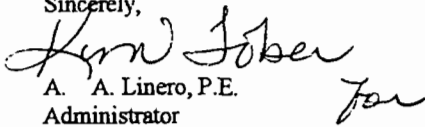
Dear Mr. Worley:

Enclosed for your review and comment is an application for the above referenced project. It consists of two intermittent duty, simple cycle, dual fuel General Electric PG7241FA combustion turbine -electrical generators. The applicant proposes to control nitrogen oxides emission when firing gas to 10.5 ppmvd @15% O<sub>2</sub> by Dry Low NO<sub>x</sub> technology.

The project will be reviewed under the applicable requirements of Florida's Power Plant Siting Act. Because no electricity will be generated from steam, there is no "automatic" requirement for an administrative hearing or for consideration by the Governor and Cabinet in their capacity as the Siting Board.

Please send your comments to me at the letterhead address or fax them to my attention at (850)922-6979. If you have any questions, please contact Teresa Heron at (850)921-9529.

Sincerely,

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

AAL/kt

Enclosures

cc: Teresa Heron, BAR



Jeb Bush  
Governor

# Department of Environmental Protection

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

David B. Struhs  
Secretary

February 18, 1999

Mr. John Bunyak, Chief  
Policy, Planning & Permit Review Branch  
NPS-Air Quality Division  
Post Office Box 25287  
Denver, CO 80225

Re: Tampa Electric Company – Polk Power Station  
PA 92-32, PSD-FL-263

Dear Mr. Bunyak:

Enclosed for your review and comment is an application for the above referenced project. It consists of two intermittent duty, simple cycle, dual fuel General Electric PG7241FA combustion turbine -electrical generators. The applicant proposes to control nitrogen oxides emission when firing gas to 10.5 ppmvd @15% O<sub>2</sub> by Dry Low NO<sub>x</sub> technology.

The project will be reviewed under the applicable requirements of Florida's Power Plant Siting Act. Because no electricity will be generated from steam, there is no "automatic" requirement for an administrative hearing or for consideration by the Governor and Cabinet in their capacity as the Siting Board.

Please send your comments to me at the letterhead address or fax them to my attention at (850)922-6979. If you have any questions, please contact Teresa Heron at (850)921-9529.

Sincerely,

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

AAL/kt

Enclosures

cc: Teresa Heron, BAR



IN REPLY REFER TO:

# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

1875 Century Boulevard  
Atlanta, Georgia 30345

MAR 19 1999

RECEIVED

MAR 22 1999

BUREAU OF  
AIR REGULATION

Re: PSD-FL-263

Mr. C. H. Fancy  
Chief, Bureau of Air Regulation  
Florida Department of Environmental Regulation  
Twin Towers Office Building  
2600 Blair Stone Road, MS 48  
Tallahassee, Florida 32399-2400

Dear Mr. Fancy:

PSD-FL-263

Our Air Quality Branch (AQB) has reviewed the Prevention of Significant Deterioration permit application for Tampa Electric Company's (TECO) proposal to construct and operate a simple cycle project at its Polk Power Station in Polk County, Florida. The facility is located 118 km southeast of Chassahowitzka Wilderness, a Class I air quality area administered by the U.S. Fish and Wildlife Service. The AQB's comments are summarized in the attached technical review document.

In summary, although TECO is proposing adequate control technologies for nitrogen oxides (NO<sub>x</sub>), the level of control proposed by TECO does not fully utilize the potential of those technologies. We believe that TECO should be required to meet lower NO<sub>x</sub> emission limits than those proposed.

In addition, TECO should evaluate potential impacts from this proposed project to regional haze at the Class I area.

If you have questions, please contact Ms. Ellen Porter of our Air Quality Branch in Denver at (303) 969-2617.

Sincerely yours,

for Sam D. Hamilton  
Regional Director

Enclosures

cc: J. Heron, BAR  
B. Owen, PPS  
C. Holladay

polk Co.  
EPA

**Technical Review of Prevention of Significant Deterioration Permit Application  
for Two Simple-Cycle Combustion Turbine Generators  
Tampa Electric Company Polk Power Station  
Polk County, Florida  
PSD-FL-263**

by

**Air Quality Branch, Fish and Wildlife Service – Denver  
March 15, 1999**

Tampa Electric Company (TECO) is proposing to construct and operate two gas/oil-fired 165-megawatt (MW) General Electric PG7241 simple-cycle combustion turbine generators at its existing Polk Power Station in Polk County, Florida. The facility is located 118 km southeast of Chassahowitzka Wilderness, a Class I air quality area administered by the U.S. Fish and Wildlife Service. The proposed project will result in significant increases in emissions of nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>) fine particulate matter (PM-10), particulate matter (PM), volatile organic compounds (VOC), sulfuric acid mist (SAM), and carbon monoxide (CO). Emissions (in tons per year – TPY) are summarized below.

POLLUTANT	EMISSIONS INCREASE (TPY)
NO <sub>x</sub>	581
SO <sub>2</sub>	126
PM-10	66
PM	66
VOC	74
SAM	14.6
CO	303

**Best Available Control Technology (BACT) Analysis**

Nitrogen oxides emissions are the primary focus of this analysis because NO<sub>x</sub> emissions are highly dependent upon the combustor type and any add-on controls. Sulfur dioxide and SAM emissions will be controlled through the use of natural gas and low-sulfur (less than 0.05%) fuel oil as a back-up fuel. Emissions of PM, PM-10, CO, and VOC will be controlled by good combustion techniques.

***NO<sub>x</sub> Controls***

TECO has proposed to meet NO<sub>x</sub> limits of 10.5 parts per million by volume on a dry basis (ppmvd) corrected to 15% oxygen controlled by use of dry low-NO<sub>x</sub> (DLN) combustors while burning natural gas. When burning oil, TECO proposes to limit NO<sub>x</sub> to 42 ppm through the use of water injection.

While we agree with the NO<sub>x</sub> control technologies proposed by TECO, we also believe that it can better utilize these technologies to achieve lower NO<sub>x</sub> emissions. For example, DLN use on the overwhelming majority of newer units shown in the enclosed Tables 1.a and 1.b indicate that emissions in the 9-ppm range are readily achievable and feasible for this industry.

Although we have relatively little data with regard to NO<sub>x</sub> limits when firing oil, it can be seen from Tables 1.a and 1.b that a limit of 25 ppm is feasible.

The economic analysis of Selective Catalytic Reduction performed by TECO is very well documented and presented—it is the best analysis we have seen and should be used as a model for others.

### ***Conclusions and Recommendations***

Although TECO is proposing adequate control technologies, the level of NO<sub>x</sub> control proposed does not fully utilize the potential of those technologies. We believe that NO<sub>x</sub> can be controlled to a level of 9 ppm when firing gas, and 25 ppm when firing oil, by the technology proposed.

### **Air Quality Analysis**

The results of the air quality analysis (using ISCST3) indicate that the proposed project will not contribute significantly to consumption of the Class I increments for SO<sub>2</sub>, nitrogen dioxide (NO<sub>2</sub>), and PM-10.

### **Air Quality Related Values (AQRV) Analysis**

TECO conducted a VISCREEN analysis to evaluate potential visible plume impacts at Chassahowitzka Wilderness from this project. The VISCREEN analysis should only be used for sources located less than 50 km from a receptor in the Class I area. We recommend that all sources, including TECO, located more than 50 km from a receptor in the Class I area perform a regional haze analysis, following the recommendations of the Interagency Workgroup on Air Quality Modeling at: <http://www.epa.gov/scram001/>; “Model Support”; “7th Modeling Conference”; “CALPUFF”; “PHASE 2.”

Contact: Ellen Porter, Air Quality Branch (303) 969-2617.

Table 1.a Gas Turbine Limits from RBLC

Facility Name	Project Description							Permit Issue Date	NOx Emission Limits			
	Simple Cycle	Combined Cycle	Duct Burner	Power Output MW	mmBtu/hr	HP	Permit #		Dry Lox-NOx Comb.		SCR	
									Gas (ppm)	Oil (ppm)	Gas (ppm)	Oil (ppm)
Alabama Power Company		Y	Y	100	353	10566	AL-0115	Dec-97	15.0			
American Cogen Tech.								Sep-85				17.0
Arrowhead Cogen								Dec-89				9.0
Aubumdale Power Part.				356	1214	36298	FL-0080	Dec-92	15.0	25.0		
Baf Energy								Jul-87				9.0
Baltimore Gas & Electric				140	495	14792	MD-0019		15.0			
Bear Island Paper		Y	Y	139	474	14172	VA-0190	Oct-92				9.0 15.0
Berkshire, MA		Y		272								3.5 9.0
Bermuda Hundred								Mar-92				9.0 15.0
Blue Mtn. Pwr.			Y	153	541	16166	PA-0148	Jul-96	Y	Y		4.0 8.4
Brooklyn Navy Yard Cogen		Y		240	848	25358	NY-0044	Jun-95				3.5 10.0
Cimarron Chemical				0			CO-0020	Mar-91				
Cogen Technologies								Jun-87				9.6
Doswell Ltd.								May-90				9.0
Ecoelectrica		Y		461	1629	48709	PR-0004	Oct-96				7.0 9.0
Fleetwood Cogeneration			Y	105	360	10764	PA-0099	Apr-94				15.0
Florida Power--Hines--Polk		Y		442	1510	45148	FL-0082	Feb-94	12.0	42.0		
Formosa Plastics		Y		132	450	13455	LA-0093	Mar-97	9.0			
Formosa Plastics		Y		132	450	13455	LA-0089	Mar-95	9.0			
Gainesville Regional Utilities	Y			74	262	7819	FL-0092	Apr-95	15.0			
Goal Line				113	386	11541	CA-0544	Nov-92				5.0
Gordonsville Energy			Y	445	1520	45433	VA-0189	Sep-92				9.0
Granite Road Limited				135	461	13781	CA-0441	May-92				3.5
Grays Ferry		Y	Y	337	1150	34384	PA-0098	Nov-92	9.0			
Hermiston Generating		Y		497	1696	50709	OR-0011	Apr-94				4.5
Kalamazoo Power				529	1806	53995	MI-0206	Dec-91	15.0			
Kamine/Besicorp				190	650	19434	NY-0049	Nov-92	9.0			9.0
Kamine/Besicorp				191	653	19524	NY-0048	Nov-92	9.0			9.0
Kingsburg Energy			Y	35	122	3645	CA-0347	Sep-89				6.0
Kissimmee Utility Authority				255	869	25982	FL-0078	Apr-93	15.0			
Lakewood Cogen								Apr-91				9.0
Lakewood Cogeneration				56	190	5681	NJ-0013	Apr-91				9.0
Las Vegas Cogen								Oct-90				10.0
Linden Cogeneration		Y		165	583	17434	NJ-0011	Aug-91				
Lordsburg				100	353	10566	NM-0031	Jun-97	15.0			
Lsp-Cottage Grove				577	1970	58901	MN-0022	Mar-95				4.5
Mid-Ga. Cogen				116	410	12257	GA-0063	Apr-96				9.0 20.0
Milagro, Williams Field Ser.				10983	37500	1121220	NM-0024					
Narragansett Electric			Y	398	1360	40663	RI-0010	Jun-96				9.0
Newark Bay Cogen				171	585	17491	NJ-0009	Nov-90				8.3
Newark Bay Cogen				181	617	18448	NJ-0017	Jun-93				8.3 16.0
Ocean State Power								Dec-88				9.0
Ols Energy								Jan-86				9.0
Orange Cogen				108	368	11012	FL-0068	Dec-93	15.0			
Panda-Kathleen		Y		75	265	7925	FL-0102	Jun-95	15.0			
Pasny/Holtsville		Y		336	1146	34264	NY-0047	Sep-92	9.0			
Pawtucket Power								Jan-89				9.0
Pedricktown Cogen				293	1000	29899	NJ-0010	Feb-90				9.0

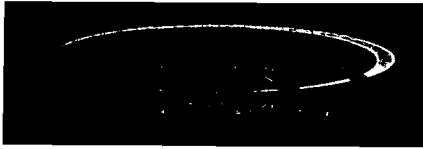
Facility Name/Location	Project Description							Permit Issue Date	NOx Emission Limits < 25 ppm			
	Simple	Combined	Duct	Power Output					Dry Lox-NOx Comb.		SCR	
	Cycle	Cycle	Burner	MW	mmBtu/hr	HP	Permit #		Gas (ppm)	Oil (ppm)	Gas (ppm)	Oil (ppm)
Phoenix Power Part.				0				May-93	22.0			
Pilgrim Energy Center			Y	410	1400	41859	NY-0075	Apr-95				4.5
Portland General Elec.				504	1720	51427	OR-0010	May-94				4.5
Puerto Rico Electric Power	Y			248	876	26204	PR-0002	Jul-95			10.0	42.0
Richmond Power Enterprise								Dec-89				8.2
Saguaro Power Company				35	122	3645	NV-0015	Jun-91				9.0
Saranac Energy Company			Y	329	1123	33577	NY-0046	Jul-92				9.0
Selkirk Cogen			Y	344	1173	35072	NY-0045	Jun-92				9.0
Seminole Fertilizer								Mar-91				9.0
Seminole Fertilizer Corp				26	92	2747	FL-0059	Mar-91				9.0
Seminole Hardee Unit 3		Y		2 x 244	981	29331	FL-0104	Jan-96	15.0		12.0	
Sithe/Independence		Y		625	2133	63775		Nov-92				4.5
So. Cal. Gas								Oct-91				8.0
Southern CA Gas				0			CA-0418	Oct-91				8.0
Southern CA Gas				54	184	5500	CA-0463	Oct-91				8.0
Sumas Energy								Jun-91				8.0
Sumas Energy								Dec-90				9.0
Sumas Energy Inc				88	311	9298	WA-0027	Dec-92				6.0
Sunlaw								Jun-85				9.0
SW PSCo				100	353	10566	NM-0028	Nov-96	15.0			
SW PSCo				100	353	10566	NM-0029	Feb-97	?			
Tallahassee		Y		260					12.0	42.0		
Tenaska WA Partners		Y	Y	1	2	55	WA-0275	May-92				7.0
Tiger Bay				473	1615	48281	FL-0072	May-92	15.0			
Union Oil								Mar-86				2.5
Unocal				0			CA-0613	Jul-89				9.0
Western Power Sys.								Mar-86				9.0
Willamette Ind.								Apr-85				15.0

Table 1.b Permits Pending or Not Yet in RBL

Facility Name/Location	Project Description							Permit Issue Date	NOx Emission Limits < 25 ppm				
	Simple	Combined	Duct	Power Output					Dry Lox-NOx Comb.		SCR		
	Cycle	Cycle	Burner	MW	mmBtu/hr	HP	Permit #		Gas (ppm)	Oil (ppm)	Gas (ppm)	Oil (ppm)	
Alabama Pwr--Theodore		Y	Y	210			AL					3.5	
Androscoggin Energy		Y	Y	150	1857	55523	ME					6.0	42.0
ARCO Watson Project				45			CA	Oct-97				5.0	
Bridgeport Energy Project												6.0	
Brush	Y			25 x 2			CO		42 (1)				
Calpine--South Point		Y	Y	500			AZ		Y			4.5	
Casco Bay Energy		Y		520	1838	54943	ME					5.0	
Cogen Tech. Linden Venture		Y		581	1983	59275	NJ					3.5	
Col. Springs--Nixon	Y			33 x 2			CO		25.0				
Dighton, MA							MA					3.5	
Duke Energy--New Smyrna		Y		500			FL		12.0				
Enron (LAER)							CA					2.5	
Frontera Power		Y		330			TX		15.0				
Griffith Energy		Y	Y	650			AZ					4.5	
HDPP (LAER)							CA					3.0	
Hermiston Generating		Y					CA	Dec-95				4.5	
Kissimmee Utility--Cane Is. #1	Y			40			FL-182B		15.0				
Kissimmee Utility--Cane Is. #3		Y		250			FL						
Lakeland McIntosh CCT		Y		350			FL					7.5	15.0
Lakeland McIntosh SCT	Y			250	883	26415	FL		9.0	42.0			
LaPoloma Generating		Y		262 x 4			CA					3.0	
Mississippi Pwr--Daniels		Y		170			MI		Y			3.5	
Northwest Regional Power		Y		838	1530	45746	WA		9.0				
Oleander Power	Y			190 x 5			FL		9.0	42.0			
Orange Generation--Bartow		Y		41 x 2					15.0				
Rotterdam, N.Y.							NY					4.5	
Sacramento Power				115			CA	Dec-94				3.0	
Sutter				170					Y			3.5	
Tampa Electric--Polk County	Y			165 x 2			FL						
TVA--Gallatin	Y			85 x 4			TN		15.0				
TVA--Johnsonville	Y			85 x 4			TN		15.0				
TX-NM Pwr--Lordsburg		Y		80			NM		15.0	25.0			
Theodore Co-Gen		Y	Y									3.5	
Tiverton, RI							RI					3.5	

(1) does not use dry low-NOx combustor technology





TAMPA ELECTRIC

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AIR REGULATION

May 6, 1999

Mr. Hamilton S. Oven, Administrator  
Siting Coordination Office  
Florida Department of Environmental Protection  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

Via Fed Ex  
Airbill No. 809689308834

Re: Tampa Electric Company  
Polk Power Station  
PPSA No. PA 92-32  
Request for Modification

0530233

Dear Mr. Oven:

Tampa Electric Company (TEC) hereby requests a modification of the Site Certification for the Polk Power Station (PA 92-32), pursuant to Section 403.516(1)(b), Florida Statutes. The Siting Board issued this certification in January 1994, authorizing the construction and operation of the first phase of an ultimate 1150 MW capacity facility. TEC is currently in the process of adding additional generating capacity to the site in the form of two GE 7F combustion turbines operated in simple cycle mode. TEC has identified the need to modify the existing Conditions of Certification (COC) to incorporate this change to the site.

The modifications related to the additional units will be resolved by incorporating the conditions of the separately issued Prevention of Significant Deterioration permit that is needed to construct these units into a new section of the COC addressing this second phase of the build-out of this site. To make it clear that these, and any other new or modified conditions of a federally delegated or approved permit program, shall modify the existing COC, TEC requests that the language found in 62-17.211(4) F.A.C. be included in existing Condition XI. of PA 92-32. Once the conditions in the new PSD permit are agreed on, TEC will supplement this request to include the new PSD condition language into the current COC.

Enclosed with this letter are four (4) signed and sealed copies, including the Electronic Submission of Application (ELSA), of Tampa Electric Company's (TEC) permit application to construct two new simple-cycle combustion turbines at the Polk Power Station site. The enclosed version of this application has been updated since the version that was originally sent to the Department in February of this year.

The revisions include revised air quality modeling due to a change in the original location and height of the combustion turbine's stacks and also include a regional haze analysis for this project. Additional revisions are included as necessary to incorporate the responses to the following questions raised by the Department based on the initial submittal.

Mr. Hamilton S. Oven  
May 6, 1999  
Page 2 of 3

**Question 1**

Please provide the rationale for the 15 (gas) ppm, 33 (oil) ppm and the 7 (gas/oil) ppm limits proposed for CO and VOC as BACT. Lower concentrations have been proposed for several identical units in previous applications. The majority of these applications contained the GE's guarantee emission data.

**TEC Response**

*The 15 ppm (CO, gas), 33 ppm (CO, oil) and 7 ppm (VOC, gas/oil) levels stated in the initial permit application are based on GE vendor data; reference Attachment B of the permit application. Note that the initial GE estimated performance data provided in Attachment B only showed emissions data for unburned hydrocarbons (UHCs). Accordingly, VOCs were conservatively set equal to UHCs in the February 1999 permit application.*

*GE was recently requested to provide emissions data for VOCs in addition to UHCs. GE's response is that VOC exhaust concentrations from the 7FA CTs will not exceed 1.4 and 3.5 ppmvw (parts per million by volume, wet) at 100% load for natural gas- and fuel oil-firing, respectively. This revised information is located in the revised Attachment B.*

**Question 2**

Please provide the rationale for the proposed 10.5 ppm @ 15 % O<sub>2</sub>. Typically, this kind of combustors are capable of meeting 9 ppm NO<sub>x</sub> and this have been the BACT for combined cycle and for simple cycle too (proposed Oleander project). GE guaranteed a limit of 9 ppm at the City of Tallahassee Combined Cycle Project where similar turbine would be used. It is our understanding that if an operator follows the GE operating procedures, the turbine is capable of maintaining the 9 ppm emission level.

**TEC Response**

*The 10.5 ppm (NO<sub>x</sub> gas) level requested was based on GE's estimated performance of 9 ppm with consideration being given to long-term performance and the frequent start-ups and shutdowns associated with simple-cycle operation; reference Page 5-40 of the permit application for further discussion of this issue.*

**Question 3**

Refer to Table 3-2 of the application (page 3-4). What is the basis for the estimates presented (4,380 Hours/year (gas), 3540 hours/yr (gas)/876 hour/yr (oil), @59°F, 100% load, etc)?

**TEC Response**

*The annual emission rates presented in Table 3-2 (Page 3-4 of the application) are based on: (a) natural gas-firing, 100% load, and 59 °F ambient temperature for 4,380 hours per year, and (b) fuel oil-firing, 100% load, and 59 °F ambient temperature for 876 hours per year.*

**Question 4**

How many extra MW are generated during the use of the evaporative cooler (refer to page 2-5 of the application).

Mr. Hamilton S. Oven  
May 6, 1999  
Page 3 of 3

TEC Response

*The references to an evaporative cooler in the initial application are in error; there is no intent to use an evaporative cooler for this project. The enclosed permit application has been revised to remove these references.*

Question 5

**How will fuel oil be delivered to the site, e.g. pipeline or trucks? What is the capacity of the tank(s)? Include this emission unit as a separate unit (submit the remaining pages of the application form for this emissions unit).**

TEC Response

*Fuel oil will be delivered by truck and stored in an existing, three million gallon storage tank.*

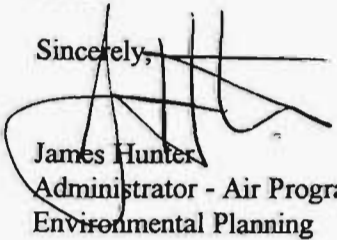
*Per FDEP's final Title V permit issued for the PPS (Permit No. 105023-001-AV), the existing fuel oil storage tank is considered to be an "insignificant emission unit/activity" due to the negligible VOC emissions associated with the storage of low volatility distillate fuel oil; reference Appendix I-1 of the final permit which lists "No. 2 fuel storage tanks >550 gallons" as an insignificant emission unit. The existing fuel oil storage tank also qualifies for an exemption from permitting requirements pursuant to the Generic Emissions Unit Exemption of Rule 62-210(3)(b)1., F.A.C.*

In addition to the above, TEC also requests that all references to Chapter 17, F.A.C. throughout the COC be update to the corresponding Chapter 62, F.A.C. reference.

A check for \$2,500.00 to the Florida Department of Environmental Protection is enclosed to supplement the \$7,500 check submitted in February (FDEP Receipt No. 07112) to cover the \$10,000 modification fee per 62-17.293(c), F.A.C. Copies of the modification request, along with the attached permit application (with the exception of the associated electronic files) are being distributed to all parties to the proceedings concurrent with this submittal.

TEC appreciates the Departments timely review and processing of this modification and associated construction permit application. If you should have any questions, please feel free to call me at (813) 641-5033.

Sincerely,

  
James Hunter  
Administrator - Air Programs  
Environmental Planning

EPbjjh898

Enclosures

c/enc: **A.A. Linero, FDEP - Tallahassee**

R.D. Garrity, Ph.D., FDEP-Tampa

Scot Gorland, FDEP - Tallahassee

All parties of record (list attached)

cc: *Jeresa Nelson*

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Attorney at Law  
Holland & Knight  
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Tallahassee, FL 32302

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James Antista, General Council  
Florida Game and Fresh Water Fish  
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Sara M. Fotopulos  
Chief Council  
Environmental Protection Commission  
Of Hillsborough County  
1900 Ninth Avenue  
Tampa, FL 33605



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AIR REGULATION

May 11, 1999

Mr. Hamilton S. Oven, Administrator  
Siting Coordination Office  
Florida Department of Environmental Protection  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

Via Fed Ex  
Airbill No. 809689308801

Re: Tampa Electric Company  
Polk Power Station  
PPSA No. PA 92-32  
Request for Modification  
Revised List for Parties to the Proceedings

Dear Mr. Oven:

Please note that the list for the "Parties to the Proceedings" enclosed with the May 6, 1999 submittal had not been updated. The new and revised list is enclosed with this letter. These updates were made prior to mailing the May 6, 1999 package to the parties on the list. Therefore the enclosed list with this letter should replace the enclosed list in the May 6<sup>th</sup> letter you received.

I apologize for any confusion this may have caused. If you should have any questions, please feel free to call me at (813) 641-5033.

Sincerely,

James Hunter  
Administrator - Air Programs  
Environmental Planning

EPbjjh899

Enclosure

c/enc: A.A. Linero, FDEP - Tallahassee  
R.D. Garrity, Ph.D., FDEP-Tampa  
Scoot Gorland, FDEP - Tallahassee

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Edward Helvenston  
General Counsel  
Southwest Florida Water Management  
District  
2370 Broad Street  
Brooksville, FL 34609-6899

Pam Leslie, General Counsel  
Dept. of Transportation  
605 Suwannee Street, M.S. 58  
Tallahassee, FL 32399-0458

James Antista, General Council  
Florida Game and Fresh Water Fish  
Commission  
Bryant Building  
620 South Meridian Street  
Tallahassee, FL 32399-1600

Sara M. Fotopulos  
Chief Council  
Environmental Protection Commission  
Of Hillsborough County  
1900 Ninth Avenue  
Tampa, FL 33605

332 6722

Check Message

Jun 2 '99 11:32

2

T.1.1	Check condition of remote Fax.	613523366722
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Chris Carlson  
 5/20/1999  
 TECO/Polk Power Station  
 PSD Application  
 Comments on Modeling

Post-It® Fax Note	7671	Date	6/2/99	# of pages	1
To	Tom Davis	From	Chris Carlson		
Co./Dept.	ECT	Co.			
Phone #	352-332-0444	Phone #	850-921-9537		
Fax #	352-332-6722	Fax #			

- 1) Section 6.6 of the permit application refers to a Table 6-1 for the dimensions of buildings and structures, but this table was not included in the application. This data is needed to support the lack of dimension specific building heights and widths used in the ISC model as a result of the BPIP analysis.
- 2) Section 6.6 also states that the locations of buildings and structures can be determined from Figure 2-2, but there are no buildings visible on the map.
- 3) Figure 2-4 shows that location of buildings, but it is unclear whether the map is oriented to true north or plant north.
- 4) Why was building downwash disregarded in the screening analysis?
- 5) Case 1 of the screening analysis assumes a unit load of 100% and an ambient temperature of 90° F . Table 2-8 states that the stack exit velocity for this scenario should be 19.7, however, a value of 19.8 was used in the SCREEN3 model. There seems to be a 0.1 m/s difference in exit velocity in many of the other cases as well.
- 6) Excluding case 1, all of the stack gas exit temperatures entered into the screening model appear to be wrong. It looks as if degrees Fahrenheit were used instead of Kelvin.
- 7) Many of the ambient temperatures that were entered into the SCREEN3 model do not match the case numbers given in Tables 7-1 though 7-5.
- 8) There is a typo in section 8.2.4, it should say 'preconstruction' instead of 'reconstruction'.

Best Available Copy

COMMISSION

PAT FRANK  
CHRIS HART  
JIM NORMAN  
JAN PLATT  
THOMAS SCOTT  
RONDA STORMS  
BEN WACKSMAN

EXECUTIVE DIRECTOR

ROGER P. STEWART



ADMINISTRATIVE OFFICES, LEGAL &  
WATER MANAGEMENT DIVISION  
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TAMPA, FLORIDA 33605  
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TELEPHONE (813) 272-5530

WASTE MANAGEMENT DIVISION  
TELEPHONE (813) 272-5788

WETLANDS MANAGEMENT DIVISION  
TELEPHONE (813) 272-7104

ENVIRONMENTAL PROTECTION COMMISSION  
of Hillsborough County

FAX Transmittal Sheet

DATE: 6/7/99

TO: Teresa Heron

FAX Phone: \_\_\_\_\_ Voice Phone: \_\_\_\_\_

TOTAL NUMBER OF PAGES INCLUDING THIS COVER PAGE: 3

EPC FAX Transmission Line: (813) 272-5605  
For retransmission or any FAX problems, call: (813) 272-5530

FROM: Steve Pak

(Circle applicable section below)

Air Division

-Compliance

-Enforcement/Analysis

-Monitoring/Toxics

-Permitting

SPECIAL INSTRUCTIONS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**COMMISSION**

PAT FRANK  
CHRIS HART  
JIM NORMAN  
JAN PLATT  
THOMAS SCOTT  
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**MEMORANDUM**

DATE: June 7, 1999

TO: Teresa Heron

FROM: *RK* Richard Kirby, IV, P.E.

SUBJECT: TECO, Polk Power Station, PPSA No. 8A92-32  
Request for modification dated May 6, 1999

The Environmental Protection Commission of Hillsborough County (EPC) has received and reviewed a copy of the referenced application. Although the facility is not located in Hillsborough County, it is very close to the eastern edge of our county. Since Hillsborough County was previously nonattainment for particulate matter (PM) and ozone, and will probably be reclassified as nonattainment for ozone, we are especially interested in large projects in the area which could affect our air quality. This application proposes construction of 2 new combustion turbine generators. The project triggers PSD and requires BACT for NO<sub>x</sub>, CO, PM, SO<sub>2</sub>, and SAM. Based on my review of the project, I offer the following comments for your consideration:

1. TECO has requested that the 2 hr/24 hr excess emissions allowed by rule be increased to 4 hr per any 24 hour period. This will accommodate the 180 and 240 minutes cold start periods. Several issues relate to this request (Reference pages 2-5 & 2-8):
  - a) In the application, it is stated that GE emission factors are used at 100% load and using TECO's capacity factors of 4380 hr/year for natural gas and 876 hr/year for #2 fuel oil. Potential to emit calculations should be based on worst case conditions allowed by the permit.
  - b) The requested 4 hr/24 hr seems excessive since a cold start cannot occur until 48 hours after shutdown. A warm startup can occur when a unit has been shut down for between 2 and 48 hours. Since 4 hours seems unnecessary and excessive, perhaps a weekly limit would be more appropriate. Say 10 hours per any calendar week.
  - c) It should be noted that the state allowed excess emissions does not apply to violation of an NSPS requirement. The proposed units would be subject to 40 CFR 60, Subpart GG.

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Teresa Heron  
June 7, 1999

Page 2

2. Table 2-5 gives maximum emissions of HCl at 5.1 lb/hr and nickel at 2.48 lb/hr. Since at 8,760 hours/yr, this would give emissions of 22.3 tpy and 10.9 tpy respectively, it will be necessary to establish a federally enforceable limit on either fuel usage or hours of operation to avoid triggering "case-by-case" MACT.
3. On page 5-9 TECO has requested 10% opacity as a surrogate test to show compliance with the proposed PM<sub>10</sub> standard. At 9 lb PM/hr and the design flow rate this comes to 0.004 gr/acf. EPC strongly disagrees that 10% opacity demonstrates compliance with this grain loading. Two previous tests performed at other TECO facilities were reviewed. A test on Big Bend 4 (April, 1995) showed 1% opacity at a PM grain loading of 0.0015 gr/acf. A test at Hookers Point #5 (August, 1998) showed 5% opacity at a PM grain loading of 0.028 gr/acf. Clearly it would require an opacity standard of less than 5% to demonstrate compliance with the proposed PM standard.

DB



Environmental Consulting & Technology, Inc.

RECEIVED

JUN 10 1999

BUREAU OF  
AIR REGULATION

June 9, 1999  
ECT No. 98637-0100

SENT BY OVERNIGHT MAIL ON 6/9/99

Mr. Chris Carlson  
Bureau of Air Regulation  
Florida Department of Environmental Protection  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

Re: Florida Department of Environmental Protection (FDEP) File No. PSD-FL-263 (PA 92-33);  
Tampa Electric Company; Polk Power Station; Simple-Cycle (SC) Power Project

Dear Mr. Carlson:

Pursuant to our recent telephone conversation, the following responses are provided to your comments on the modeling analysis submitted for the above referenced project:

**A. Building Downwash Issues**

Comments 1 through 4 concern building downwash issues. Table 6-1, Page 6-8, of the April 1999 permit application was apparently omitted from the application distribution copies. Accordingly, a copy of Table 6-1 is attached for your review. This table lists all of the existing facility structures, including structure dimensions, used in the building downwash analysis. As advised, the figure citation in Section 6.6 on Page 6-7 is incorrect; the citation should be "Figure 2-4" instead of "Figure 2-2". The north arrow shown on Figure 2-4 is oriented towards true north.

Application of EPA's Building Downwash Profile Input (BPIP) program to the structures listed in Table 6-1 show that the two, new combustion turbines (CTs) will not be affected by any existing structure. Also, there are no significant structures associated with the new CTs. For these reasons, the screening analysis for the new CTs did not consider building downwash.

**B. SCREEN Runs – Exit Velocity Issue**

Comment 5 concerns 0.1 meter per second (m/s) differences in exit velocities for some SCREEN3 input datasets in comparison to the exit velocity data shown in Table 2-8. The SCREEN3 input datasets were revised so that the exit velocities employed are consistent with those shown in Table 2-8 and Attachment D, Emission Rate Calculations.

**C. SCREEN Runs – Temperature Issues**

Comments 6 and 7 concern CT exit and ambient air temperatures used in the SCREEN3 runs. The SCREEN3 input datasets were revised to correct the temperature errors identified.

3701 Northwest  
98<sup>th</sup> Street  
Gainesville, FL  
32606

(352)  
332-0444

FAX (352)  
332-6722

Mr. Chris Carlson  
June 9, 1999  
Page-2-

**D. Section 8.2.4 – Typographical Error**

Comment 8 concerns a typographical error in Section 8.2.4 on Page 8-4; i.e., “reconstruction” should be “preconstruction”.

Due to the revisions to the SCREEN3 input datasets, the SCREEN3 model runs were repeated. The revised SCREEN3 results indicate that maximum 1-hour impacts for NO<sub>2</sub>, SO<sub>2</sub>, CO, and H<sub>2</sub>SO<sub>4</sub> mist will occur under CT Case 1 operating conditions (i.e., 100-percent load, fuel oil firing, and 20°F ambient temperature). For NO<sub>2</sub>, maximum 1-hour impacts were essentially the same for Cases 1 and 4. For PM/PM<sub>10</sub>, the maximum 1-hour SCREEN3 impact occurred under Case 9 conditions (i.e., 50-percent load, fuel oil firing, and 90°F ambient temperature). These are the same worst-case operating scenarios that were identified by the original SCREEN3 modeling analysis.

Revised Page 6-7, Page 8-4, and SCREEN3 Model Results Tables 7-1 through 7-5 are enclosed. A diskette containing the revised SCREEN3 model input and output files is also enclosed. Your continued expeditious review of the Tampa Electric Company Polk Power Station CT project will be appreciated. Please contact me at 352/332-6230, Ext.351, if there are any further questions.

Sincerely,

**ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC.**



Thomas W. Davis, P.E.  
Principal Engineer

Enclosures

cc: Mr. Jamie Hunter, TEC

Table 6-1. Building/Structure Dimensions

Building/Structure	Dimensions		
	Width (meters)	Length (meters)	Height (meters)
Coal delivery enclosure	5.8	14.9	15.2
Coal grinding structure	7.6	15.2	27.4
Coal storage silos (2)	--	18.0*	60.0
7F HRSG	13.1	40.0	27.4
Gasifier structure	19.2	18.3	91.4
Syngas cooling wings (2)	7.6	46.3	27.4
Air separation unit cold box	--	7.0*	50.3
Hot gas cleanup unit	15.8	19.8	85.0
Oil storage tanks (3)	--	30.5	17.4

\*Diameter

Sources: Texaco, 1992.  
Bechtel, 1994.  
ECT, 1999.

Table 7-1. SCREEN3 Model Results—NO<sub>2</sub> Impacts; CT2 and CT3

Operating Scenarios					1-Hour Impacts (µg/m <sup>3</sup> )			
Case Number	Load (%)	Ambient Temperature (°F)	Emission Rate (g/s)	CT Fuel	SCREEN3 Unadjusted Results*	Emission Rate Factor†	SCREEN3 Adjusted Results**	Downwind Distance (meters)
1	100	20	85.18	Fuel oil	2.15	8.52	18.32	1,545
2	75	20	68.54	Fuel oil	2.55	6.85	17.47	1,468
3	50	20	52.92	Fuel oil	3.00	5.29	15.87	1,398
4	100	59	80.38	Fuel oil	2.28	8.04	18.33	1,518
5	75	59	64.76	Fuel oil	2.69	6.48	17.43	1,445
6	50	59	50.40	Fuel oil	3.11	5.04	15.67	1,382
7	100	90	73.08	Fuel oil	2.46	7.31	17.98	1,485
8	75	90	59.22	Fuel oil	2.86	5.92	16.93	1,419
9	50	90	46.36	Fuel oil	3.29	4.64	15.27	1,360
10	100	20	18.52	Natural gas	2.19	1.85	4.05	1,536
11	75	20	14.70	Natural gas	2.64	1.47	3.88	1,453
12	50	20	11.46	Natural gas	3.05	1.15	3.51	1,392
13	100	59	17.34	Natural gas	2.34	1.73	4.05	1,507
14	75	59	13.82	Natural gas	2.78	1.38	3.84	1,431
15	50	59	10.88	Natural gas	3.17	1.09	3.46	1,375
16	100	90	15.88	Natural gas	2.50	1.59	3.98	1,477
17	75	90	12.94	Natural gas	2.92	1.29	3.77	1,410
18	50	90	10.30	Natural gas	3.33	1.03	3.43	1,360
<b>Maximum</b>							<b>18.33</b>	

\*Based on 10.0-g/s emission rate.

†Emission rate (in g/s) divided by 10.0 g/s.

\*\*SCREEN3 unadjusted results multiplied by emission rate factor.

Source: ECT, 1999.

Table 7-2. SCREEN3 Model Results—SO<sub>2</sub> Impacts; CT2 and CT3

Operating Scenarios					1-Hour Impacts (µg/m <sup>3</sup> )			
Case Number	Load (%)	Ambient Temperature (°F)	Emission Rate (g/s)	CT Fuel	SCREEN3 Unadjusted Results*	Emission Rate Factor†	SCREEN3 Adjusted Results**	Downwind Distance (meters)
1	100	20	26.24	Fuel oil	2.15	2.62	5.63	1,545
2	75	20	21.28	Fuel oil	2.55	2.13	5.43	1,468
3	50	20	16.60	Fuel oil	3.00	1.66	4.98	1,398
4	100	59	24.72	Fuel oil	2.28	2.47	5.63	1,518
5	75	59	20.10	Fuel oil	2.69	2.01	5.41	1,445
6	50	59	15.80	Fuel oil	3.11	1.58	4.91	1,382
7	100	90	22.48	Fuel oil	2.46	2.25	5.54	1,485
8	75	90	18.40	Fuel oil	2.86	1.84	5.26	1,419
9	50	90	14.56	Fuel oil	3.29	1.46	4.80	1,360
10	100	20	2.48	Natural gas	2.19	0.25	0.55	1,536
11	75	20	1.98	Natural gas	2.64	0.20	0.53	1,453
12	50	20	1.58	Natural gas	3.05	0.16	0.49	1,392
13	100	59	2.32	Natural gas	2.34	0.23	0.54	1,507
14	75	59	1.88	Natural gas	2.78	0.19	0.53	1,431
15	50	59	1.50	Natural gas	3.17	0.15	0.48	1,375
16	100	90	2.14	Natural gas	2.50	0.21	0.53	1,477
17	75	90	1.74	Natural gas	2.92	0.17	0.50	1,410
18	50	90	1.42	Natural gas	3.33	0.14	0.47	1,360
<b>Maximum</b>							<b>5.63</b>	

\*Based on 10.0-g/s emission rate.

†Emission rate (in g/s) divided by 10.0 g/s.

\*\*SCREEN3 unadjusted results multiplied by emission rate factor.

Source: ECT, 1999.

7-3

Table 7-3. SCREEN3 Model Results—PM/PM<sub>10</sub> Impacts; CT2 and CT3

Operating Scenarios					One-Hour Impacts (µg/m <sup>3</sup> )			
Case Number	Load (%)	Ambient Temperature (°F)	Emission Rate (g/s)	CT Fuel	SCREEN3 Unadjusted Results*	Emission Rate Factor†	SCREEN3 Adjusted Results**	Downwind Distance (meters)
1	100	20	6.80	Fuel oil	2.15	0.43	0.92	1,545
2	75	20	5.22	Fuel oil	2.55	0.43	1.10	1,468
3	50	20	4.42	Fuel oil	3.00	0.43	1.29	1,398
4	100	59	6.36	Fuel oil	2.28	0.43	0.98	1,518
5	75	59	5.08	Fuel oil	2.69	0.43	1.16	1,445
6	50	59	4.08	Fuel oil	3.11	0.43	1.34	1,382
7	100	90	5.86	Fuel oil	2.46	0.43	1.06	1,485
8	75	90	4.88	Fuel oil	2.86	0.43	1.23	1,419
9	50	90	3.94	Fuel oil	3.29	0.43	1.41	1,360
10	100	20	2.56	Natural gas	2.19	0.23	0.50	1,536
11	75	20	2.50	Natural gas	2.64	0.23	0.61	1,453
12	50	20	2.46	Natural gas	3.05	0.23	0.70	1,392
13	100	59	2.54	Natural gas	2.34	0.23	0.54	1,507
14	75	59	2.48	Natural gas	2.78	0.23	0.64	1,431
15	50	59	2.44	Natural gas	3.17	0.23	0.73	1,375
16	100	90	2.52	Natural gas	2.50	0.23	0.58	1,477
17	75	90	2.46	Natural gas	2.92	0.23	0.67	1,410
18	50	90	2.44	Natural gas	3.33	0.23	0.77	1,360
					<b>Maximum</b>		<b>1.41</b>	

\*Based on 10.0-g/s emission rate.

†Emission rate (in g/s) divided by 10.0 g/s.

\*\*SCREEN3 unadjusted results multiplied by emission rate factor.

Source: ECT, 1999.

7-4



Table 7-4. SCREEN3 Model Results—CO Impacts; CT2 and CT3

Operating Scenarios					One-Hour Impacts ( $\mu\text{g}/\text{m}^3$ )			
Case Number	Load (%)	Ambient Temperature ( $^{\circ}\text{F}$ )	Emission Rate (g/s)	CT Fuel	SCREEN3 Unadjusted Results*	Emission Rate Factor†	SCREEN3 Adjusted Results**	Downwind Distance (meters)
1	100	20	28.48	Fuel oil	2.15	2.85	6.13	1,545
2	75	20	21.16	Fuel oil	2.55	2.12	5.41	1,468
3	50	20	17.90	Fuel oil	3.00	1.79	5.37	1,398
4	100	59	26.72	Fuel oil	2.28	2.67	6.09	1,518
5	75	59	20.42	Fuel oil	2.69	2.04	5.49	1,445
6	50	59	17.64	Fuel oil	3.11	1.76	5.47	1,382
7	100	90	24.44	Fuel oil	2.46	2.44	6.00	1,485
8	75	90	19.40	Fuel oil	2.86	1.94	5.55	1,419
9	50	90	16.88	Fuel oil	3.29	1.69	5.56	1,360
10	100	20	12.86	Natural gas	2.19	1.29	2.83	1,536
11	75	20	10.34	Natural gas	2.64	1.03	2.72	1,453
12	50	20	8.56	Natural gas	3.05	0.86	2.62	1,392
13	100	59	12.10	Natural gas	2.34	1.21	2.83	1,507
14	75	59	9.82	Natural gas	2.78	0.98	2.72	1,431
15	50	59	8.06	Natural gas	3.17	0.81	2.57	1,375
16	100	90	10.84	Natural gas	2.50	1.08	2.70	1,477
17	75	90	9.08	Natural gas	2.92	0.91	2.66	1,410
18	50	90	7.56	Natural gas	3.33	0.76	2.53	1,360
					<b>Maximum</b>		<b>6.13</b>	

\*Based on 10.0-g/s emission rate.

†Emission rate (in g/s) divided by 10.0 g/s.

\*\*SCREEN3 unadjusted results multiplied by emission rate factor.

Source: ECT, 1999.

7-5

Table 7-5. SCREEN3 Model Results—H<sub>2</sub>SO<sub>4</sub> Mist Impacts; CT2 and CT3

Operating Scenarios					One-Hour Impacts (µg/m <sup>3</sup> )			
Case Number	Load (%)	Ambient Temperature (°F)	Emission Rate (g/s)	CT Fuel	SCREEN3 Unadjusted Results*	Emission Rate Factor†	SCREEN3 Adjusted Results**	Downwind Distance (meters)
1	100	20	3.02	Fuel oil	2.15	0.30	0.65	1,545
2	75	20	2.44	Fuel oil	2.55	0.24	0.61	1,468
3	50	20	1.90	Fuel oil	3.00	0.19	0.57	1,398
4	100	59	2.84	Fuel oil	2.28	0.28	0.64	1,518
5	75	59	2.30	Fuel oil	2.69	0.23	0.62	1,445
6	50	59	1.82	Fuel oil	3.11	0.18	0.56	1,382
7	100	90	2.58	Fuel oil	2.46	0.26	0.64	1,485
8	75	90	2.12	Fuel oil	2.86	0.21	0.60	1,419
9	50	90	1.68	Fuel oil	3.29	0.17	0.56	1,360
10	100	20	0.28	Natural gas	2.19	0.03	0.07	1,536
11	75	20	0.22	Natural gas	2.64	0.02	0.05	1,453
12	50	20	0.18	Natural gas	3.05	0.02	0.06	1,392
13	100	59	0.26	Natural gas	2.34	0.03	0.07	1,507
14	75	59	0.22	Natural gas	2.78	0.02	0.06	1,431
15	50	59	0.18	Natural gas	3.17	0.02	0.06	1,375
16	100	90	0.24	Natural gas	2.50	0.02	0.05	1,477
17	75	90	0.20	Natural gas	2.92	0.02	0.06	1,410
18	50	90	0.16	Natural gas	3.33	0.02	0.07	1,360
<b>Maximum</b>							<b>0.65</b>	

\*Based on 10.0-g/s emission rate.

†Emission rate (in g/s) divided by 10.0 g/s.

\*\*SCREEN3 unadjusted results multiplied by emission rate factor.

Source: ECT,

7-6

### 8.2.1 PM<sub>10</sub>

The maximum 24-hour PM<sub>10</sub> impact was predicted to be 0.54 µg/m<sup>3</sup>. This concentration is below the 10 µg/m<sup>3</sup> *de minimis* level ambient impact level.

### 8.2.2 CO

The maximum 8-hour CO impact was predicted to be 7.2 µg/m<sup>3</sup>. This concentration is below the 575-µg/m<sup>3</sup> *de minimis* ambient impact level. Therefore, a preconstruction monitoring exemption is appropriate in accordance with the PSD regulations.

### 8.2.3 NO<sub>2</sub>

The maximum annual NO<sub>2</sub> impact was predicted to be 0.05 µg/m<sup>3</sup>. This concentration is below the 14-µg/m<sup>3</sup> *de minimis* ambient impact level. Therefore, a preconstruction monitoring exemption is appropriate in accordance with the FDEP PSD regulations.

### 8.2.4 SO<sub>2</sub>

The maximum 24-hour SO<sub>2</sub> impact was predicted to be 2.2 µg/m<sup>3</sup>. This concentration is below the 13-µg/m<sup>3</sup> *de minimis* ambient impact level. Therefore, a preconstruction monitoring exemption is appropriate in accordance with the FDEP PSD regulations.

# INTEROFFICE MEMORANDUM

**Date:** 21-Jun-1999 09:30pm  
**From:** Ellen\_Porter  
**Dept:**  
**Tel No:**

**To:** HOLLADAY\_C  
**To:** CARLSON\_C  
**CC:** Don\_Shepherd  
**CC:** John\_Notar  
**CC:** Bud\_Rolofson

**Subject:** TECO-Polk

I have reviewed the results of the regional haze analysis for TECO-Polk and discussed them with John Notar. We agree that there is a less than 5% change in extinction predicted at Chassahowitza as a result of the project and therefore, have no objection to the project on this account.

However, we noted in our 3/99 tech review document that we thought lower NOx limits were achievable. What is their latest proposed limit (it was 10.5 ppm previously)?



BUREAU OF AIR REGULATION

AUG 10 1999

RECEIVED

August 9, 1999

Mr. A. A. Linero, P.E.  
Administrator, New Source Review Section  
Florida Department of Environmental Protection  
111 South Magnolia Drive, Suite 4  
Tallahassee, Florida 32301

Via FedEx  
Airbill No. 8132 1667 8206

**Re: Tampa Electric Company (TEC) – Polk Power Station  
Combustion Turbine Units 2 and 3  
Comments on the “Intent to Issue PSD Permit” Package  
FDEP File No. PSD-FL-263**

Dear Mr. Linero:

The above referenced project was publicly noticed in the Lakeland Ledger on July 10, 1999. The following provides the Department with Tampa Electric Company's comments on the various portions of the “Intent to Issue PSD Permit” package broken down by section.

**Public Notice of Intent to Issue PSD Permit**

Although the notice was published as requested by the Department, it should be noted that the referenced units do not have “evaporative inlet coolers.” The reference to these coolers was inadvertently included in the original permit application, but removed in the revised application.

**Technical Evaluation and Preliminary Determination**

The reference to evaporative inlet coolers should be deleted from this section (page TE-4 of 10) for the above stated reason.

The reference to volatile organic compounds (VOC) in the “Significant emission rate increases” paragraph (page TE-4 of 10) should be deleted. Based on the emissions estimates provided in the revised permit application, VOC emission increases are less than the PSD significance level.

The “Project Emissions (TPY) and PSD Applicability” table (page TE-7 of 10) “PSD Review” column for “Ozone (VOC)” should be changed from “Yes” to “No” based on the above comment.

Mr. A. A. Linero, P.E.

August 9, 1999

Page 2 of 3

### **Draft Permit**

Condition 8 (page 7 of 13) should be corrected from “higher heating value (LHV)” to “higher heating value (HHV)” or “lower heating value (LHV)”, whichever one is intended.

Condition 13 (page 7 of 13) should allow 876 hours per year on fuel oil, as this was the basis of the permit application and associated analysis. Also, this condition should be clarified to indicate that allowable hours of operation on gas and oil are both “per year” and based on “full load equivalent hours” since this was the basis for which the emission estimates and associated analysis were completed.

Condition 17 (page 8 of 13) requires DLN systems to be maintained to minimize NO<sub>x</sub> and CO emissions and requires operation of the DLN combustor in the diffusion-firing mode to be minimized. These are broad, general requirements which could be open to differing interpretations. This condition should be re-written to simply require the DLN systems be properly maintained to comply with permitted NO<sub>x</sub> and CO emission rates.

Condition 18 (page 8 of 13) should state emission limits for VOC, CO, SO<sub>2</sub>, SAM and NO<sub>x</sub> in terms of “pounds per hour” only, using the relevant ppm rate as the basis for these limits. VOC basis should be expressed as ppmvw. CO basis should be expressed as ppmvd. CO limits are lower than vendor guarantee data; gas-firing GE data is 15 ppmvd vs. 12 ppmvd, oil-firing GE data is 33 ppmvd vs. 20 ppmvd. Natural gas sulfur content limit should be 2 gr S/100 ft<sup>3</sup> (missing “t”). Also, the “PM/PM<sub>10</sub>, VE” limit for oil firing should be 20 percent opacity.

The Condition 19 (page 8 of 13) requirement to substitute missing data per Title IV (40 CFR 75) is overly punitive when applied to averaging periods shorter than what is contained in Title IV (calendar year annual average). Missing data periods, as well as startup/shutdown (less than fifty percent load) and malfunction periods should be excluded from the calculation of short-term averages. The NO<sub>x</sub> limits in this condition should be stated in terms of “pounds per hour” only, using the ppm rate as the basis. The averaging period while firing fuel oil should be changed from “3 hr average” to “24 hour block average” similar to the requirement for gas firing. In addition, the requirement to submit an engineering report related to lower NO<sub>x</sub> emission rate while burning oil should be removed.

The CO limits in Condition 20 (page 9 of 13) should be stated in terms of “pounds per hour” only, using the ppm rate as the basis. In addition, the only vendor guarantee received to date has CO limit of 15 ppmvd for gas and 33 ppmvd for oil; therefore, these rates should be used as the basis. Concentration should be expressed as ppmvd for both gas and oil firing. Mass (lb/hr) limits should be referenced to ISO conditions.

The VOC limits in Condition 21 (page 9 of 13) should be stated in terms of “pounds per hour” only, using the ppmvw rate as the basis. Concentration should be expressed as ppmvw. Mass (lb/hr) limits should be referenced to ISO conditions.

Mr. A. A. Linero, P.E.  
August 9, 1999  
Page 3 of 3

In Condition 22, SO<sub>2</sub> lb/hr limits should be referenced to ISO conditions.

In Condition 23 (page 9 of 13) the words "operating with or without the duct burner and" should be removed, as it does not apply here. The opacity limit for oil firing should be 20 percent.

In Condition 24 (page 9 of 13), the wording "Operation below 50% output shall be limited to 2 hours per unit cycle (breaker closed to breaker open)" is unclear and should be changed to "Operation below 50% output shall be limited to 2 hours per startup or shutdown".

In Condition 26 (page 10 of 13) the wording "for greater than 2 hours in a 24-hour period" should be inserted after the word "malfunction" in the first sentence.

### **Appendix BD**

The BACT determination should be modified to reflect the changes referenced above, such as stating the proposed limits in terms of "pounds per hour" and removing the determination requiring a follow-up report on NO<sub>x</sub> limits while firing oil, for example. Additional comments regarding the BACT determination are listed below:

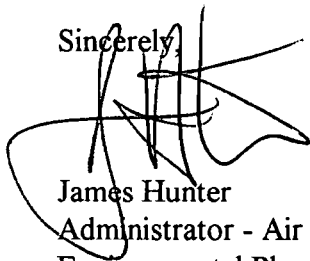
BD-12: Third and sixth bullet. Although the SCR vendor specified a guarantee of 3 years, 5 years was conservatively used in the submitted permit application BACT cost-analysis; reference Page 5-16, Table 5-7 of the permit application.

BD-13: Fifth bullet. Basis for lower CO limits is the *proposed* Oleander project levels. GE needs to confirm that these lower limits are attainable.

BD-13: Final bullet. FDEP lowers the oil-firing hours from 876 to 750 per year without any explanation for the decrease.

Thank you for your attention to this matter. If you have any concerns or questions feel free to contact me at (813) 641-5033.

Sincerely,



James Hunter  
Administrator - Air Programs  
Environmental Planning

EP\gm\JH904

c: Teresa Herron, FDEP  
Hamilton Oven, FDEP

cc: EPA  
NPS

SWD  
T. DAVIS, PE, ECT

**RECEIVED**

**AUG 10 1999**

**BUREAU OF AIR REGULATION**





RECEIVED

SEP 15 1999

BUREAU OF AIR REGULATION

September 14, 1999

Mr. A. A. Linero, P.E.  
Administrator, New Source Review Section  
Florida Department of Environmental Protection  
111 South Magnolia Drive, Suite 4  
Tallahassee, Florida 32301

Via FedEx  
Airbill No. 7902 9804 2708

**Re: Tampa Electric Company (TEC) – Polk Power Station  
Combustion Turbine Units 2 and 3  
Additional Comments on the Draft Permit  
FDEP File No. PSD-FL-263**

Dear Mr. Linero:

Based on recent conversations with you and your staff, the following addresses TEC's current understanding of the comments made in our August 9, 1999, letter and continued concerns regarding unresolved issues. The issues below in italics are the original comments found in the August 9, 1999, letter followed by TEC's current response.

**Draft Permit**

*Condition 8 (page 7 of 13) should be corrected from "higher heating value (LHV)" to "higher heating value (HHV)" or "lower heating value (LHV)", which ever one is intended.*

We understand that the correction will be made to "lower heating value.

*Condition 13 (page 7 of 13) should allow 876 hours per year on fuel oil, as this was the basis of the permit application and associated analysis. Also, this condition should be clarified to indicate that allowable hours of operation on gas and oil are both "per year" and based on "full load equivalent hours" since this was the basis for which the emission estimates and associated analysis were completed.*

While TEC may accept the proposed limit of 750 hours per year on fuel oil, it is imperative that this condition be clarified to indicate that allowable hours of operation on gas and oil are both "per year" and based on "full load equivalent hours".

*Condition 17 (page 8 of 13) requires DLN systems to be maintained to minimize NO<sub>x</sub> and CO emissions and requires operation of the DLN combustor in the diffusion-firing mode to be minimized. These are broad, general requirements which could be open to differing*

*interpretations. This condition should be re-written to simply require the DLN systems be properly maintained to comply with permitted NO<sub>x</sub> and CO emission rates.*

We understand that this condition will be clarified as follows:

The permittee shall provide manufacturer's emissions performance versus load diagrams for the DLN and wet injection systems prior to their installation. DLN systems shall each be tuned upon initial operation to optimize emissions reductions consistent with normal operation and maintenance practices and shall be maintained to minimize NO<sub>x</sub> emissions and CO emissions, consistent with normal operation and maintenance practices. Operation of the DLN systems in the diffusion-firing mode shall be minimized when firing natural gas. [Rule 62-4.070, and 62-210.650, F.A.C.]

*Condition 18 (page 8 of 13) should state emission limits for VOC, CO, SO<sub>2</sub>, SAM and NO<sub>x</sub> in terms of "pounds per hour" only, using the relevant ppm rate as the basis for these limits. VOC basis should be expressed as ppmvw. CO basis should be expressed as ppmvd. CO limits are lower than vendor guarantee data; gas-firing GE data is 15 ppmvd vs. 12 ppmvd, oil-firing GE data is 33 ppmvd vs. 20 ppmvd. Natural gas sulfur content limit should be 2 gr S/100 ft<sup>3</sup> (missing "t"). Also, the "PM/PM<sub>10</sub>, VE" limit for oil firing should be 20 percent opacity.*

We understand that the "ppmvw," the "ppmvd," and the missing "t" comments will be corrected. With respect to the "pounds per hour" issue, please see the comments for Condition 19 below. As discussed previously, TEC retracts our request to change the oil firing limit to 20 percent opacity and will accept the 10 percent limit conditions originally drafted in lieu of particulate stack testing requirements.

*The Condition 19 (page 8 of 13) requirement to substitute missing data per Title IV (40 CFR 75) is overly punitive when applied to averaging periods shorter than what is contained in Title IV (calendar year annual average). Missing data periods, as well as startup/shutdown (less than fifty percent load) and malfunction periods should be excluded from the calculation of short-term averages. The NO<sub>x</sub> limits in this condition should be stated in terms of "pounds per hour" only, using the ppm rate as the basis. The averaging period while firing fuel oil should be changed from "3 hr average" to "24 hour block average" similar to the requirement for gas firing. In addition, the requirement to submit an engineering report related to lower NO<sub>x</sub> emission rate while burning oil should be removed.*

Regarding the first bullet in Condition 19, we reiterate that using straight Title IV required missing data routines is overly punitive because these routines were intended to only be used for the purposes of showing compliance on an annual basis, not on a short term basis. TEC requests that this bullet is eliminated and the current language in Condition 29 is used to determine what valid data will be used to calculate the emission rate averages.

If this is unacceptable, TEC proposes that the following language, which is consistent with the language proposed by TEC as part of the CEM based compliance plan used in the Title V permits, be inserted to replace this bullet:

When NO<sub>x</sub> monitoring data is not available, substitution for missing data shall be handled as follows:

In the event that monitor failure causes loss of valid data for four (4) hours or less, these hours will be excluded from any emissions average calculations.

In the event that monitor failure causes loss of valid data for more than four (4), up through twenty-four (24) hours, Method of Determination Code 6 pursuant to 40 CFR 75, Subpart D – The Missing Data Substitution Procedure, will be used to back fill the missing data. In general this procedure allows for use of average hourly data from the hours before and after the missing data period.

In the event, that monitor failure causes loss of valid data for more than twenty-four (24) hours, Method of Determination Code 11 pursuant to 40 CFR 75, Subpart D – The Missing Data Substitution Procedure, will be used to back fill the missing data. In general this procedure allows for use of average hourly data from corresponding load ranges within the reporting quarter.

Regarding the use of “pounds per hour” as the method of demonstrating continuous compliance with the NO<sub>x</sub> limit TEC proposes the following language be inserted to replace the second bullet in Condition 19:

While Firing Natural Gas: The emission rate of NO<sub>x</sub> in the exhaust gas shall not exceed 69 lb/hr (at ISO conditions) on a 24 hr block average as measured by the continuous emission monitoring system (CEMS). In addition, NO<sub>x</sub> emissions calculated as NO<sub>2</sub> (at ISO conditions) shall not exceed 10.5 ppm @15% O<sub>2</sub> to be demonstrated by annual stack test nor 9 ppm @15% O<sub>2</sub> to be demonstrated by the initial “new and clean” GE performance stack test. Note: Basis for lb/hr limit is 10.5 ppm @ 15% O<sub>2</sub>, full load. [Rule 62-212.400, F.A.C.]

Regarding the three hour averaging period when burning fuel oil, TEC believes that the averaging period for NO<sub>x</sub> emissions should be consistent at twenty-four hours for both gas and oil firing.

With regard to the requirement that an engineering report be prepared based on the lowest achievable emission rate when firing oil, TEC feels this requirement is completely unwarranted based on the fact that the vendor will only guarantee oil fired NO<sub>x</sub> emissions rates at 42 ppm. In addition, these units will only burn oil as necessary for backup which is expected to be for short periods of time and fairly sporadic; therefore, it will be extremely difficult to determine an emission rate that can consistently be achieved while taking into account long-term performance expectations and good operating and maintenance practices.

*The CO limits in Condition 20 (page 9 of 13) should be stated in terms of "pounds per hour" only, using the ppm rate as the basis. In addition, the only vendor guarantee received to date has CO limit of 15 ppmvd for gas and 33 ppmvd for oil; therefore, these rates should be used as the basis. Concentration should be expressed as ppmvd for both gas and oil firing. Mass (lb/hr) limits should be referenced to ISO conditions.*

TEC cannot accept a permit limit on CO that is more stringent than the vendor guarantee. We again request that the permit condition reflect the vendor guarantee provided in the permit application.

*The VOC limits in Condition 21 (page 9 of 13) should be stated in terms of "pounds per hour" only, using the ppm<sub>v</sub> rate as the basis. Concentration should be expressed as ppm<sub>v</sub>. Mass (lb/hr) limits should be referenced to ISO conditions.*

We understand that the corrected references to "ppm<sub>v</sub>" will be made.

*In Condition 22, SO<sub>2</sub> lb/hr limits should be referenced to ISO conditions.*

We understand that this correction will be made.

*In Condition 23 (page 9 of 13) the words "operating with or without the duct burner and" should be removed, as it does not apply here. The opacity limit for oil firing should be 20 percent.*

We understand that the correction will be made to remove the unnecessary wording. See above comments regarding the opacity limit.

*In Condition 24 (page 9 of 13), the wording "Operation below 50% output shall be limited to 2 hours per unit cycle (breaker closed to breaker open)" is unclear and should be changed to "Operation below 50% output shall be limited to 2 hours per startup or shutdown".*

Based on further review, TEC rescinds this comment and will accept the language originally provided in the draft permit.

*In Condition 26 (page 10 of 13) the wording "for greater than 2 hours in a 24-hour period" should be inserted after the word "malfunction" in the first sentence.*

No further comment on this issue.

In addition to the above, two new comments have come to light. The first is in Condition 38. It appears that the reference to "Condition No. 26" should read "Condition No. 36." The second pertains to Condition 40, which seems to be the same (but uncompleted version) as Condition 41, and can be eliminated.

Mr. A. A. Linero, P.E.  
September 14, 1999  
Page 5 of 5

Thank you for your attention to this matter. If you have any concerns or questions feel free to contact me at (813) 641-5033.

Sincerely,



James Hunter  
Administrator - Air Programs  
Environmental Planning

EP\gm\JJH905

c: Teresa Herron, FDEP  
Hamilton Oven, FDEP

cc: SWD  
POLK CO.  
EPA  
NPS



TAMPA ELECTRIC

January 6, 2000

Mr. Clair Fancy  
Florida Department of Environmental Protection  
111 South Magnolia Drive, Suite 4  
Tallahassee, Florida 32301

**Via Fed Ex**  
**Airbill No. 7925 3372 3040**

**Re: Tampa Electric Company (TEC) – Polk Power Station Title V  
Permit BACT Determination for Syngas Combustion Turbine – Test #2**

Dear Mr. Fancy:

As per Specific Condition A.49 of the Polk Power Station Title V Permit, Tampa Electric has completed the second NO<sub>x</sub> BACT Determination Test on the combustion turbine while operating on syngas. Accordingly, the final report is attached for your review. If you have any questions, please feel free to contact me at (813) 641-5033.

Sincerely,

Gregory M. Nelson, P.E.  
Manager  
Environmental Planning

EP\gm\SKT133

Enclosure

c/enc: Mr. Al Linero - FDEP  
Mr. Syed Arif - FDEP  
Mr. Jerry Kissel - FDEP SW  
Mr. Rick Kirby - EPCHC

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**JAN 07 2000**

**BUREAU OF AIR REGULATION**



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APR 26 2000

BUREAU OF AIR REGULATION

April 25, 2000

Mr. A. A. Linero, P.E.  
Florida Department of Environmental Protection  
111 South Magnolia Drive, Suite 4  
Tallahassee, Florida 32301

Via FedEx  
Airbill No. 7910 7616 1036

**Re: Tampa Electric Company (TEC)  
Polk Power Station – CTG's 2 and 3  
Manufacturer's Emissions Versus Load Diagrams  
FDEP File No. PSD-FL-263**

Dear Mr. Linero:

Please find enclosed copies of the manufacturer's emissions performance versus load diagrams for the DLN and wet injection systems for the above units. This submittal is being made to satisfy the requirement in Condition 17 of the above referenced PSD permit.

If you have any concerns or questions feel free to contact me at (813) 641-5033.

Sincerely,

A handwritten signature in black ink, appearing to read "Jamie Hunter".

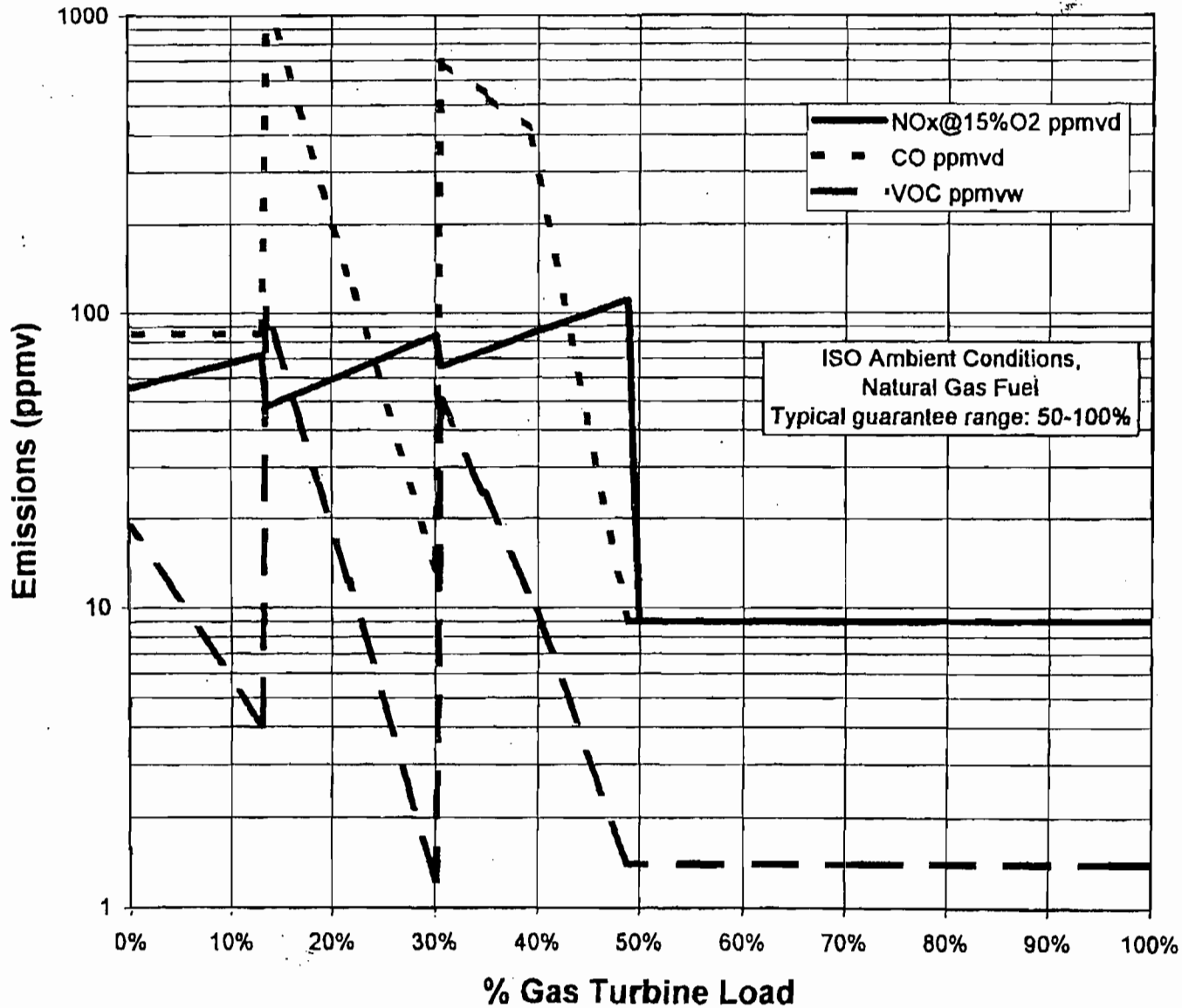
Jamie Hunter  
Consulting Engineer  
Environmental Planning

EPgmJJH919

Enclosures

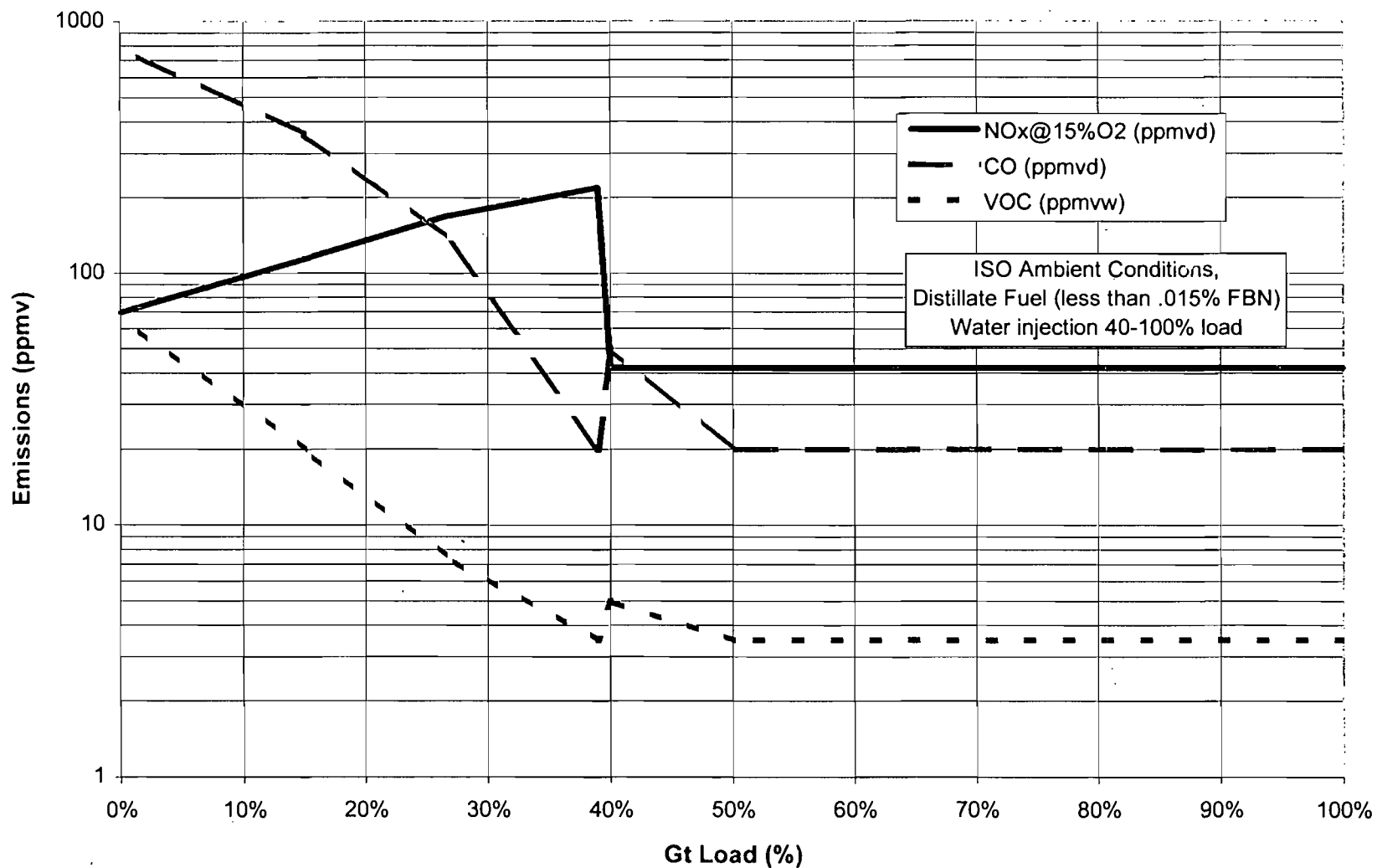
cc: J. Kahn  
J. Koerner  
M. Halpin  
T. Heron

# PG7241FA with DLN2.6 Combustor Estimated Emissions vs Gas Turbine Load





# 7241FA with DLN2.6 Combustor Estimated Emissions - Liquid Fuel





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JUL 03 2000

BUREAU OF AIR REGULATION

June 28, 2000

Mr. Mike D. Harley  
Florida Department of  
Environmental Protection  
2600 Blair Stone Road  
Tallahassee, FL 32399-2400

Certified Mail No. Z 504 094 679  
Return Receipt Requested

CEM Section  
U. S. Environmental Protection Agency  
401 "M" Street, SW  
Washington, DC 20460

Certified Mail No. Z 504 094 680  
Return Receipt Requested

RE: Tampa Electric Company  
Polk Power Station  
Unit #1 RATA  
Permit #1050233-001-AV  
Unit #2 Initial CEM Certification RATA  
Unit #2 Initial Emissions Testing  
Permit #PSD-FL-263

Dear Sir or Madam:

This is written notification that Tampa Electric Company has tentatively scheduled the following tests:

- Polk Unit #1 RATA to begin the week of August 7, 2000;
- Polk Unit #2 Initial CEM Certification, RATA, Linearity and 7 Day Draft, Oil and Gas on August 2, 2000;
- Polk Unit #2 Initial Emissions Performance Test on August 15, 2000.

If you have any questions, please call me or Jamie Woodlee at (813)-641-5060.

Sincerely,

Gregory M. Nelson, P.E.  
Designated Representative  
Acid Rain Program

EP\td\RATA\Polk1&200

c: Al Linero, FDEP

Different Polk Power Project - Permitted in 1999. Goes to file. Al



September 25, 2000

*Feresa Herron,  
then to  
File for  
PSD-FL-263  
al*

**RECEIVED**  
SEP 28 2000  
BUREAU OF AIR REGULATION

Mr. Bill Proses  
Florida Department of Environmental Protection  
Southwest District Office  
3804 Coconut Palm Drive  
Tampa, Florida 33619

**Via Fed Ex**  
**Airbill No. 7903 6442 7004**

**Re: Tampa Electric Company  
Polk Unit 2 Initial Compliance Testing**

Dear Mr. Proses:

As required by Conditions 27 and 28 of the Polk Unit 2 PSD permit (PSD-FL-263), Tampa Electric Company (TEC) has completed the initial compliance testing for allowable emission limiting standards while firing distillate oil. However, due to the interruptible nature of the natural gas supply, the Company was unable to complete the initial compliance testing while firing natural gas within 60 days after achieving the maximum production rate. TEC is currently in the process of rescheduling the compliance test while firing natural gas and plans to complete the testing by November 1, 2000. As such, Tampa Electric Company hereby requests a waiver of the 60-day period in which the initial compliance testing must occur. If the schedule permits, TEC will submit the oil- and natural gas-fired initial compliance test reports together. Otherwise, the oil-fired initial compliance test report will be submitted within 45 days of the oil-fired test and the natural gas fired initial compliance test report will be submitted within 45 days of the natural gas-fired test. If you have any questions, you may contact me at (813) 641-5125.

Sincerely,

Shannon K. Todd  
Engineer  
Environmental Affairs

EP\gm\SKT201

- c: **Mr. Alvaro Linero -FDEP**
- Mr. Buck Oven - FDEP
- Mr. Scott Sheplak - FDEP
- Mr. Jerry Kissel - FDEP SW

-file-



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MAY 03 2002

BUREAU OF AIR REGULATION

April 30, 2002

Mr. Lynn Haynes  
Region IV  
U.S. Environmental Protection Agency  
Atlanta Federal Center  
61 Forsyth Street  
Atlanta, Georgia 30303-3104

Via FedEx  
Airbill No. 7920 2537 6783

Mr. Bill Proses  
Florida Department of Environmental Protection  
Southwest District  
3804 Coconut Palm Drive  
Tampa, FL 33619

Via FedEx  
Airbill No. 7920 2540 1641

**Re: Tampa Electric Company (TEC)  
Polk Power Station Unit 3  
Part 75 Commercial Operation Re-Notifications  
FDEP File No. PSD-FL-263**

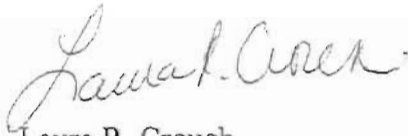
Dear Messrs. Haynes and Proses:

As required by 40 CFR 75.61(a)(2)(i) and Condition 1 of permit PSD-FL-263, the designated representative for an affected unit shall submit written notification for the planned date when a new unit will commence commercial operation. TEC notified the agency of a commence commercial operation date of May 1, 2002. As required by 40 CFR 75.61(a)(2)(ii) and Condition 1 of permit PSD-FL-263, if the date when the unit commences commercial operation changes from the planned date, a notification of the actual date shall be submitted not later than 7 days following the date the unit commences commercial operation. *TEC hereby gives notice that Polk Power Station Unit 3 commenced commercial operation on April 24, 2002.*

Mr. Lynn Haynes  
Mr. Bill Proses  
April 30, 2002  
Page 2 of 2

If there are any other changes in regard to these dates, TEC will continue to notify the agency. If you have any questions or comments, please contact me at (813) 641-5261.

Sincerely,



Laura R. Crouch  
Manager – Air Programs  
Environmental Affairs

EA/bmr/RC121

c: Mr. J. Kahn - FDEP  
Mr. J. Kissel - FDEP SW  
Mr. A. Linero - FDEP  
Kim Nguyen - CAMD  
Mr. H. Owen - FDEP  
Mr. S. Sheplak - FDEP

Table A-1. Summary of Federally EPA Regulatory Applicability and Corresponding Requirements (Page 11 of 11)

Regulation	Citation	Not Applicable	Applicable Emission Units	Applicable Requirement or Non-Applicability Rationale
Reporting and Recordkeeping Requirements	§82.166(k), (m), and (n)		Appliances as defined by §82.152	Owners/operators of appliances normally containing 50 or more pounds of refrigerant must keep servicing records documenting the date and type of service, as well as the quantity of refrigerant added.
<b>40 CFR Part 50 - National Primary and Secondary Ambient Air Quality Standards</b>		X		State agency requirements - not applicable to individual emission sources.
<b>40 CFR Part 51 - Requirements for Preparation, Adoption, and Submittal of Implementation Plans</b>		X		State agency requirements - not applicable to individual emission sources.
<b>40 CFR Part 52 - Approval and Promulgation of Implementation Plans</b>		X		State agency requirements - not applicable to individual emission sources.
<b>40 CFR Part 62 - Approval and Promulgation of State Plans for Designated Facilities and Pollutants</b>		X		State agency requirements - not applicable to individual emission sources.
<b>40 CFR Part 70 - State Operating Permit Programs</b>		X		State agency requirements - not applicable to individual emission sources.
<b>40 CFR Parts 53, 54, 55, 56, 57, 58, 64, 66, 67, 68, 69, 71, 73, 74, 76, 78, 79, 80, 81, 85, 86, 87, 88, 89, 90, 91, 92, 93, 95, and 96</b>		X		The listed regulations do not contain any requirements which are applicable to the TEC simple cycle CTGs.

Source: ECT, 1999.

Table A-2. Summary of FDEP Regulatory Applicability and Corresponding Requirements (Page 1 of 12)

Regulation	Citation	Not Applicable	Applicable: Facility-Wide	Applicable: Emission Units	Applicable Requirement or Non-Applicability Rationale
<b>Chapter 62-4, F.A.C. - Permits: Part I General</b>					
Scope of Part I	62-4.001, F.A.C.	X			Contains no applicable requirements.
Definitions	62-4.020, .021, F.A.C.	X			Contains no applicable requirements.
Transferability of Definitions	62-4.021, .021, F.A.C.	X			Contains no applicable requirements.
General Prohibition	62-4.030, F.A.C		X		All stationary air pollution sources must be permitted, unless otherwise exempted.
Exemptions	62-4.040, F.A.C		X		Certain structural changes exempt from permitting. Other stationary sources exempt from permitting upon FDEP insignificance determination.
Procedures to Obtain Permits	62-4.050, F.A.C.		X		General permitting requirements.
Surveillance Fees	62-4.052, F.A.C.	X			Not applicable to air emission sources.
Permit Processing	62-4.055, F.A.C.	X			Contains no applicable requirements.
Consultation	62-4.060, F.A.C.	X			Consultation is encouraged, not required.
Standards for Issuing or Denying Permits; Issuance; Denial	62-4.070, F.A.C	X			Establishes standard procedures for FDEP. Requirement is not applicable to the TEC simple cycle CTGs.
Modification of Permit Conditions	62-4.080, F.A.C	X			Application is for initial construction permit. Modification of permit conditions is not being requested.
Renewals	62-4.090, F.A.C.		X		Establishes permit renewal criteria. Additional criteria are cited at 62-213.-430(3), F.A.C. <b>(future requirement)</b>
Suspension and Revocation	62-4.100, F.A.C.		X		Establishes permit suspension and revocation criteria.

Table A-2. Summary of FDEP Regulatory Applicability and Corresponding Requirements (Page 2 of 12)

Regulation	Citation	Not Applicable	Applicable: Facility- Wide	Applicable: Emission Units	Applicable Requirement or Non-Applicability Rationale
Financial Responsibility	62-4.110, F.A.C.	X			Contains no applicable requirements.
Transfer of Permits	62-4.120, F.A.C.	X			A sale or legal transfer of a permitted facility is not included in this application.
Plant Operation - Problems	62-4.130, F.A.C.		X		Immediate notification is required whenever the permittee is temporarily unable to comply with any permit condition. Notification content is specified. <b>(potential future requirement)</b>
Review	62-4.150, F.A.C.	X			Contains no applicable requirements.
Permit Conditions	62-4.160, F.A.C.	X			Contains no applicable requirements.
Scope of Part II	62-4.2.00, F.A.C.	X			Contains no applicable requirements.
Construction Permits	62-4.210, F.A.C.	X			General requirements for construction permits.
Operation Permits for New Sources	62-4.220, F.A.C.	X			General requirements for initial new source operation permits. <b>(future requirement)</b>
Water Permit Provisions	62-4.240 - 250, F.A.C.	X			Contains no applicable requirements.
<b>Chapter 62-17, F.A.C. - Electrical Power Plant Siting</b>			X		Power Plant Siting Act provisions.
<b>Chapter 62-102, F.A.C. - Rules of Administrative Procedure - Rule Making</b>			X		General administrative procedures.
<b>Chapter 62-103, F.A.C. - Rules of Administrative Procedure - Final Agency Action</b>			X		General administrative procedures.



Table A-2. Summary of FDEP Regulatory Applicability and Corresponding Requirements (Page 3 of 12)

Regulation	Citation	Not Applicable	Applicable: Facility-Wide	Applicable: Emission Units	Applicable Requirement or Non-Applicability Rationale
<b>Chapter 62-204, F.A.C. - State Implementation Plan</b>					
State Implementation Plan	62-204.100, .200, .220(1)-(3), .240, .260, .320, .340, .360, .400, and .500, F.A.C.	X			Contains no applicable requirements.
Ambient Air Quality Protection	62-204.220(4), F.A.C.		X		Assessments of ambient air pollutant impacts must be made using applicable air quality models, data bases, and other requirements approved by FDEP and specified in 40 CFR Part 51, Appendix W.
State Implementation Plan	62-204.800(1) - (6), F.A.C.	X			Referenced federal regulations contain no applicable requirements.
State Implementation Plan	62-204.800(7)(a), (b)39., (c), (d), and (e), F.A.C.			CTG-2, CTG-3	NSPS Subpart GG; see Table A-1 for detailed federal regulatory citations.
State Implementation Plan	62-204.800(8) - (13), (15), (17), (20), and (22) F.A.C.	X			Referenced federal regulations contain no applicable requirements.
State Implementation Plan	62-204.800 (14), (16), (18), (19), F.A.C.			CTG-2, CTG-3	Acid Rain Program; see Table A-1 for detailed federal regulatory citations.
State Implementation Plan	62-204.800(21), F.A.C.		X		Protection of Stratospheric Ozone; see Table A-1 for detailed federal regulatory citations.
<b>Chapter 62-210, F.A.C. - Stationary Sources - General Requirements</b>					
Purpose and Scope	62-210.100, F.A.C.	X			Contains no applicable requirements.
Definitions	62-210.200, F.A.C.	X			Contains no applicable requirements.
Small Business Assistance Program	62-210.220, F.A.C.	X			Contains no applicable requirements.

Table A-2. Summary of FDEP Regulatory Applicability and Corresponding Requirements (Page 4 of 12)

Regulation	Citation	Not Applicable	Applicable: Facility-Wide	Applicable: Emission Units	Applicable Requirement or Non-Applicability Rationale
Permits Required	62-210.300(1) and (3), F.A.C.		X		Air construction permit required. Exemptions from permitting specified for certain facilities and sources.
Permits Required	62-210.300(2), F.A.C.		X		Air operation permit required. <b>(future requirement)</b>
Air General Permits	62-210.300(4), F.A.C.	X			Not applicable to the TEC simple cycle CTGs.
Notification of Startup	62-210.300(5), F.A.C.	X			Sources which have been shut down for more than one year shall notify the FDEP prior to startup.
Emission Unit Reclassification	62-210.300(6), F.A.C.		X		Emission unit reclassification <b>(potential future requirement)</b>
Public Notice and Comment					
Public Notice of Proposed Agency Action	62-210.350(1), F.A.C.		X		All permit applicants required to publish notice of proposed agency action.
Additional Notice Requirements for Sources Subject to Prevention of Significant Deterioration or Nonattainment Area New Source Review	62-210.350(2), F.A.C.		X		Additional public notice requirements for PSD and nonattainment area NSR applications.
Additional Public Notice Requirements for Sources Subject to Operation Permits for Title V Sources	62-210.350(3), F.A.C.		X		Notice requirements for Title V operating permit applicants <b>(future requirement)</b> .
Public Notice Requirements for FESOPS and 112(g) Emission Sources	62-210.350(4) and (5), F.A.C.	X			Not applicable to the TEC simple cycle CTGs.
Administrative Permit Corrections	62-210.360, F.A.C.	X			An administrative permit correction is not requested in this application.

Table A-2. Summary of FDEP Regulatory Applicability and Corresponding Requirements (Page 5 of 12)

Regulation	Citation	Not Applicable	Applicable: Facility-Wide	Applicable: Emission Units	Applicable Requirement or Non-Applicability Rationale
<b>Reports</b>					
Notification of Intent to Relocate Air Pollutant Emitting Facility	62-210.370(1), F.A.C.	X			Project does not have any relocatable emission units.
Annual Operating Report for Air Pollutant Emitting Facility	62-210.370(3), F.A.C.		X		Specifies annual reporting requirements. <b>(future requirement)</b> .
Stack Height Policy	62-210.550, F.A.C.		X		Limits credit in air dispersion studies to good engineering practice (GEP) stack heights for stacks constructed or modified since 12/31/70.
Circumvention	62-210.650, F.A.C.		X		An applicable air pollution control device cannot be circumvented and must be operated whenever the emission unit is operating.
Excess Emissions	62-210.700(1), F.A.C.		X		Excess emissions due to startup, shut down, and malfunction are permitted for no more than two hours in any 24 hour period unless specifically authorized by the FDEP for a longer duration.  <b>Excess emissions for up to four hours in a 24 hour period are specifically requested for the TEC simple cycle CTGs. See Section 2.2 of the PSD permit application for details.</b>
Excess Emissions	62-210.700(2) and (3), F.A.C.	X			Not applicable to the TEC simple cycle CTGs.

Table A-2. Summary of FDEP Regulatory Applicability and Corresponding Requirements (Page 6 of 12)

Regulation	Citation	Not Applicable	Applicable: Facility-Wide	Applicable: Emission Units	Applicable Requirement or Non-Applicability Rationale
Excess Emissions	62-210.700(4), F.A.C.		X		Excess emissions caused entirely or in part by poor maintenance, poor operations, or any other equipment or process failure which may reasonably be prevented during startup, shutdown, or malfunction are prohibited. <b>(potential future requirement)</b> .
Excess Emissions	62-210.700(5), F.A.C.	X			Contains no applicable requirements.
Excess Emissions	62-210.700(6), F.A.C.		X		Excess emissions resulting from malfunctions must be reported to the FDEP in accordance with 62-4.130, F.A.C. <b>(potential future requirement)</b> .
Forms and Instructions	62-210.900, F.A.C.		X		Contains AOR requirements.
Notification Forms for Air General Permits	62-210.920, F.A.C.	X			Contains no applicable requirements.
<b>Chapter 62-212, F.A.C. - Stationary Sources - Preconstruction Review</b>					
Purpose and Scope	62-212.100, F.A.C.	X			Contains no applicable requirements.
General Preconstruction Review Requirements	62-212.300, F.A.C.		X		General air construction permit requirements.
Prevention of Significant Deterioration	62-212.400, F.A.C.		X		PSD permit required prior to construction of Project.
New Source Review for Nonattainment Areas	62-212.500, F.A.C.	X			Project is not located in a nonattainment area or a nonattainment area of influence.

Table A-2. Summary of FDEP Regulatory Applicability and Corresponding Requirements (Page 7 of 12)

Regulation	Citation	Not Applicable	Applicable: Facility-Wide	Applicable: Emission Units	Applicable Requirement or Non-Applicability Rationale
Sulfur Storage and Handling Facilities	62-212.600, F.A.C.	X			Applicable only to sulfur storage and handling facilities.
Air Emissions Bubble	62-212.710, F.A.C.	X			Not applicable to the TEC simple cycle CTGs.
<b>Chapter 62-213, F.A.C. - Operation Permits for Major Sources of Air Pollution</b>					
Purpose and Scope	62-213.100, F.A.C.	X			Contains no applicable requirements.
Annual Emissions Fee	62-213.205(1), (4), and (5), F.A.C.		X		Annual emissions fee and documentation requirements. <b>(future requirement)</b>
Annual Emissions Fee	62-213.205(2) and (3), F.A.C.	X			Contains no applicable requirements.
Title V Air General Permits	62-213.300, F.A.C.	X			No eligible facilities
Permits and Permit Revisions Required	62-213.400, F.A.C.		X		Title V operation permit required. <b>(future requirement)</b>
Changes Without Permit Revision	62-213.410, F.A.C.		X		Certain changes may be made if specific notice and recordkeeping requirements are met <b>(potential future requirement)</b> .
Immediate Implementation Pending Revision Process	62-213.412, F.A.C.		X		Certain modifications can be implemented pending permit revision if specific criteria are met <b>(potential future requirement)</b> .
Fast-Track Revisions of Acid Rain Parts	62-213.413, F.A.C.			CTG-2, CTG-3	Optional provisions for Acid Rain permit revisions <b>(potential future requirement)</b> .
Trading of Emissions within a Source	62-213.415, F.A.C.	X			Applies only to facilities with a federally enforceable emissions cap.

Table A-2. Summary of FDEP Regulatory Applicability and Corresponding Requirements (Page 8 of 12)

Regulation	Citation	Not Applicable	Applicable: Facility-Wide	Applicable: Emission Units	Applicable Requirement or Non-Applicability Rationale
Permit Applications	62-213.420(1)(a)2. and (1)(b), (2), (3), and (4), F.A.C.		X		Title V operating permit application required no later than 180 days after commencing operation. <b>(future requirement)</b>
Permit Issuance, Renewal, and Revision					
Action on Application	62-213.430(1), F.A.C.	X			Contains no applicable requirements.
Permit Denial	62-213.430(2), F.A.C.	X			Contains no applicable requirements.
Permit Renewal	62-213.430(3), F.A.C.		X		Permit renewal application requirements <b>(future requirement)</b> .
Permit Revision	62-213.430(4), F.A.C.		X		Permit revision application requirements <b>(potential future requirement)</b> .
EPA Recommended Actions	62-213.430(5), F.A.C.	X			Contains no applicable requirements.
Insignificant Emission Units	62-213.430(6), F.A.C.	X			Contains no applicable requirements.
Permit Content	62-213.440, F.A.C.	X			Agency procedures, contains no applicable requirements.
Permit Review by EPA and Affected States	62-213.450, F.A.C.	X			Agency procedures, contains no applicable requirements.
Permit Shield	62-213.460, F.A.C.		X		Provides permit shield for facilities in compliance with permit terms and conditions. <b>(future requirement)</b>
Forms and Instructions	62-213.900, F.A.C.		X		Contains annual emissions fee form requirements.
<b>Chapter 62-214—Requirements for Sources Subject to the Federal Acid Rain Program</b>					
Purpose and Scope	§62-214.100, F.A.C.	X			Contains no applicable requirements.

Table A-2. Summary of FDEP Regulatory Applicability and Corresponding Requirements (Page 9 of 12)

Regulation	Citation	Not Applicable	Applicable: Facility-Wide	Applicable: Emission Units	Applicable Requirement or Non-Applicability Rationale
Applicability	§62-214.300, F.A.C.		X		Project includes Acid Rain affected units, therefore compliance with §62-213 and §62-214, F.A.C., is required.
Applications	§62-214.320, F.A.C.			CTG-2, CTG-3	Acid Rain application requirements. Application for new units are due at least 24 months before the later of 1/1/2000 or the date on which the unit commences operation. <b>(future requirement)</b>
Acid Rain Compliance Plan and Compliance Options	§62-214.330(1)(a), F.A.C.			CTG-2, CTG-3	Acid Rain compliance plan requirements. Sulfur dioxide requirements become effective the later of 1/1/2000 or the deadline for CEMS certification pursuant to 40 CFR Part 75. <b>(future requirement)</b>
Exemptions	§62-214.340, F.A.C.		X		An application may be submitted for certain exemptions <b>(potential future requirement)</b> .
Certification	§62-214.350, F.A.C.			CTG-2, CTG-3	The designated representative must certify all Acid Rain submissions. <b>(future requirement)</b>
Department Action on Applications	§62-214.360, F.A.C.	X			Contains no applicable requirements.
Revisions and Administrative Corrections	§62-214.370, F.A.C.			CTG-2, CTG-3	Defines revision procedures and automatic amendments <b>(potential future requirement)</b> ..
Acid Rain Part Content	§62-214.420, F.A.C.	X			Agency procedures, contains no applicable requirements.
Implementation and Termination of Compliance Options	§62-214.430, F.A.C.			CTG-2, CTG-3	Defines permit activation and termination procedures <b>(potential future requirement)</b> .

Table A-2. Summary of FDEP Regulatory Applicability and Corresponding Requirements (Page 10 of 12)

Regulation	Citation	Not Applicable	Applicable: Facility-Wide	Applicable: Emission Units	Applicable Requirement or Non-Applicability Rationale
<b>Chapter 62-242 - Motor Vehicle Standards and Test Procedures</b>	62-242, F.A.C.	X			Not applicable to the TEC simple cycle CTGs.
<b>Chapter 62-243 - Tampering with Motor Vehicle Air Pollution Control Equipment</b>	62-243, F.A.C.	X			Not applicable to the TEC simple cycle CTGs.
<b>Chapter 62-252 - Gasoline Vapor Control</b>	62-252, F.A.C.	X			Not applicable to the TEC simple cycle CTGs.
<b>Chapter 62-256 - Open Burning and Frost Protection Fires</b>					
Declaration and Intent	62-256.100, F.A.C.	X			Contains no applicable requirements.
Definitions	62-256.200, F.A.C.	X			Contains no applicable requirements.
Prohibitions	<b>62-256.300, F.A.C.<sup>1</sup></b>		X		Prohibits open burning.
Burning for Cold and Frost Protection	62-256.450, F.A.C.	X			Limited to agricultural protection.
Land Clearing	<b>62-256.500, F.A.C.<sup>1</sup></b>		X		Defines allowed open burning for non-rural land clearing and structure demolition.
Industrial, Commercial, Municipal, and Research Open Burning	<b>62-256.600, F.A.C.<sup>1</sup></b>		X		Prohibits industrial open burning
Open Burning allowed	62-256.700, F.A.C.		X		Specifies allowable open burning activities. <b>(potential future requirement)</b>
Effective Date	62-256.800, F.A.C.	X			Contains no applicable requirements.
<b>Chapter 62-257 - Asbestos Fee</b>	62-257, F.A.C.	X			Not applicable to the TEC simple cycle CTGs.
<b>Chapter 62-281 - Motor Vehicle Air Conditioning Refrigerant Recovery and Recycling</b>	62-281, F.A.C.	X			Not applicable to the TEC simple cycle CTGs.



Table A-2. Summary of FDEP Regulatory Applicability and Corresponding Requirements (Page 11 of 12)

Regulation	Citation	Not Applicable	Applicable: Facility-Wide	Applicable: Emission Units	Applicable Requirement or Non-Applicability Rationale
<b>Chapter 62-296 - Stationary Source - Emission Standards</b>					
Purpose and Scope	62-296.100, F.A.C.	X			Contains no applicable requirements
General Pollutant Emission Limiting Standard, Volatile Organic Compounds Emissions	62-296.320(1), F.A.C.		X		Known and existing vapor control devices must be applied as required by the Department.
General Pollutant Emission Limiting Standard, Objectionable Odor Prohibited	62-296.320(2), F.A.C.		X		Objectionable odor release is prohibited.
General Pollutant Emission Limiting Standard, Industrial, Commercial, and Municipal Open Burning Prohibited	<b>62-296.320(3), F.A.C.<sup>1</sup></b>		X		Open burning in connection with industrial, commercial, or municipal operations is prohibited.
General Particulate Emission Limiting Standard, Process Weight Table	62-296.320(4)(a), F.A.C.	X			Project does not have any applicable emission units. Combustion emission units are exempt per 62-296.320(4)(a)1a.
General Particulate Emission Limiting Standard, General Visible Emission Standard	62-296.320(4)(b), F.A.C.		X		Opacity limited to 20 percent, unless otherwise permitted. Test methods specified.
General Particulate Emission Limiting Standard, Unconfined Emission of Particulate Matter	62-296.320(4)(c), F.A.C.		X		Reasonable precautions must be taken to prevent unconfined particulate matter emission.
Specific Emission Limiting and Performance Standards	62-296.401 through 62-296.417, F.A.C.	X			None of the referenced standards are applicable to the TEC simple cycle CTGs.
Reasonably Available Control Technology (RACT) Volatile Organic Compounds (VOC) and Nitrogen Oxides (NO <sub>x</sub> ) Emitting Facilities	62-296.500 through 62-296.516, F.A.C.	X			Project is not located in an ozone nonattainment area or an ozone air quality maintenance area.

Table A-2. Summary of FDEP Regulatory Applicability and Corresponding Requirements (Page 12 of 12)

Regulation	Citation	Not Applicable	Applicable: Facility-Wide	Applicable: Emission Units	Applicable Requirement or Non-Applicability Rationale
Reasonably Available Control Technology (RACT) - Requirements for Major VOC- and NO <sub>x</sub> -Emitting Facilities	62-296.570, F.A.C.	X			Project is not located in a specified ozone nonattainment area or a specified ozone air quality maintenance area (i.e., is not located in Broward, Dade or Palm Beach Counties)
Reasonably Available Control Technology (RACT) - Lead	62-296.600 through 62-296.605, F.A.C.	X			Project is not located in a lead non-attainment area or a lead air quality maintenance area.
Reasonably Available Control Technology (RACT)—Particulate Matter	§62-296.700 through 62-296.712, F.A.C.	X			Project is not located in a PM nonattainment area or a PM air quality maintenance area.
<b>Chapter 62-297 - Stationary Sources - Emissions Monitoring</b>					
Purpose and Scope	62-297.100, F.A.C.	X			Contains no applicable requirements.
General Compliance Test Requirements	62-297.310, F.A.C.		X		Specifies general compliance test requirements.
Compliance Test Methods	62-297.401, F.A.C.	X			Contains no applicable requirements.
Supplementary Test Procedures	62-297.440, F.A.C.	X			Contains no applicable requirements.
EPA VOC Capture Efficiency Test Procedures	62-297.450, F.A.C.	X			Not applicable to the TEC simple cycle CTGs.
CEMS Performance Specifications	62-297.520, F.A.C.	X			Contains no applicable requirements.
Exceptions and Approval of Alternate Procedures and Requirements	62-297.620, F.A.C.	X			Exceptions or alternate procedures have not been requested.

<sup>1</sup> - State requirement only; not federally enforceable.

Source: ECT, 1998.

**ATTACHMENT A-2**

**II.E.4—PRECAUTIONS TO PREVENT EMISSIONS  
OF UNCONFINED PARTICULATE MATTER**

## PRECAUTIONS TO PREVENT EMISSIONS OF UNCONFINED PARTICULATE MATTER

Unconfined particulate matter emissions that may result from New Smyrna Beach Power Project operations include:

- Vehicular traffic on paved and unpaved roads.
- Wind-blown dust from yard areas.
- Periodic abrasive blasting.

The following techniques may be used to control unconfined particulate matter emissions on an as needed basis:

- Chemical or water application to:
  - Unpaved roads
  - Unpaved yard areas
- Paving and maintenance of roads, parking areas and yards.
- Landscaping or planting of vegetation.
- Confining abrasive blasting where possible.
- Other techniques, as necessary

**ATTACHMENT A-3**

**III.L.2—FUEL ANALYSES OR SPECIFICATIONS**

## Typical Natural Gas Composition

Component	Mole Percent (by volume)
<u>Gas Composition</u>	
Hexane+	0.018
Propane	0.190
I-butane	0.010
N-butane	0.007
Pentane	0.002
Nitrogen	0.527
Methane	96.195
CO <sub>2</sub>	0.673
Ethane	2.379
<u>Other Characteristics</u>	
Heat content	1,022 Btu/ft <sup>3</sup> with 14.73 psia, dry
Real specific gravity	0.5776
Sulfur content (maximum)	2.0 gr/100 scf

Note: Btu/ft<sup>3</sup> = British thermal units per cubic foot.  
psia = pounds per square inch absolute.  
gr/100 scf = grains per 100 standard cubic foot.

Source: TEC, 1999.

## Typical No. 2 Fuel Oil Analysis

Parameter	Value
Specific gravity @ 60°F (maximum)	0.876
Viscosity, saybolt (SUS) @ 100°F	
Minimum	40.2
Maximum	32.6
Flash point, °F (minimum)	100
Pour point, °F (minimum)	0
Minimum gross heating value, Btu/gal	
LHV	129,811
HHV	137,600
Water and sediment, percent by volume (maximum)	0.05
Ash, percent by weight (maximum)	0.01
Sulfur, percent by weight (maximum)	0.05
Fuel-bound nitrogen, percent by weight (maximum)	0.015
Trace constituents, ppm (maximum)	
Lead	1.0
Sodium	1.0
Vanadium	0.5

Note: SUS = Saybolt Universal Seconds.  
Btu/gal = British thermal units per gallon.  
LHV = lower heating value.  
HHV = higher heating value.

Source: TEC, 1992.

**ATTACHMENT B—**  
**CTG VENDOR EMISSIONS DATA**



## ESTIMATED PERFORMANCE PG7241(FA)

Load Condition		BASE	75%	50%
Ambient Temp.	Deg F.	20.	20.	20.
Fuel Type		Cust Gas	Cust Gas	Cust Gas
Fuel LHV	Btu/lb	20,886	20,886	20,886
Fuel Temperature	Deg F	80	80	80
Output	kW	183,400.	137,500.	91,700.
Heat Rate (LHV)	Btu/kWh	9,300.	9,950.	11,910.
Heat Cons. (LHV) X 10 <sup>6</sup>	Btu/h	1,705.6	1,368.1	1,092.1
Exhaust Flow X 10 <sup>3</sup>	lb/h	3776.	3010.	2473.
Exhaust Temp.	Deg F.	1081.	1111.	1160.
Exhaust Heat (LHV) X 10 <sup>6</sup>	Btu/h	1017.8	848.9	738.3

## EMISSIONS

NOx	ppmvd @ 15% O2	9.	9.	9.
NOx AS NO2	lb/h	63.	50.	39.
CO	ppmvd	15.	15.	15.
CO	lb/h	51.	41.	34.
UHC	ppmvw	7.	7.	7.
UHC	lb/h	15.	12.	10.
Particulates	lb/h	9.0	9.0	9.0

## EXHAUST ANALYSIS % VOL.

Argon	0.90	0.91	0.90
Nitrogen	75.06	75.07	75.18
Oxygen	12.56	12.59	12.90
Carbon Dioxide	3.87	3.85	3.71
Water	7.61	7.59	7.31

## SITE CONDITIONS

Elevation	ft.	143.0
Site Pressure	psia	14.63
Inlet Loss	in Water	4.0
Exhaust Loss	in Water	5.5
Relative Humidity	%	30
Application		7FH2 Hydrogen-Cooled Generator
Combustion System		9/42 DLN Combustor

Emission information based on GE recommended measurement methods. NOx emissions are corrected to 15% O2 without heat rate correction and are not corrected to ISO reference condition per 40CFR 60.335(c)(1). NOx levels shown will be controlled by algorithms within the SPEEDTRONIC control system.

TECO - Polk station

**ESTIMATED PERFORMANCE PG7241(FA)**

Load Condition		BASE	75%	50%
Ambient Temp.	Deg F.	59.	59.	59.
Fuel Type		Cust Gas	Cust Gas	Cust Gas
Fuel LHV	Btu/lb	20,886	20,886	20,886
Fuel Temperature	Deg F	80	80	80
Output	kW	170,300.	127,700.	85,100.
Heat Rate (LHV)	Btu/kWh	9,370.	10,130.	12,200.
Heat Cons. (LHV) X 10 <sup>6</sup>	Btu/h	1,595.7	1,293.6	1,038.2
Exhaust Flow X 10 <sup>3</sup>	lb/h	3518.	2874.	2384.
Exhaust Temp.	Deg F.	1117.	1139.	1184.
Exhaust Heat (LHV) X 10 <sup>6</sup>	Btu/h	956.6	810.4	708.7

**EMISSIONS**

NOx	ppmvd @ 15% O2	9.	9.	9.
NOx AS NO2	lb/h	59.	47.	37.
CO	ppmvd	15.	15.	15.
CO	lb/h	48.	39.	32.
UHC	ppmvw	7.	7.	7.
UHC	lb/h	14.	11.	9.
Particulates	lb/h	9.0	9.0	9.0

**EXHAUST ANALYSIS** % VOL.

Argon	0.89	0.88	0.89
Nitrogen	74.38	74.43	74.54
Oxygen	12.38	12.52	12.85
Carbon Dioxide	3.87	3.80	3.65
Water	8.49	8.37	8.07

**SITE CONDITIONS**

Elevation	ft.	143.0
Site Pressure	psia	14.63
Inlet Loss	in Water	4.0
Exhaust Loss	in Water	5.5
Relative Humidity	%	60
Application		7FH2 Hydrogen-Cooled Generator
Combustion System		9/42 DLN Combustor

Emission information based on GE recommended measurement methods. NOx emissions are corrected to 15% O2 without heat rate correction and are not corrected to ISO reference condition per 40CFR 60.335(c)(1). NOx levels shown will be controlled by algorithms within the SPEEDTRONIC control system.

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## ESTIMATED PERFORMANCE PG7241(FA)

Load Condition		BASE	75%	50%
Ambient Temp.	Deg F.	90.	90.	90.
Fuel Type		Cust Gas	Cust Gas	Cust Gas
Fuel LHV	Btu/lb	20,886	20,886	20,886
Fuel Temperature	Deg F	80	80	80
Output	kW	151,100.	113,300.	75,500.
Heat Rate (LHV)	Btu/kWh	9,720.	10,620.	12,860.
Heat Cons. (LHV) X 10 <sup>6</sup>	Btu/h	1,468.7	1,203.2	970.9
Exhaust Flow X 10 <sup>3</sup>	lb/h	3263.	2695.	2262.
Exhaust Temp.	Deg F.	1141.	1166.	1200.
Exhaust Heat (LHV) X 10 <sup>6</sup>	Btu/h	899.5	772.2	676.3

## EMISSIONS

NOx	ppmvd @ 15% O2	9.	9.	9.
NOx AS NO2	lb/h	54.	44.	35.
CO	ppmvd	15.	15.	15.
CO	lb/h	43.	36.	30.
UHC	ppmvw	7.	7.	7.
UHC	lb/h	13.	11.	9.
Particulates	lb/h	9.0	9.0	9.0

## EXHAUST ANALYSIS % VOL.

Argon	0.87	0.87	0.86
Nitrogen	72.32	72.37	72.50
Oxygen	11.96	12.10	12.48
Carbon Dioxide	3.80	3.73	3.56
Water	11.06	10.93	10.60

## SITE CONDITIONS

Elevation	ft.	143.0
Site Pressure	psia	14.63
Inlet Loss	in Water	4.0
Exhaust Loss	in Water	5.5
Relative Humidity	%	80
Application		7FH2 Hydrogen-Cooled Generator
Combustion System		9/42 DLN Combustor

Emission information based on GE recommended measurement methods. NOx emissions are corrected to 15% O2 without heat rate correction and are not corrected to ISO reference condition per 40CFR 60.335(c)(1). NOx levels shown will be controlled by algorithms within the SPEEDTRONIC control system.

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## ESTIMATED PERFORMANCE PG7241(FA)

Load Condition		BASE	75%	50%
Ambient Temp.	Deg F.	20.	20.	20.
Fuel Type		Dist.	Dist.	Dist.
Fuel LHV	Btu/lb	18,300	18,300	18,300
Fuel Temperature	Deg F	59	59	59
Liquid Fuel H/C Ratio		1.8	1.8	1.8
Output	kW	189,400.	142,100.	94,700.
Heat Rate (LHV)	Btu/kWh	10,060.	10,880.	12,730.
Heat Cons. (LHV) X 10 <sup>6</sup>	Btu/h	1,905.4	1,546.	1,205.5
Exhaust Flow X 10 <sup>3</sup>	lb/h	3894.	2911.	2430.
Exhaust Temp.	Deg F.	1067.	1184.	1200.
Exhaust Heat (LHV) X 10 <sup>6</sup>	Btu/h	1056.0	900.4	766.3
Water Flow	lb/h	132,150.	102,410.	69,710.

## EMISSIONS

NOx	ppmvd @ 15% O2	42.	42.	42.
NOx AS NO2	lb/h	338.	272.	210.
CO	ppmvd	33.	33.	33.
CO	lb/h	113.	84.	71.
UHC	ppmvw	7.	7.	7.
UHC	lb/h	15.	11.	10.
Particulates	lb/h	17.0	17.0	17.0

## EXHAUST ANALYSIS % VOL.

Argon	0.87	0.85	0.87
Nitrogen	71.82	71.53	72.47
Oxygen	11.17	10.49	11.37
Carbon Dioxide	5.61	6.02	5.60
Water	10.54	11.11	9.70

## SITE CONDITIONS

Elevation	ft.	143.0
Site Pressure	psia	14.63
Inlet Loss	in Water	4.0
Exhaust Loss	in Water	5.5
Relative Humidity	%	30
Application		7FH2 Hydrogen-Cooled Generator
Combustion System		9/42 DLN Combustor

Emission information based on GE recommended measurement methods. NOx emissions are corrected to 15% O2 without heat rate correction and are not corrected to ISO reference condition per 40CFR 60.335(c)(1). NOx levels shown will be controlled by algorithms within the SPEEDTRONIC control system.

Distillate Fuel is Assumed to have 0.015% Fuel-Bound Nitrogen, or less.  
FBN Amounts Greater Than 0.015% Will Add to the Reported NOx Value.

## ESTIMATED PERFORMANCE PG7241(FA)

Load Condition		BASE	75%	50%
Ambient Temp.	Deg F.	59.	59.	59.
Fuel Type		Dist.	Dist.	Dist.
Fuel LHV	Btu/lb	18,300	18,300	18,300
Fuel Temperature	Deg F	59	59	59
Liquid Fuel H/C Ratio		1.8	1.8	1.8
Output	kW	178,800.	134,100.	89,400.
Heat Rate (LHV)	Btu/kWh	10,040.	10,880.	12,840.
Heat Cons. (LHV) X 10 <sup>6</sup>	Btu/h	1,795.2	1,459.	1,147.9
Exhaust Flow X 10 <sup>3</sup>	lb/h	3662.	2812.	2395.
Exhaust Temp.	Deg F.	1098.	1195.	1200.
Exhaust Heat (LHV) X 10 <sup>6</sup>	Btu/h	996.1	854.1	735.2
Water Flow	lb/h	120,430.	91,300.	62,380.

## EMISSIONS

NOx	ppmvd @ 15% O2	42.	42.	42.
NOx AS NO2	lb/h	319.	257.	200.
CO	ppmvd	33.	33.	33.
CO	lb/h	106.	81.	70.
UHC	ppmvw	7.	7.	7.
UHC	lb/h	14.	11.	9.
Particulates	lb/h	17.0	17.0	17.0

## EXHAUST ANALYSIS % VOL.

Argon	0.85	0.86	0.87
Nitrogen	71.31	71.26	72.21
Oxygen	11.04	10.63	11.59
Carbon Dioxide	5.61	5.88	5.40
Water	11.19	11.37	9.94

## SITE CONDITIONS

Elevation	ft.	143.0
Site Pressure	psia	14.63
Inlet Loss	in Water	4.0
Exhaust Loss	in Water	5.5
Relative Humidity	%	60
Application		7FH2 Hydrogen-Cooled Generator
Combustion System		9/42 DLN Combustor

Emission information based on GE recommended measurement methods. NOx emissions are corrected to 15% O2 without heat rate correction and are not corrected to ISO reference condition per 40CFR 60.335(c)(1). NOx levels shown will be controlled by algorithms within the SPEEDTRONIC control system.

Distillate Fuel is Assumed to have 0.015% Fuel-Bound Nitrogen, or less.  
FBN Amounts Greater Than 0.015% Will Add to the Reported NOx Value.

## ESTIMATED PERFORMANCE PG7241(FA)

Load Condition		BASE	75%	50%
Ambient Temp.	Deg F.	90.	90.	90.
Fuel Type		Dist.	Dist.	Dist.
Fuel LHV	Btu/lb	18,300	18,300	18,300
Fuel Temperature	Deg F	59	59	59
Liquid Fuel H/C Ratio		1.8	1.8	1.8
Output	kW	159,900.	119,900.	79,900.
Heat Rate (LHV)	Btu/kWh	10,210.	11,150.	13,240.
Heat Cons. (LHV) X 10 <sup>6</sup>	Btu/h	1,632.6	1,336.9	1,057.9
Exhaust Flow X 10 <sup>3</sup>	lb/h	3375.	2693.	2316.
Exhaust Temp.	Deg F.	1130.	1200.	1200.
Exhaust Heat (LHV) X 10 <sup>6</sup>	Btu/h	931.9	808.1	698.3
Water Flow	lb/h	91,870.	67,650.	44,800.

## EMISSIONS

NOx	ppmvd @ 15% O2	42.	42.	42.
NOx AS NO2	lb/h	290.	235.	184.
CO	ppmvd	33.	33.	33.
CO	lb/h	97.	77.	67.
UHC	ppmvw	7.	7.	7.
UHC	lb/h	13.	11.	9.
Particulates	lb/h	17.0	17.0	17.0

## EXHAUST ANALYSIS % VOL.

Argon	0.85	0.85	0.85
Nitrogen	70.02	70.24	71.08
Oxygen	10.85	10.77	11.69
Carbon Dioxide	5.50	5.59	5.12
Water	12.79	12.56	11.27

## SITE CONDITIONS

Elevation	ft.	143.0
Site Pressure	psia	14.63
Inlet Loss	in Water	4.0
Exhaust Loss	in Water	5.5
Relative Humidity	%	80
Application		7FH2 Hydrogen-Cooled Generator
Combustion System		9/42 DLN Combustor

Emission information based on GE recommended measurement methods. NOx emissions are corrected to 15% O2 without heat rate correction and are not corrected to ISO reference condition per 40CFR 60.335(c)(1). NOx levels shown will be controlled by algorithms within the SPEEDTRONIC control system.

Distillate Fuel is Assumed to have 0.015% Fuel-Bound Nitrogen, or less.  
FBN Amounts Greater Than 0.015% Will Add to the Reported NOx Value.

**ATTACHMENT C—  
CONTROL SYSTEM VENDOR QUOTE**

# ENGELHARD

101 WOOD AVENUE  
ISELIN, NJ 08830  
732-205-5000

POWER GENERATION SALES:  
ENGELHARD CORPORATION  
2205 CHEQUERS COURT  
BEL AIR, MD 21015  
PHONE 410-569-0297  
FAX 410-569-1841  
E-Mail Fred\_Booth@ENGELHARD.COM

January 26, 1999

Sargent & Lundy  
ATTN: Paula Scholl

RE: Sargent and Lundy / Tampa Electric – Polk Station  
GE Fr7FA Simple Cycle Turbine  
Oxidation Catalyst Components  
High Temperature SCR Catalyst System Components  
Engelhard Budgetary Proposal EPB99318

Dear Ms Scholl,

We provide Engelhard Budgetary Proposal EPB99318 for Engelhard Camet® CO Oxidation Catalyst System Components and NOxCAT ZNX™ High Temperature SCR Catalyst system components for the above project. This is per your FAXed request of January 25, 1999.

Our Budgetary Proposal is based on:

- Given data for GE 7EA Gas Turbine operating in simple cycle mode;
- Oxidation Catalysts for 90% CO reduction as noted;
- Catalysts for NOx reduction as noted with ammonia slip of 5 ppmvd@15%O<sub>2</sub>;
  - Option 1: NOx reduction from 10.5 ppmvd @ 15% O<sub>2</sub> to 6 ppmvd @ 15% O<sub>2</sub>
  - Option 2: NOx reduction from 10.5 ppmvd @ 15% O<sub>2</sub> to 3.5 ppmvd @ 15% O<sub>2</sub>
  - Option 3: NOx reduction from 12 ppmvd @ 15% O<sub>2</sub> to 6 ppmvd @ 15% O<sub>2</sub>
  - Option 4: NOx reduction from 12 ppmvd @ 15% O<sub>2</sub> to 3.5 ppmvd @ 15% O<sub>2</sub>
- Delta P through SCR system - Nominal 3"WG;
- Assumed internally insulated ducts with cross sections at the catalysts as illustrated.
- Scope as noted. Please note that we have assumed horizontal gas flow through the CO / SCR reactor and the use of 28% aqueous ammonia. The system proposed requires the use of an ambient air cooling system to reduce the gas temperature to the SCR catalyst.
- Three (3) Year Performance Guarantee (expected life five to seven years).

We request the opportunity to work with you on this project.

Sincerely yours,

ENGELHARD CORPORATION



Frederick A. Booth  
Sales Engineer

cc: Nancy Ellison - Proposal Administrator



**ENGELHARD CORPORATION**  
**CAMET™ CO CATALYST SYSTEM**  
**NOxCAT ZNX™ HIGH TEMPERATURE SCR NOx ABATEMENT CATALYST SYSTEM**

Engelhard Corporation ("Engelhard") offers to supply to Buyer the CAMET™ metal substrate CO Catalyst System components and the NOxCAT ZNX™ ceramic substrate SCR system components summarized herein.

**Scope of Supply**

1. Engelhard CAMET® CO and NOxCAT ZNX™ SCR catalyst in modules;
2. Internal support structures for catalyst modules (frames);
3. Internally insulated reactor ductwork - with stainless steel liner sheets - to house CO catalyst modules, AIG, and SCR Catalyst modules;
4. Ammonia Injection Grid (AIG);
5. AIG manifold with flow control valves ;
6. NH<sub>3</sub> Vaporization / Air dilution skid: 28% Aqueous Ammonia to skid;
7. Ambient air cooling system components as required.

<b>BUDGET PRICES:</b>	<b>Per Turbine-</b>	<b>Option 1</b>	<b>Option 2</b>	<b>Option 3</b>	<b>Option 4</b>
	<b>CO Catalyst System</b>	<b>\$ 885,000</b>	<b>\$1,075,000</b>	<b>\$ 960,000</b>	<b>\$1,100,000</b>
	<b>Replacement CO Modules</b>	<b>\$ 700,000</b>	<b>\$ 850,000</b>	<b>\$ 780,000</b>	<b>\$ 900,000</b>
	<b>SCR Catalyst System</b>	<b>\$2,400,000</b>	<b>\$3,400,000</b>	<b>\$2,600,000</b>	<b>\$3,500,000</b>
	<b>Replacement ZNX Modules</b>	<b>\$1,000,000</b>	<b>\$1,800,000</b>	<b>\$1,200,000</b>	<b>\$2,000,000</b>

**WARRANTY AND GUARANTEE:**

Mechanical Warranty: One year of operation\* or 1.5 years after catalyst delivery, whichever occurs first.  
Performance Guarantee: Three (3) years of operation\* or 3.5 years after catalyst delivery, whichever occurs first. Catalyst warranty is prorated over the guaranteed life

**DOCUMENT / MATERIAL DELIVERY SCHEDULE**

Drawings / Documentation - 6 - 8 weeks after notice to proceed and Engelhard receipt of all engineering specifications and details  
Operating manuals  
Material Delivery 20 - 24 weeks after approval and release for fabrication

**SYSTEM DESIGN BASIS:**

Gas Flow from:	GE Fr7FA - with ambient air cooling
Gas Flow:	Assumed Horizontal
Fuel:	Natural Gas
Gas Flow Rate (At catalyst face):	See Performance data
Temperature (At catalyst face):	See Performance data
CO Concentration (At catalyst face):	See Performance data
CO Reduction:	90%
NOx Concentration (At catalyst face):	See Performance data
NOx Reduction:	See Performance data
NH <sub>3</sub> Slip:	5 ppmvd@15%O <sub>2</sub>
Pressure Drop through SCR	Nom. 3"WG through ea. catalyst

## Performance Data

<u>GIVEN / CALCULATED DATA</u>	<u>OPTION 1</u>	<u>OPTION 2</u>	<u>OPTION 3</u>	<u>OPTION 4</u>
AMBIENT	90	90	90	90
LOAD	BASE	BASE	BASE	BASE
TURBINE EXHAUST TEMPERATURE, F	1,140	1,140	1,140	1,140
TURBINE EXHAUST FLOW, lb/hr	3,280,000	3,280,000	3,280,000	3,280,000
TURBINE EXHAUST GAS ANALYSIS, % VOL.				
N2	74.19	74.19	74.19	74.19
O2	12.47	12.47	12.47	12.47
CO2	3.80	3.80	3.80	3.80
H2O	8.65	8.65	8.65	8.65
Ar	0.89	0.89	0.89	0.89
AMBIENT AIR FLOW, lb/hr	443,597	443,597	443,597	443,597
TOTAL FLOW - TURBINE EXHAUST + AMBIENT - lb/hr	3,723,597	3,723,597	3,723,597	3,723,597
AMBIENT + EXHAUST GAS ANALYSIS, % VOL.				
N2	75.02	75.02	75.02	75.02
O2	13.21	13.21	13.21	13.21
CO2	3.35	3.35	3.35	3.35
H2O	7.63	7.63	7.63	7.63
Ar	0.79	0.79	0.79	0.79
CALCULATED AIR + GAS MOL. WT.	28.41	28.41	28.41	28.41
GIVEN: TURBINE CO, ppmvd @ 15% O2	15.0	15.0	15.0	15.0
CALC.: TURBINE CO, lb/hr	54.5	54.5	54.5	54.5
GIVEN: TURBINE NOx, ppmvd @ 15% O2	10.5	10.5	12.0	12.0
CALC.: TURBINE NOx, lb/hr	62.7	62.7	71.6	71.6
CALC.: CO, ppmvd@15%O2 - AT CATALYST FACE	14.4	14.4	14.4	14.4
CALC.: NOx, ppmvd@15%O2 - AT CATALYST FACE	10.1	10.1	11.5	11.5
AMBIENT + EXHAUST GAS TEMP. @ CATALYSTS, F	1,025	1,025	1,025	1,025
<u>DESIGN REQUIREMENTS</u>				
<u>CO CATALYST</u> CO OUT, ppmvd@15%O2	1.4	1.4	1.4	1.4
<u>SCR CATALYST</u> NOx OUT, ppmvd@15%O2	6.0	3.5	6.0	3.5
NH3 SLIP, ppmvd@15%O2	5	5	5	5
SCR PRESSURE DROP, "WG - Max.	3"	3"	3"	3"
<u>GUARANTEED PERFORMANCE DATA</u>				
<u>CO CATALYST</u> CO CONVERSION - % Max.	90.0%	90.0%	90.0%	90.0%
CO OUT, ppmvd@15%O2 - Max.	1.4	1.4	1.4	1.4
CO OUT, lb/hr - Max.	5.5	5.5	5.5	5.5
CO PRESSURE DROP, "WG - Max.	1.7	1.1	1.4	1.0
<u>SCR CATALYST</u> NOx CONVERSION, % - Min.	42.9%	66.7%	50.0%	70.8%
NOx OUT, lb/hr - Max.	35.8	20.9	35.8	20.9
NOx OUT, ppmvd@15%O2 - Max.	5.8	3.4	5.8	3.4
EXPECTED AQUEOUS NH3 (28% SOL.) FLOW, lb/hr	77	96	88	108
NH3 SLIP, ppmvd@15%O2 - Max.	5	5	5	5
SCR PRESSURE DROP, "WG - Max.	3.0	3.0	3.0	3.0

The equipment supplied is installed by others in accordance with the Engelhard design and installation instructions.

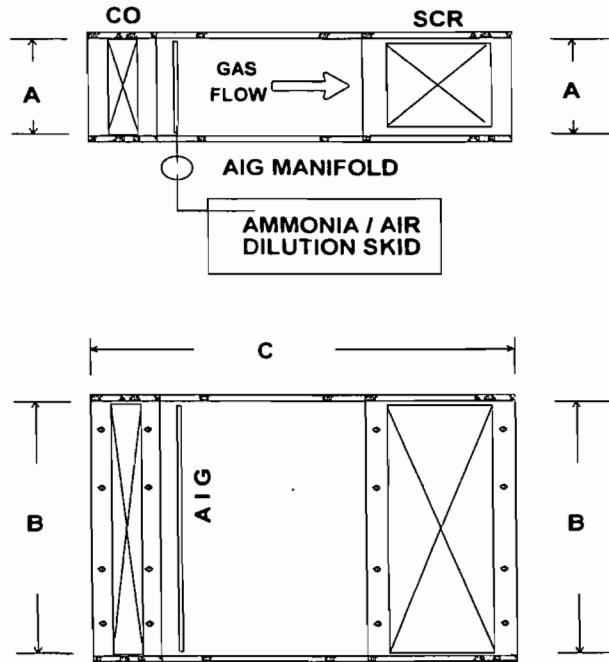
Assumed Dimensions / Sketch:

**Option 1**  
 Reactor Width (A) 49'-3"  
 Reactor Height (B) 32'-3"  
 Reactor Reactor Depth (C) 15'-0"

**Option 2**  
 Reactor Width (A) 54'-0"  
 Reactor Height (B) 38'-6"  
 Reactor Reactor Depth (C) 15'-6"

**Option 3**  
 Reactor Width (A) 45'-0"  
 Reactor Height (B) 40'-0"  
 Reactor Reactor Depth (C) 15'-0"

**Option 4**  
 Reactor Width (A) 57'-3"  
 Reactor Height (B) 38'-6"  
 Reactor Reactor Depth (C) 16'-0"



Excluded from Scope of Supply:

- Ammonia storage and pumping
- Any duct transitions to and from reactor
- Electrical grounding equipment
- Foundations
- All other items not specifically listed in Scope of Supply

- Any interconnecting field piping or wiring
- Utilities
- All Monitors

Item Description	Comments/Assumptions	Material or Equipment	Quantity	Units	Unit Price matl/equip	Total matl or equip Cost	Unit Labor Rate	Total Manhours	Crew Wage Rate	Total Labor Cost	Total Projected Cost
Ambient air fans	Provide 2 blowers and duct work on each side of the exhaust upstream of silencer to inject cool air.	Fans	2	Ea	25,000.00	\$50,000	100	200	41.00	\$8,200	\$58,200
Foundation for ambient air fans	Assume small support pedestals on 4' thick mat. Each mat plan area estimated at 100 sq. ft. Add 30% for pedestals.	Concrete	39	CY	70.17	\$2,700	1.885	73	19.57	\$1,400	\$4,100
		Reinforcing	3.4	TN	562.00	\$1,900	23.1	78	32.03	\$2,500	\$4,400
		Formwork	416	SF	2.18	\$900	0.185	77	26.92	\$2,100	\$3,000
		Piles	8	Ea	1,000.00	\$8,000	5.55	44	70.12	\$3,100	\$11,100
Ambient air cooling ductwork.	Assume 2 ducts 7' x 7' x 40' long. Use a ductwork weight of 20 psf.	Stiffened plate, A36 material	22.4	TN	1,600.00	\$35,800	20	448	65.96	\$29,600	\$65,400
		Support Steel	5.6	TN	1,600.00	\$9,000	20	112	65.96	\$7,400	\$16,400
	Insulation & Lagging	Mineral Wool	2,240	SF	17.04	\$38,200	0.146	327	37.00	\$12,100	\$50,300
Transition duct after silencer, before SCR.	Assume length of 35' and weight of 40 psf to include extensive turning vanes and lower material properties at high temperatures. Transitions from 25'W x 22'H to 63.5'W x 41.75'H	Stiffened plate	118	TN	1,600.00	\$189,200	25	2,957	65.96	\$195,000	\$384,200
		Support Steel	29.6	TN	1,600.00	\$47,300	25	739	65.96	\$48,800	\$96,100
	Insulation & Lagging	Mineral Wool	5,880	SF	17.04	\$100,200	0.146	858	37.00	\$31,800	\$132,000
SCR & CO Catalyst System	Assume that the reactor dimensions are as follows: 63.5'W x 41.75'H x 16"D.		1	Ea	See Vendor Quote		12,000	12,000	62.00	\$744,000	\$744,000

COST ESTIMATE FOR ADDED SCR - LABOR AND COMMODITY COSTS

Item Description	Comments/Assumptions	Material or Equipment	Quantity	Units	Unit Price matl/equip	Total matl or equip Cost	Unit Labor Rate	Total Manhours	Crew Wage Rate	Total Labor Cost	Total Projected Cost
		Support Steel	40	TN	1,600.00	\$64,000	25	1,000	65.96	\$66,000	\$130,000
	Insulation & Lagging	Mineral Wool	3,368	SF	17.04	\$57,400	0.146	492	37.00	\$18,200	\$75,600
Transition duct after SCR, before stack.	Assume length of 40' and weight of 40 psf to include extensive turning vanes and lower material properties at high temperatures. Transitions from 63.5'W x 41.75'H to 18'W x 41.75'H	Stiffened plate	142	TN	1,600.00	\$227,700	25	3,558	65.96	\$234,700	\$462,400
		Support Steel	35.6	TN	1,600.00	\$56,900	25	890	65.96	\$58,700	\$115,600
	Insulation & Lagging	Mineral Wool	7,101	SF	17.04	\$121,000	0.146	1,037	37.00	\$38,400	\$159,400
Expansion joints	Ambient air ducts	Fabric	56	LF	120.00	\$6,700	2	112	62.00	\$6,900	\$13,600
	Between silencer & transition	Fabric	94	LF	120.00	\$11,300	2	188	62.00	\$11,700	\$23,000
	Between transition and stack	Fabric	120	LF	120.00	\$14,300	2	239	62.00	\$14,800	\$29,100
Galleries to access SCR	Platforms and stairs	Steel	3,000	SF	30.00	\$90,000	0.380	1,140	65.96	\$75,200	\$165,200
Foundation under transition ducts and SCR	Assume 4' thick mat, 91' long and 65' wide. Assumed volume includes allowance for small piers/pads for equipment and duct/SCR support on main mat.	Concrete	964	CY	70.17	\$67,600	1.885	1,817	19.57	\$35,600	\$103,200
		Reinforcing	83.4	TN	562.00	\$46,900	23.1	1,926	32.03	\$61,700	\$108,600
		Formwork	1,373	SF	2.18	\$3,000	0.185	254	26.92	\$6,800	\$9,800
		Piles	54	Ea	1,000.00	\$54,000	5.55	300	70.12	\$21,000	\$75,000
<b>Total Direct Costs</b>						<b>\$1,304,000</b>		<b>30,866</b>		<b>\$1,735,700</b>	<b>\$3,039,700</b>
Engineering Indirects	7% of total direct costs										\$212,800

**Attachment C-1. Polk Power Station Simple Cycle CTGs - Basis for SCR Capital Costs**

Item	(\$)	OAQPS Factor
<b>A. Direct Costs</b>		
<u>Purchased Equipment</u>	<u>4,035,000</u>	<u>A</u>
<u>Sales Tax</u>	<u>242,100</u>	<u>0.06 x A</u>
<u>Freight</u>	<u>201,750</u>	<u>0.05 x A</u>
<u>Subtotal Purchased Equipment</u>	<u>4,478,850</u>	<u>B</u>
<u>Subtotal Installation Cost</u>	<u>1,343,655</u>	<u>0.30 x B</u>
<u>Subtotal Direct Costs</u>	<u>5,822,505</u>	
<b>B. Indirect Costs</b>		
<u>Subtotal Indirect Costs</u>	<u>1,388,444</u>	<u>0.31 x B</u>
<u>Total Capital Investment</u>	<u>7,210,949</u>	<u>TCI</u>

Engelhard quote of \$3,400,000 + Sargent & Lundy estimate for exhaust stream cooling equipment + cost of NH<sub>3</sub> storage tank.

Engelhard Quote = \$3,400,000  
 Sargent & Lundy Estimate = \$50,000 + 35,800 + 169,000 + 227,700 + 6,700 + 11,300 + 14,300 + 90,000 = \$605,000  
 NH<sub>3</sub> storage tank = \$30,000  
 Total SCR System = \$3,400,000 + \$605,000 + \$30,000 = \$4,035,000

Purchased Equipment x 6% sales tax  
 Sales Tax = \$4,035,000 x (0.06) = \$242,100

Purchased Equipment x OAQPS Freight Factor of 0.05  
 Sales Tax = \$4,035,000 x (0.05) = \$201,750

Sum of Purchased Equipment + Sales Tax + Freight  
 Subtotal Purchased Equipment = \$4,035,000 + \$242,100 + \$201,750 = \$4,478,850

Subtotal Purchased Equipment x OAQPS Installation Cost Factor of 0.30  
 OAQPS Installation Cost Factor = (0.08 + 0.14 + 0.04 + 0.02 + 0.01 + 0.01) = 0.30  
 Subtotal Installation Cost = \$4,478,850 x 0.30 = \$1,343,655

Subtotal Purchased Equipment + Subtotal Installation Cost  
 Subtotal Direct Costs = \$4,478,850 + \$1,343,655 = \$5,822,505

Subtotal Purchased Equipment x OAQPS Indirect Cost Factor of 0.31  
 OAQPS Indirect Cost Factor = (0.10 + 0.05 + 0.10 + 0.02 + 0.01 + 0.03) = 0.31  
 Subtotal Indirect Costs = \$4,478,850 x 0.31 = \$1,388,444

Subtotal Direct Cost + Subtotal Indirect Cost  
 Total Capital Investment = \$5,822,505 + \$1,388,444 = \$7,210,949

**Attachment C-2. Polk Power Station Simple Cycle CTGs - Basis for SCR Annual Operating Costs (Page 1 of 4)**

Item	(\$)	OAQPS Factor	Basis
<b>A. Direct Costs</b>			
<u>Operator Labor</u>	<u>7,227</u>	<u>A</u>	$0.50 \text{ hrs/shift} \times 3 \text{ shifts/day} \times 219 \text{ dys/yr} \times \$22.00/\text{hr}$ Operator Labor = $(0.50) \times (3) \times (219) \times (22.00) = \$7,227$
<u>Supervisor Labor</u>	<u>1,084</u>	<u>0.15 x A</u>	Operator Labor x OAQPS Supervisor Labor Factor of 0.15 Supervisor Labor = $\$7,227 \times 0.15 = \$1,084$
<u>Maintenance Labor</u>	<u>7,227</u>	<u>B</u>	$0.5 \text{ hrs/shift} \times 3 \text{ shifts/day} \times 219 \text{ dys/yr} \times \$22.00/\text{hr}$ Maintenance Labor = $(0.5) \times (3) \times (219) \times (22.00) = \$7,227$
<u>Maintenance Material</u>	<u>7,227</u>	<u>1.0 x B</u>	Maintenance Labor x OAQPS Supervisor Labor Factor of 1.0 Maintenance Materials = $\$7,227 \times 1.0 = \$7,227$
<u>Subtotal Labor and Materials</u>	<u>22,765</u>	<u>C</u>	Operator Labor + Supervisor Labor + Maintenance Labor + Maintenance Materials Subtotal Labor and Materials = $\$7,227 + \$1,084 + \$7,227 + \$7,227 = \$22,765$
<u>Catalyst Replacement Costs</u>	<u>2,088,000</u>		Engelhard quote of \$1,800,000 + sales tax + freight + disposal and associated expenses  Catalyst Cost = \$1,800,000 Sales Tax = $\$1,800,000 \times 0.06 = \$108,000$ Freight = $\$1,800,000 \times 0.05 = \$90,000$ Labor and Associated Expenses = \$90,000  Total Catalyst Replacement Cost = $\$1,800,000 + \$108,000 + \$90,000 + \$90,000$ Total Catalyst Replacement Cost = \$2,088,000

Attachment C-2. Polk Power Station Simple Cycle CTGs - Basis for SCR Annual Operating Costs (Page 2 of 4)

Item	OAQPS Factor	Basis
Annualized Catalyst Replacement Costs	544,491	
Electricity Cost	17,722	
Aqueous Ammonia Cost	119,092	
Subtotal Raw Materials and Utilities	136,815	

Total Catalyst Replacement Cost x Capital Recovery Factor (CRF)

$$CFR = [i \times (1 + i)^n] / [(1+i)^n - 1]$$

i = annual pretax marginal rate of return on private investment = 9.55% (0.0955) for TEC  
n = frequency of catalyst replacement = 5 years (Engelhard estimate)

$$CFR = [0.0955 \times (1 + 0.0955)^5] / [(1 + 0.0955)^5 - 1] = 0.2608$$

Annualized Catalyst Replacement Cost = \$2,088,000 x 0.2608 = \$544,491

Power for NH<sub>3</sub> Fan and Pump + Power to Vaporize Liquid NH<sub>3</sub>

Power for NH<sub>3</sub> Fan and Pump = 5 kW x \$0.040 kWh x 5,256 hrs/yr = \$1,051  
Power to Vaporize Liquid NH<sub>3</sub> = 2 kW per lb NH<sub>3</sub>  
= [(2 kW) x (0.28 lb NH<sub>3</sub> / lb NH<sub>3, aq.</sub>) x (141.6 lb NH<sub>3, aq.</sub>/hr)] x \$0.040 kWh x 5,256 hrs/yr  
= \$16,671  
Electricity Cost = \$1,051 + \$16,671 = \$17,722

Aqueous NH<sub>3</sub> = \$320/ton; 28 weight % NH<sub>3</sub> solution; 1:1 molar ratio of NH<sub>3</sub> to NO<sub>x</sub>  
NO<sub>x</sub> = 90% NO + 10% NO<sub>2</sub>, by volume; SCR Control Efficiency = 70.83 %  
Molecular Weight (MW) NO = 30 lb/mole; MW NO<sub>2</sub> = 46 lb/mole  
MW NO<sub>x</sub> = (.9 x 30) + (.1 x 46) = 31.6 lb NO<sub>x</sub> / mole NO<sub>x</sub>  
NO<sub>x</sub> Controlled = 73.7 lb/hr

Aqueous NH<sub>3</sub> Usage = (NO<sub>x</sub> lb/hr) x (1 mole NH<sub>3</sub> / 1 mole NO<sub>x</sub>) x (17 lb NH<sub>3</sub> / mole NH<sub>3</sub>)  
x (mole NO<sub>x</sub> / 31.6 lb NO<sub>x</sub>) x (100 lb NH<sub>3, aq.</sub> / 28 lb NH<sub>3</sub>) x (5,256 hrs/yr) x (1 ton/2,000 lb)  
= (73.7) x (1/1) x (17) x (1/31.6) x (100/28) x (5,256) x (1/2,000) = 372.2 ton/yr

Aqueous NH<sub>3</sub> Cost = 372.2 ton/yr x \$320/ton = \$119,092

Electricity Cost + Aqueous Ammonia Cost  
Subtotal Raw Materials and Utilities = \$17,722 + \$119,092 = \$136,815



Attachment C-2. Polk Power Station Simple Cycle CTGs - Basis for SCR Annual Operating Costs (Page 3 of 4)

Item	(\$)	OAQPS Factor	Basis
<b>Energy Penalties</b>			
<u>Turbine Backpressure</u>	<u>208,138</u>		<p>Turbine Backpressure Penalty = 0.2% per 1.0 inch H<sub>2</sub>O backpressure (GE)                      Turbine Backpressure = 3.0 inch H<sub>2</sub>O (Engelhard); CT Power Output = 165,000 kW                      Power Cost = \$0.040 kW; Annual Hours = 5,256 hrs/yr</p> <p>Turbine Backpressure Penalty = (3.0) x (0.2/100) x (165,000 kW) x (5,256 hrs/yr) x (\$0.040/kWh)                      Turbine Backpressure Penalty = \$208,138</p>
<u>Subtotal Direct Costs</u>	<u>912,209</u>		<p>Subtotal Direct Costs = Subtotal Labor and Materials + Annualized Catalyst Replacemen Cost + Subtotal Raw Materials and Utilities + Turbine Backpressure</p> <p>Subtotal Direct Costs = \$22,765 + \$544,491 + \$136,815 + \$208,138                      Subtotal Direct Costs = \$912,209</p>
<b>B. Indirect Costs</b>			
<u>Overhead</u>	<u>13,659</u>	0.60 x C	<p>Subtotal Labor and Materials x OAQPS Overhead Cost Factor                      Overhead = \$22,765 x 0.60 = \$13,659</p>
<u>Administrative Charges</u>	<u>144,219</u>	0.02 x TCI	<p>Total Capital Investment x OAQPS Administrative Charges Factor                      Administrative Charges = \$7,210,949 x 0.02 = \$144,219</p>
<u>Property Taxes</u>	<u>72,110</u>	0.01 x TCI	<p>Total Capital Investment x OAQPS Property Tax Factor                      Property Taxes = \$7,210,949 x 0.01 = \$72,110</p>
<u>Insurance</u>	<u>72,110</u>	0.01 x TCI	<p>Total Capital Investment x OAQPS Insurance Factor                      Insurance = \$7,210,949 x 0.01 = \$72,110</p>

Attachment C-2. Polk Power Station Simple Cycle CTGs - Basis for SCR Annual Operating Costs (Page 4 of 4)

Item	OAQPS Factor	Basis
Capital Recovery	667,855	

$$\text{Capital Recovery} = (\text{TCI} - \text{Initial Catalyst Cost}) \times \text{CRF}$$

$$\text{TCI} = \$7,210,949; \text{Initial Catalyst Cost} = \$1,998,000$$

$$\text{CRF} = [i \times (1 + i)^n] / [(1 + i)^n - 1]$$

$$i = \text{annual pretax marginal rate of return on private investment} = 9.55\% (0.0955) \text{ for TEC}$$

$$n = \text{control system life} = 15 \text{ years}$$

$$\text{CRF} = [0.0955 \times (1 + 0.0955)^{15}] / [(1 + 0.0955)^{15} - 1] = 0.1281$$

$$\text{Capital Recovery} = (\$7,210,949 - \$1,998,000) \times 0.1281 = \$667,855$$

Subtotal Indirect Costs	969,952	
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$$\text{Subtotal Indirect Costs} = \text{Overhead} + \text{Administrative Charges} + \text{Property Taxes} + \text{Insurance} + \text{Capital Recovery}$$

$$\text{Subtotal Indirect Costs} = \$13,659 + \$144,219 + \$72,110 + \$72,110 + \$667,855$$

$$\text{Subtotal Direct Costs} = \$969,952$$

Total Annual Cost	1,882,161	
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$$\text{Total Annual Cost} = \text{Subtotal Direct Costs} + \text{Subtotal Indirect Costs}$$

$$\text{Total Annual Cost} = \$912,209 + \$969,952$$

$$\text{Total Annual Cost} = \$1,882,161$$

Cost Effectiveness	9,717	
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$$\text{Cost Effectiveness} = \text{Total Annual Cost} / \text{tons NO}_x \text{ Controlled}$$

$$\text{Tons NO}_x \text{ Controlled (Per CTG)} = 193.7$$

$$\text{Tons NO}_x \text{ Controlled (Two CTGs)} = 2 \times 193.7 = 387.4$$

$$\text{Total Annual Cost (Per CTG)} = \$1,882,161$$

$$\text{Total Annual Cost (Two CTGs)} = 2 \times \$1,882,161 = \$3,764,322$$

$$\text{Cost Effectiveness} = \$3,764,322 / 387.4 \text{ tons} = \$9,717$$

**ATTACHMENT D—**  
**EMISSION RATE CALCULATIONS**

**Table 1. TEC Polk Power Station, CT-2 and CT-3  
CT Operating Scenarios - General Electric 7241FA CT**

Case	Ambient Temperature (oF)	Load (%)	CT-2	CT-3	Natural Gas Firing	Fuel Oil Firing
1	20	100	X	X	X	X
2	20	75	X	X	X	X
3	20	50	X	X	X	X
4	59	100	X	X	X	X
5	59	75	X	X	X	X
6	59	50	X	X	X	X
7	90	100	X	X	X	X
8	90	75	X	X	X	X
9	90	50	X	X	X	X

Sources: TEC, 1999.  
ECT, 1999.

**Table 2. TEC Polk Power Station, CT-2 and CT-3  
CT Hourly Emission Rates - General Electric 7241FA CT (Per CT)  
Natural Gas-Firing**

Temp. (°F)	Case	Load (%)	PM/PM <sub>10</sub> <sup>1</sup>		SO <sub>2</sub> <sup>2</sup>		H <sub>2</sub> SO <sub>4</sub> <sup>3</sup>	
			(lb/hr)	(g/sec)	(lb/hr)	(g/sec)	(lb/hr)	(g/sec)
20	1	100	10.1	1.28	9.8	1.24	1.1	0.14
	2	75	9.9	1.25	7.9	0.99	0.9	0.11
	3	50	9.7	1.23	6.3	0.79	0.7	0.09
59	4	100	10.1	1.27	9.2	1.16	1.1	0.13
	5	75	9.9	1.24	7.5	0.94	0.9	0.11
	6	50	9.7	1.22	6.0	0.75	0.7	0.09
90	7	100	10.0	1.26	8.5	1.07	1.0	0.12
	8	75	9.8	1.23	6.9	0.87	0.8	0.10
	9	50	9.6	1.22	5.6	0.71	0.6	0.08
<b>Maximums</b>			<b>10.1</b>	<b>1.28</b>	<b>9.8</b>	<b>1.24</b>	<b>1.1</b>	<b>0.14</b>

Temp. (°F)	Case	Load (%)	NO <sub>x</sub>			CO			VOC <sup>5</sup>		
			(ppmvd) <sup>4</sup>	(lb/hr)	(g/sec)	(ppmvd) <sup>4</sup>	(lb/hr)	(g/sec)	(ppmvd) <sup>4</sup>	(lb/hr)	(g/sec)
20	1	100	10.5	73.5	9.26	12.1	51.0	6.43	6.1	15.0	1.89
	2	75	10.5	58.3	7.35	12.2	41.0	5.17	6.1	12.0	1.51
	3	50	10.5	45.5	5.73	12.7	34.0	4.28	6.4	10.0	1.26
59	4	100	10.5	68.8	8.67	12.0	48.0	6.05	6.1	14.0	1.76
	5	75	10.5	54.8	6.91	12.2	39.0	4.91	6.2	11.0	1.39
	6	50	10.5	43.2	5.44	12.8	32.0	4.03	6.5	9.0	1.13
90	7	100	10.5	63.0	7.94	11.9	43.0	5.42	6.2	13.0	1.64
	8	75	10.5	51.3	6.47	12.1	36.0	4.54	6.3	11.0	1.39
	9	50	10.5	40.8	5.15	12.8	30.0	3.78	6.7	9.0	1.13
<b>Maximums</b>			<b>10.5</b>	<b>73.5</b>	<b>9.26</b>	<b>12.8</b>	<b>51.0</b>	<b>6.43</b>	<b>6.7</b>	<b>15.0</b>	<b>1.89</b>

<sup>1</sup> Includes sulfuric acid mist.

<sup>2</sup> Based on natural gas sulfur content of 2.0 gr/100 ft<sup>3</sup>.

<sup>3</sup> Based on 7.5% conversion of SO<sub>2</sub> to H<sub>2</sub>SO<sub>4</sub>.

<sup>4</sup> Corrected to 15% O<sub>2</sub>.

<sup>5</sup> Non-methane hydrocarbons (NMHC) expressed as methane.

Sources: ECT, 1999.  
GE, 1998.

**Table 3. TEC Polk Power Station Unit, CT-2 and CT-3  
 CT Hourly Emission Rates - General Electric 7241FA CT (Per CT)  
 Distillate Fuel Oil-Firing**

Temp. (°F)	Case	Load (%)	PM/PM <sub>10</sub> <sup>1</sup>		SO <sub>2</sub> <sup>2</sup>		H <sub>2</sub> SO <sub>4</sub> <sup>3</sup>	
			(lb/hr)	(g/sec)	(lb/hr)	(g/sec)	(lb/hr)	(g/sec)
20	1	100	27.0	3.40	104.1	13.12	12.0	1.51
	2	75	20.7	2.61	84.5	10.64	9.7	1.22
	3	50	17.6	2.21	65.9	8.30	7.6	0.95
59	4	100	25.3	3.18	98.1	12.36	11.3	1.42
	5	75	20.2	2.54	79.7	10.05	9.2	1.15
	6	50	16.2	2.04	62.7	7.90	7.2	0.91
90	7	100	23.2	2.93	89.2	11.24	10.2	1.29
	8	75	19.4	2.44	73.1	9.20	8.4	1.06
	9	50	15.6	1.97	57.8	7.28	6.6	0.84
<b>Maximums</b>			<b>27.0</b>	<b>3.40</b>	<b>104.1</b>	<b>13.12</b>	<b>12.0</b>	<b>1.51</b>

Temp. (°F)	Case	Load (%)	NO <sub>x</sub>			CO			VOC <sup>5</sup>		
			(ppmvd) <sup>4</sup>	(lb/hr)	(g/sec)	(ppmvd) <sup>4</sup>	(lb/hr)	(g/sec)	(ppmvd) <sup>4</sup>	(lb/hr)	(g/sec)
20	1	100	42.0	338.0	42.59	23.1	113.0	14.24	5.5	15.0	1.89
	2	75	42.0	272.0	34.27	21.4	84.0	10.58	5.1	11.0	1.39
	3	50	42.0	210.0	26.46	23.4	71.0	8.95	5.5	10.0	1.26
59	4	100	42.0	319.0	40.19	23.0	106.0	13.36	5.5	14.0	1.76
	5	75	42.0	257.0	32.38	21.9	81.0	10.21	5.2	11.0	1.39
	6	50	42.0	200.0	25.20	24.2	70.0	8.82	5.7	9.0	1.13
90	7	100	42.0	290.0	36.54	23.0	97.0	12.22	5.6	13.0	1.64
	8	75	42.0	235.0	29.61	22.7	77.0	9.70	5.5	11.0	1.39
	9	50	42.0	184.0	23.18	25.2	67.0	8.44	6.0	9.0	1.13
<b>Maximums</b>			<b>42.0</b>	<b>338.0</b>	<b>42.59</b>	<b>25.2</b>	<b>113.0</b>	<b>14.24</b>	<b>6.0</b>	<b>15.0</b>	<b>1.89</b>

<sup>1</sup> Includes sulfuric acid mist.

<sup>2</sup> Based on fuel oil sulfur content of 0.05 wt percent.

<sup>3</sup> Based on 7.5% conversion of SO<sub>2</sub> to H<sub>2</sub>SO<sub>4</sub>.

<sup>4</sup> Corrected to 15% O<sub>2</sub>.

<sup>5</sup> Non-methane hydrocarbons (NMHC) expressed as methane.

Sources: ECT, 1999.

GE, 1998.

**Table 4. TEC Polk Power Station Unit, CT-2 and CT-3  
 CT Emission Rates - General Electric 7241FA CT (Per CT)  
 Natural Gas-Firing: Noncriteria Pollutants**

Maximum Hourly Heat Input: (Case 1)	1,984	10 <sup>6</sup> Btu/hr
Average Hourly Heat Input: (Case 4)	1,772	10 <sup>6</sup> Btu/hr
Maximum Annual Hours:	4,380	hrs/yr

Pollutant	Emission Factor (lb/10 <sup>6</sup> Btu)	Emission Factor Reference	Emission Rates	
			(lb/hr)	(ton/yr)
Benzene	1.40E-06	1	2.78E-03	5.43E-03
Dioxins/Furans	1.20E-12	2	2.38E-09	4.66E-09
Formaldehyde	2.90E-05	1	5.75E-02	1.13E-01
Mercury	7.80E-10	3	1.55E-06	3.03E-06
Naphthalene	6.70E-07	1	1.33E-03	2.60E-03
Polycyclic Organic Matter	5.00E-08	1	9.92E-05	1.94E-04
Toluene	1.02E-05	1	2.02E-02	3.96E-02

Emission Factor References:

- 1 - EPA Electric Utility Hazardous Air Pollutant Study, Final Report, Table A-6, February 1998.
- 2 - EPRI Synthesis Report, November 1994.
- 3 - Florida Coordinating Group (FCG), 1995.

Source: ECT, 1999.

**Table 5. TEC Polk Power Station Unit, CT-2 and CT-3  
CT Emission Rates - General Electric 7241FA CT (Per CT)  
Distillate Fuel Oil-Firing: Noncriteria Pollutants**

Maximum Hourly Heat Input: (Case 1)	2,066	10 <sup>6</sup> Btu/hr
Average Hourly Heat Input: (Case 4)	1,947	10 <sup>6</sup> Btu/hr
Maximum Annual Hours:	876	hrs/yr

Pollutant	Emission Factor (lb/10 <sup>6</sup> Btu)	Emission Factor Reference	Emission Rates	
			(lb/hr)	(ton/yr)
Acetaldehyde	8.20E-06	1	1.69E-02	6.99E-03
Antimony	2.20E-05	2	4.55E-02	1.88E-02
Arsenic	4.90E-06	2	1.01E-02	4.18E-03
Benzene	1.40E-06	1	2.89E-03	1.19E-03
Beryllium	3.30E-07	2	6.82E-04	2.81E-04
Cadmium	4.20E-06	2	8.68E-03	3.58E-03
Chromium	4.70E-05	2	9.71E-02	4.01E-02
Cobalt	9.10E-06	2	1.88E-02	7.76E-03
Dioxins/Furans	1.15E-10	1	2.38E-07	9.81E-08
Ethylbenzene	4.90E-07	1	1.01E-03	4.18E-04
Formaldehyde	3.00E-05	1	6.20E-02	2.56E-02
Hydrogen Chloride	2.48E-03	3	5.12E+00	2.11E+00
Hydrogen Fluoride	2.66E-04	3	5.50E-01	2.27E-01
Lead	5.80E-05	2	1.20E-01	4.95E-02
Manganese	3.40E-04	2	7.02E-01	2.90E-01
Methyl Chloroform	7.60E-06	1	1.57E-02	6.48E-03
Methylene Chloride	3.23E-05	1	6.66E-02	2.75E-02
Mercury	9.10E-07	2	1.88E-03	7.76E-04
Naphthalene	3.40E-07	1	7.02E-04	2.90E-04
Nickel	1.20E-03	2	2.48E+00	1.02E+00
Phenol	2.43E-05	1	5.02E-02	2.07E-02
Phosphorus	3.00E-04	2	6.20E-01	2.56E-01
Polycyclic Organic Matter	6.74E-07	1	1.39E-03	5.75E-04
Selenium	5.30E-06	2	1.09E-02	4.52E-03
Tetrachloroethylene	5.50E-07	2	1.14E-03	4.69E-04
Toluene	8.00E-06	1	1.65E-02	6.82E-03
Vinyl Acetate	5.15E-06	1	1.06E-02	4.39E-03
Xylenes	2.19E-06	1	4.52E-03	1.87E-03

Emission Factor References:

- 1 - EPA Electric Utility Hazardous Air Pollutant Study, Final Report, Table A-5, February 1998.
- 2 - EPA AP-42 Emission Factors, Table 3.1-4., October 1996.
- 3 - EPA AP-42 Emission Factors, Table 1.3-10., October 1996.

Source: ECT, 1999.



**Table 6. TEC Polk Power Station, CT-2 and CT-3  
CT Annual Emission Rates**

Source	Case	Annual Operations (hrs/yr)	Emission Rates					
			NO <sub>x</sub>		CO		VOC	
			(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
CT-2	4 - NG	4,380	68.8	150.7	48.0	105.1	14.0	30.7
CT-3	4 - NG	4,380	68.8	150.7	48.0	105.1	14.0	30.7
CT-2	4 - Oil	876	319.0	139.7	106.0	46.4	14.0	6.1
CT-3	4 - Oil	876	319.0	139.7	106.0	46.4	14.0	6.1
		<b>Totals</b>	<b>N/A</b>	<b>580.9</b>	<b>N/A</b>	<b>303.1</b>	<b>N/A</b>	<b>73.6</b>

Source	Case	Annual Operations (hrs/yr)	Emission Rates					
			PM/PM <sub>10</sub>		SO <sub>2</sub>		H <sub>2</sub> SO <sub>4</sub>	
			(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
CT-2	4 - NG	4,380	10.1	22.0	9.2	20.2	1.06	2.3
CT-3	4 - NG	4,380	10.1	22.0	9.2	20.2	1.06	2.3
CT-2	4 - Oil	876	25.3	11.1	98.1	43.0	11.27	4.9
CT-3	4 - Oil	876	25.3	11.1	98.1	43.0	11.27	4.9
		<b>Totals</b>	<b>N/A</b>	<b>66.2</b>	<b>N/A</b>	<b>126.3</b>	<b>N/A</b>	<b>14.5</b>

1. CT-2 and CT-3 operating with natural gas-firing at a 50% capacity factor; 4,380 hours/year at base load (Case 4)
2. CT-2 and CT-3 operating with fuel oil-firing at a 10% capacity factor; 876 hours/year at base load (Case 4).
3. SO<sub>2</sub> and H<sub>2</sub>SO<sub>4</sub> rates based on natural gas sulfur content of 2.0 gr/100 ft<sup>3</sup> and 7.5% conversion of SO<sub>2</sub> to H<sub>2</sub>SO<sub>4</sub>
4. SO<sub>2</sub> and H<sub>2</sub>SO<sub>4</sub> rates based on fuel oil sulfur content of 0.05 wt. percent and 7.5% conversion of SO<sub>2</sub> to H<sub>2</sub>SO<sub>4</sub>.

Sources: GE, 1998.  
ECT, 1999.  
TEC, 1999.

**Table 7. TEC Polk Power Station, CT-2 and CT-3  
 General Electric 7241FA CT  
 NSPS GG NO<sub>x</sub> Limits**

Fuel	7241FA Gas Turbine ISO Heat Rate		F	NO <sub>x</sub> Std (ppmvd)
	(Btu/kw-hr)	(kj/w-hr)		
Gas	9,370	9.886	0.0	109.2
Distillate	10,040	10.593	0.0	102.0

Sources: ECT, 1999.  
 GE, 1998.

**Table 8.A. TEC Polk Power Station, CT-2 and CT-3  
 CT Exhaust Data - General Electric 7241FA CT (Per CT)  
 Natural Gas-Firing**

**A. Exhaust MW**

Component	MW (lb/mole) Case	Exhaust Gas Composition - Volume %								
		100 % Load			75 % Load			50 % Load		
		20 °F	59 °F	90 °F	20 °F	59 °F	90 °F	20 °F	59 °F	90 °F
		1	4	7	2	5	8	3	6	9
Ar	39.944	0.90	0.89	0.87	0.91	0.88	0.87	0.90	0.89	0.86
N <sub>2</sub>	28.016	75.06	74.38	72.32	75.07	74.43	72.37	75.18	74.54	72.50
O <sub>2</sub>	32.000	12.56	12.38	11.96	12.59	12.52	12.10	12.90	12.85	12.48
CO <sub>2</sub>	44.010	3.87	3.87	3.80	3.85	3.80	3.73	3.71	3.65	3.56
H <sub>2</sub> O	17.008	7.61	8.49	11.06	7.59	8.37	10.93	7.31	8.07	10.60
SO <sub>2</sub>	64.066	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO	28.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HC (CH <sub>4</sub> )	16.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO	30.008	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals		100.00	100.01	100.01	100.01	100.00	100.00	100.00	100.00	100.00
Exhaust MW (lb/mole)		28.41	28.30	27.99	28.41	28.31	28.00	28.43	28.33	28.02
Exhaust Flow (lb/sec)		1,048.89	977.22	906.39	836.11	798.33	748.61	686.94	662.22	628.33
Exhaust Temp. (°F)		1,081	1,117	1,141	1,111	1,139	1,166	1,160	1,184	1,200
(K)		856	876	889	873	888	903	900	913	922
Exhaust O <sub>2</sub> (Vol %, Dry)		13.59	13.53	13.45	13.62	13.66	13.58	13.92	13.98	13.96

Sources: ECT, 1999.  
 GE, 1998.

**Table 8.B. TEC Polk Power Station, CT-2 and CT-3  
 CT Exhaust Data - General Electric 7241FA CT (Per CT)  
 Natural Gas-Firing**

**B. Exhaust Flow Rates**

	Flow Rates (ft <sup>3</sup> /min)								
	100 % Load			75 % Load			50 % Load		
	20 °F	59 °F	90 °F	20 °F	59 °F	90 °F	20 °F	59 °F	90 °F
Case	1	4	7	2	5	8	3	6	9
ACFM	2,491,429	2,384,051	2,270,019	2,024,406	1,974,549	1,903,746	1,714,105	1,682,606	1,629,943
Velocity (fps)	63.3	60.5	57.6	51.4	50.1	48.3	43.5	42.7	41.4
Velocity (m/s)	19.3	18.4	17.6	15.7	15.3	14.7	13.3	13.0	12.6
SCFM, Dry'	788,670	730,443	665,839	628,745	597,436	550,622	517,832	496,789	463,485
ACFM (15% O <sub>2</sub> , Dry)	2,849,980	2,725,734	2,550,293	2,307,030	2,219,082	2,102,390	1,880,347	1,814,753	1,714,092

Sources: ECT, 1999.  
 GE, 1998.

**Table 9.A. TEC Polk Power Station, CT-2 and CT-3  
CT Exhaust Data - General Electric 7241FA CT (Per CT)  
Distillate Fuel Oil-Firing**

**A. Exhaust MW**

		Exhaust Gas Composition - Volume %								
Component	MW (lb/mole)	100 % Load			75 % Load			50 % Load		
		20 °F	59 °F	90 °F	20 °F	59 °F	90 °F	20 °F	59 °F	90 °F
	Case	1	4	7	2	5	8	3	6	9
Ar	39.944	0.87	0.85	0.85	0.85	0.86	0.85	0.87	0.87	0.85
N <sub>2</sub>	28.016	71.82	71.31	70.02	71.53	71.26	70.24	72.47	72.21	71.08
O <sub>2</sub>	32.000	11.17	11.04	10.85	10.49	10.63	10.77	11.37	11.59	11.69
CO <sub>2</sub>	44.010	5.61	5.61	5.50	6.02	5.88	5.59	5.60	5.40	5.12
H <sub>2</sub> O	17.008	10.54	11.19	12.79	11.11	11.37	12.56	9.70	9.94	11.27
SO <sub>2</sub>	64.066	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO	28.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HC (CH <sub>4</sub> )	16.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NO	30.008	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Totals	100.01	100.00	100.01	100.00	100.00	100.01	100.01	100.01	100.01
Exhaust MW (lb/mole)		28.30	28.22	28.02	28.28	28.23	28.06	28.40	28.35	28.16
Exhaust Flow (lb/sec)		1,081.67	1,017.22	937.50	808.61	781.11	748.06	675.00	665.28	643.33
Exhaust Temp. (°F)		1,067	1,098	1,130	1,184	1,195	1,200	1,200	1,200	1,200
(K)		848	865	883	913	919	922	922	922	922
Exhaust O <sub>2</sub> (Vol %, Dry)		12.49	12.43	12.44	11.80	11.99	12.32	12.59	12.87	13.17

Sources: ECT, 1999.

GE, 1998.

**Table 9.B. TEC Polk Power Station, CT-2 and CT-3  
 CT Exhaust Data - General Electric 7241FA CT (Per CT)  
 Distillate Fuel Oil-Firing**

**B. Exhaust Flow Rates**

	Flow Rates (ft <sup>3</sup> /min)								
	100 % Load			75 % Load			50 % Load		
	20 °F	59 °F	90 °F	20 °F	59 °F	90 °F	20 °F	59 °F	90 °F
Case	1	4	7	2	5	8	3	6	9
ACFM	2,555,005	2,458,676	2,328,904	2,058,509	2,004,944	1,937,579	1,727,258	1,705,360	1,660,210
Velocity (fps)	64.9	62.4	59.1	52.3	50.9	49.2	43.9	43.3	42.2
Velocity (m/s)	19.8	19.0	18.0	15.9	15.5	15.0	13.4	13.2	12.8
SCFM, Dry'	790,343	739,996	674,458	587,676	566,916	538,884	496,102	488,511	468,554
ACFM (15% O <sub>2</sub> , Dry)	3,259,640	3,134,307	2,911,876	2,821,905	2,682,434	2,464,653	2,196,457	2,090,523	1,928,817

Sources: ECT, 1999.  
 GE, 1998.

**Table 10. TEC Polk Power Station, CT-2 and CT-3  
CT Fuel Flow Rate Data - General Electric 7241FA CT (Per CT)**

**A. Natural Gas-Firing**

	100 % Load			75 % Load			50 % Load		
	20 °F	59 °F	90 °F	20 °F	59 °F	90 °F	20 °F	59 °F	90 °F
Case	1	4	7	2	5	8	3	6	9
Heat Input - HHV (MMBtu/hr)	1,894	1,772	1,631	1,519	1,437	1,336	1,213	1,153	1,078
Fuel Rate (lb/hr)	81,662	76,400	70,320	65,503	61,936	57,608	52,289	49,708	46,486
Fuel Rate (lb/sec)	22.684	21.222	19.533	18.195	17.205	16.002	14.525	13.808	12.913

**B. Distillate Fuel Oil-Firing**

	100 % Load			75 % Load			50 % Load		
	20 °F	59 °F	90 °F	20 °F	59 °F	90 °F	20 °F	59 °F	90 °F
Case	1	4	7	2	5	8	3	6	9
Heat Input - HHV (MMBtu/hr)	2,066	1,947	1,770	1,677	1,582	1,450	1,307	1,245	1,147
Fuel Rate (lb/hr)	104,120	98,098	89,213	84,481	79,727	73,055	65,874	62,727	57,809
Fuel Rate (lb/sec)	28.922	27.250	24.781	23.467	22.146	20.293	18.298	17.424	16.058

Sources: ECT, 1999.  
GE, 1998.

**ATTACHMENT E—  
DISPERSION MODELING FILES**





RECEIVED

FEB 25 1999

BUREAU OF AIR REGULATION

February 5, 1999

Mr. Clair Fancy  
Florida Department of Environmental Protection  
Bureau of Air Regulation  
111 Magnolia Drive, Suite 4  
Tallahassee, Florida 32301

Via FedEx  
Airbill No. 809689309646

Re: **Tampa Electric Company**  
~~Big Bend Station Units 1 and 2~~ *Polk Power Station*  
~~Flue Gas Desulfurization (FGD) System~~ *Two Simple Cycle Turbines*  
**Construction Permit Application**

Dear Mr. Fancy:

Please find enclosed four (4) signed and sealed copies, including the Electronic Submission of Application (ELSA), of Tampa Electric Company's (TEC) permit application to construct two new simple-cycle combustion turbines at the Polk Power Station site. A check for \$7,500.00 to the Florida Department of Environmental Protection is enclosed to cover the processing fee per 62-4.050(4)(a)1.

TEC appreciates your timely review and processing of this construction permit application. If you should have any questions, please feel free to call me at (813) 641-5033.

Sincerely,

James Hunter  
Administrator - Air Programs  
Environmental Planning

EP\gm\jjh897

Enclosures

c: **A.A. Linero, FDEP - Tallahassee**  
**R.D. Garrity, Ph.D., FDEP-Tampa**



TAMPA ELECTRIC

July 16, 1999

Mr. A. A. Linero, P.E.  
Florida Department of Environmental Protection  
111 South Magnolia Drive, Suite 4  
Tallahassee, Florida 32301

RECEIVED

JUL 19 1999

BUREAU OF AIR REGULATION

Via FedEx  
Airbill No. 8132 1667 8022

**Re: Tampa Electric Company (TEC)  
Polk Power Station – CTG's 2 and 3  
Proof of Publication of the Intent to Issue  
FDEP File No. PSD-FL-263 (PA92-32SA)**

Dear Mr. Linero:

Please find enclosed a copy the proof of publication of the "Notice of Intent to Issue PSD Permit" to Tampa Electric Company for the construction of two combustion turbine-electrical generators. This notice was published in the legal section of the Lakeland Ledger on Saturday, July 10, 1999. Due to time constraints, the attached is a faxed copy provided by the newspaper. A cleaner version will be forwarded when it becomes available.

Although the Public Notice was published as provided by the Department, please note that evaporative inlet coolers are not being used on these units.

Thank you for your attention to this matter. If you have any concerns or questions feel free to contact me at (813) 641-5033.

Sincerely,

Jamie Hunter  
Administrator - Air Programs  
Environmental Planning

EP\gmJJH901

Enclosure

cc: J. Nelson, BAR  
SWD  
B. Owen, PPS

EPA

# AFFIDAVIT OF PUBLICATION

## THE LEDGER Best Available Copy Lakeland, Polk County, Florida

A better copy is coming soon.

Case No .....

Attach Notice Here

STATE OF FLORIDA)  
COUNTY OF POLK)

Before the undersigned authority personally appeared Nelson Kirkland, who on oath says that he is Classified Advertising Manager of The Ledger, a daily newspaper published at Lakeland in Polk County, Florida; that the attached copy of advertisement, being a

Notice of Intent

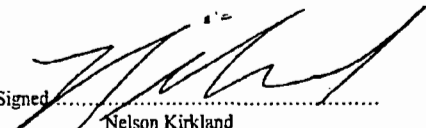
in the matter of DEP File No.: PSD-FL-263

in the

Court, was published in said newspaper in the issues of

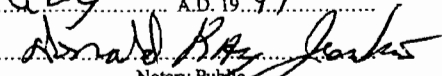
July 10; 1999

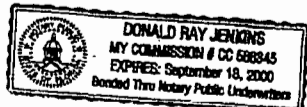
Affiant further says that said The Ledger is a newspaper published at Lakeland, in said Polk County, Florida, and that the said newspaper has heretofore been continuously published in said Polk County, Florida, daily, and has been entered as second class matter at the post office in Lakeland, in said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

Signed   
Nelson Kirkland  
Classified Advertising Manager  
Who is personally known to me.

Sworn to and subscribed before me this 12TH

day of July A.D. 1999

  
Notary Public  
DONALD RAY JENKINS



(Seal)  
My Commission Expires .....

Public Notice of Intent... The Department of Environmental Protection (Department) gives notice of its intent to issue a permit for the construction, installation, operation, and maintenance of a new 115 kV transmission line... The new units will be General Electric... The units must achieve... The maximum emissions... Public hearing... Comments received...

Is your RETURN ADDRESS completed on the reverse side?

**SENDER:**

- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):

1.  Addressee's Address

2.  Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:  
 Gregory M. Nelson, PE  
 Manager, Env. Planning  
 Tampa Electric Co  
 6944 US Hwy North  
 Apollo Beach, FL  
 33572-9200

4a. Article Number  
 Z 031 392 017

4b. Service Type

Registered  Certified

Express Mail  Insured

Return Receipt for Merchandise  COD

7. Date of Delivery  
 10-12-99

5. Received By: (Print Name)  
 Nancy Foley

8. Addressee's Address (Only if requested and fee is paid)

6. Signature: (Addressee or Agent)  
 X

Thank you for using Return Receipt Service.

PS Form 3811, December 1994

102595-98-B-0229 Domestic Return Receipt

Z 031 392 017

US Postal Service  
**Receipt for Certified Mail**  
 No Insurance Coverage Provided.  
 Do not use for International Mail (See reverse)

Sent to	Greg Nelson
Street & Number	Tampa Electric
Post Office, State, & ZIP Code	Apollo Bch FL
Postage	\$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Addressee's Address	
<b>TOTAL Postage &amp; Fees</b>	<b>\$</b>
Postmark or Date	10-8-99
	1050233 P50-FL-263

PS Form 3800, April 1995

Is your RETURN ADDRESS completed on the reverse side?

<b>SENDER:</b> ■ Complete items 1 and/or 2 for additional services. ■ Complete items 3, 4a, and 4b. ■ Print your name and address on the reverse of this form so that we can return this card to you. ■ Attach this form to the front of the mailpiece, or on the back if space does not permit. ■ Write "Return Receipt Requested" on the mailpiece below the article number. ■ The Return Receipt will show to whom the article was delivered and the date delivered.		I also wish to receive the following services (for an extra fee): 1. <input type="checkbox"/> Addressee's Address 2. <input type="checkbox"/> Restricted Delivery Consult postmaster for fee.
3. Article Addressed to: Mr. Gregory M. Nelson, PE Manager Edu. Planning Tampa Elect. Co. 6944 US Hwy 41 North Apollo Beach, FL 33572-9200	4a. Article Number Z 333 618 185	
5. Received By: (Print Name) Angelia Heath		4b. Service Type <input type="checkbox"/> Registered <input checked="" type="checkbox"/> Certified <input type="checkbox"/> Express Mail <input type="checkbox"/> Insured <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> COD
6. Signature: (Addressee or Agent) X		7. Date of Delivery 7-1-99
8. Addressee's Address (Only if requested and fee is paid)		

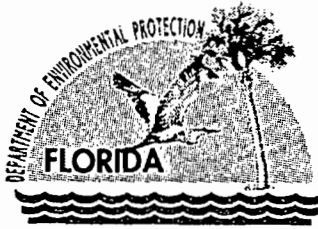
Thank you for using Return Receipt Service.

Z 333 618 185

US Postal Service  
**Receipt for Certified Mail**  
 No Insurance Coverage Provided.  
 Do not use for International Mail (See reverse)

Sent to Gregory Nelson	
Street & Number 7200	
Post Office, State, & ZIP Code Apollo Bch FL	
Postage	\$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	\$
Postmark or Date Polk P.S. 6-29-99 PSP-FI-263	

PS Form 3800, April 1995



# Department of Environmental Protection

Jeb Bush  
Governor

Southwest District  
3804 Coconut Palm Drive  
Tampa, Florida 33619

David B. Struhs  
Secretary

October 13, 2000

Mr. Shannon K. Todd  
Tampa electric Company  
P.O. Box 111  
Tampa, Florida 33601

Re: Tampa Electric Company  
Polk Unit 2 Initial Compliance Testing

*TO  
File*

Dear Mr. Todd:

In response to your letter dated September 25, 2000, the Department is not authorized to grant your request for an extension of the NSPS initial compliance testing lead-time for the natural gas fired test.

In reviewing this request, the Southwest District was unable to locate the notifications required by 40 CFR 60, Section 60.7 (a) (1) through 60.7 (a) (3). Please provide copies of these notifications, or if none were made, provide the date construction commenced and the actual date of initial startup for both fuel oil and natural gas.

I see that the test took place on October 6, 2000. Was this test within the first 60 days of achieving maximum production rate while firing natural gas?

If you have should have any questions, please call me at (813) 744-6100 extension 119.

Sincerely,

W. A. Proses, P.E.  
Air Compliance Supervisor

cc: Mr. Alvaro Linero – FDEP  
Mr. Buck Oven – FDEP  
Mr. Scott Sheplak – FDEP  
Mr. Jerry Kissel – FDEP/SWD

RECEIVED

OCT 18 2000

BUREAU OF AIR REGULATION



To TECO PSD 263 file

RECEIVED

MAR 2 2001

BUREAU OF AIR REGULATION

February 27, 2001

Mr. W.A. Proses  
Florida Department of Environmental Protection  
Southwest District  
3804 Coconut Palm Drive  
Tampa, FL 33619

Via FedEx  
Airbill No. 7919 8438 8990

Re: Tampa Electric Company  
Polk Power Station Unit 3  
Start of Construction Notification

Dear Mr. Proses:

As required by 40 CFR 60.7 and Condition 3 of permit PSD-FL-263, TEC hereby gives notice that construction of Polk Power Station Unit 3 commenced on February 26, 2001.

If you have any questions, please feel free to call me at (813) 641-5125.

Sincerely,

Jamie Hunter  
Consulting Engineer  
Environmental Affairs

EP\gm\JH947

- c: Mr. A. Linero – FDEP
- Mr. H. Oven – FDEP
- Mr. S. Sheplak – FDEP
- Mr. J. Kissel – FDEP SW

1050233





RECEIVED

JAN 29 2001

January 26, 2001

BUREAU OF AIR REGULATION

Mr. A. A. Linero, P.E.  
Florida Department of Environmental Protection  
111 South Magnolia Drive, Suite 4  
Tallahassee, Florida 32301

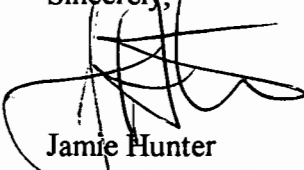
Via FedEx  
Airbill No. 7919 5611 8017

**Re: Tampa Electric Company (TEC)  
Polk Power Station – CTG's 2 and 3  
Manufacturer's Curves  
FDEP File No. PSD-FL-263**

Dear Mr. Linero:

Please find enclosed copies of the manufacturer's curve (one set of curves for natural gas and one set of curves for oil) for correction of the heat input rate to other ambient conditions. This submittal is being made to satisfy the requirement in Condition 8 of the above referenced PSD permit. If you have any concerns or questions feel free to contact me at (813) 641-5033.

Sincerely,



Jamie Hunter  
Consulting Engineer  
Environmental Planning

EPgmJJH943

Enclosures

c: Bill Proses, FDEP – Tampa

# General Electric Model PG7241(FA) Gas Turbine

Estimated Performance - Configuration: DLN Combustor

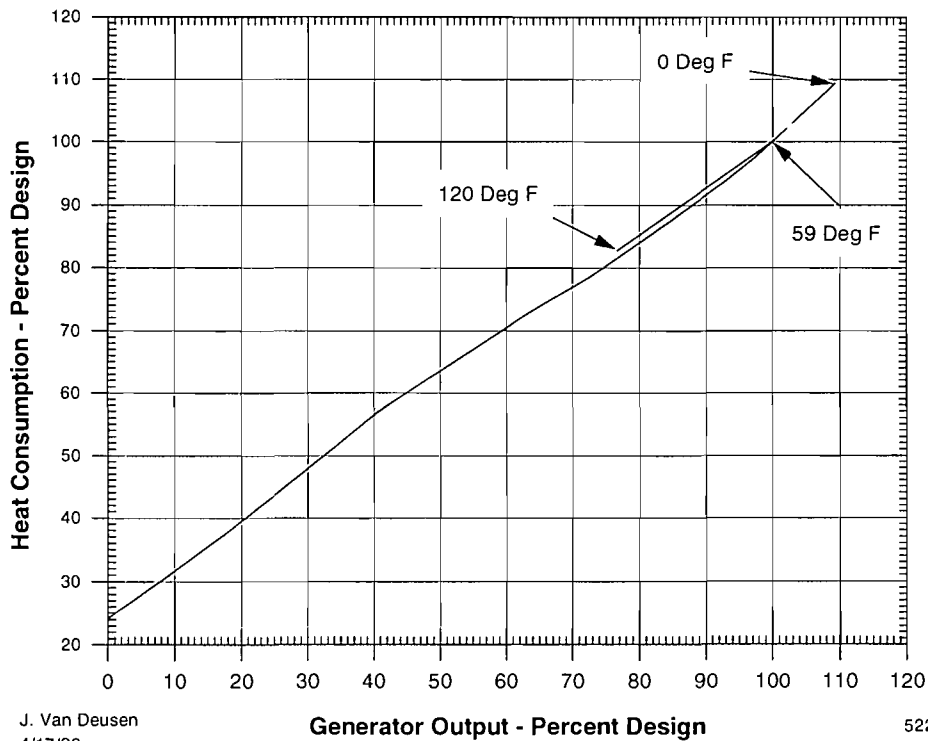
Compressor Inlet Conditions 59 F (15 C), 60% Relative Humidity  
 Atmospheric Pressure 14.7 psia (1.013 bar)

Fuel:	Natural Gas	
Design Output	171700	
Design Heat Rate (LHV)	Btu/kWh (kJ/kWh)	9360 (9870)
Design Heat Cons (LHV)	Btu/h (kJ/h)x10 <sup>6</sup>	1607.1 (1695.2)
Design Exhaust Flow	lb/h (kg/h)x10 <sup>3</sup>	3542.0 (1607)
Exhaust Temperature	deg. F (deg. C)	1116 (602.2)
Load	Base	

**Notes:**

1. Altitude correction on curve 416HA662 Rev A.
2. Ambient temperature correction on curve 522HA852 Rev A.
3. Effect of modulating IGV's on exhaust temperature and flow on curve 522HA853 Rev A.
4. Humidity effects on curve 498HA697 Rev. B - all performance calculated with a constant specific humidity of .0064 or less as not to exceed 100% relative humidity.
5. Plant Performance is measured at the generator terminals and includes allowances for the effects of inlet bleed heating, oxidation power, shaft driven auxiliaries, and 3.04 In H<sub>2</sub>O (6.33 mbar) inlet and 5.5 in H<sub>2</sub>O (13.70 mbar) exhaust pressure drops and a DLN Combustor.
6. Additional inlet and exhaust pressure loss effects:

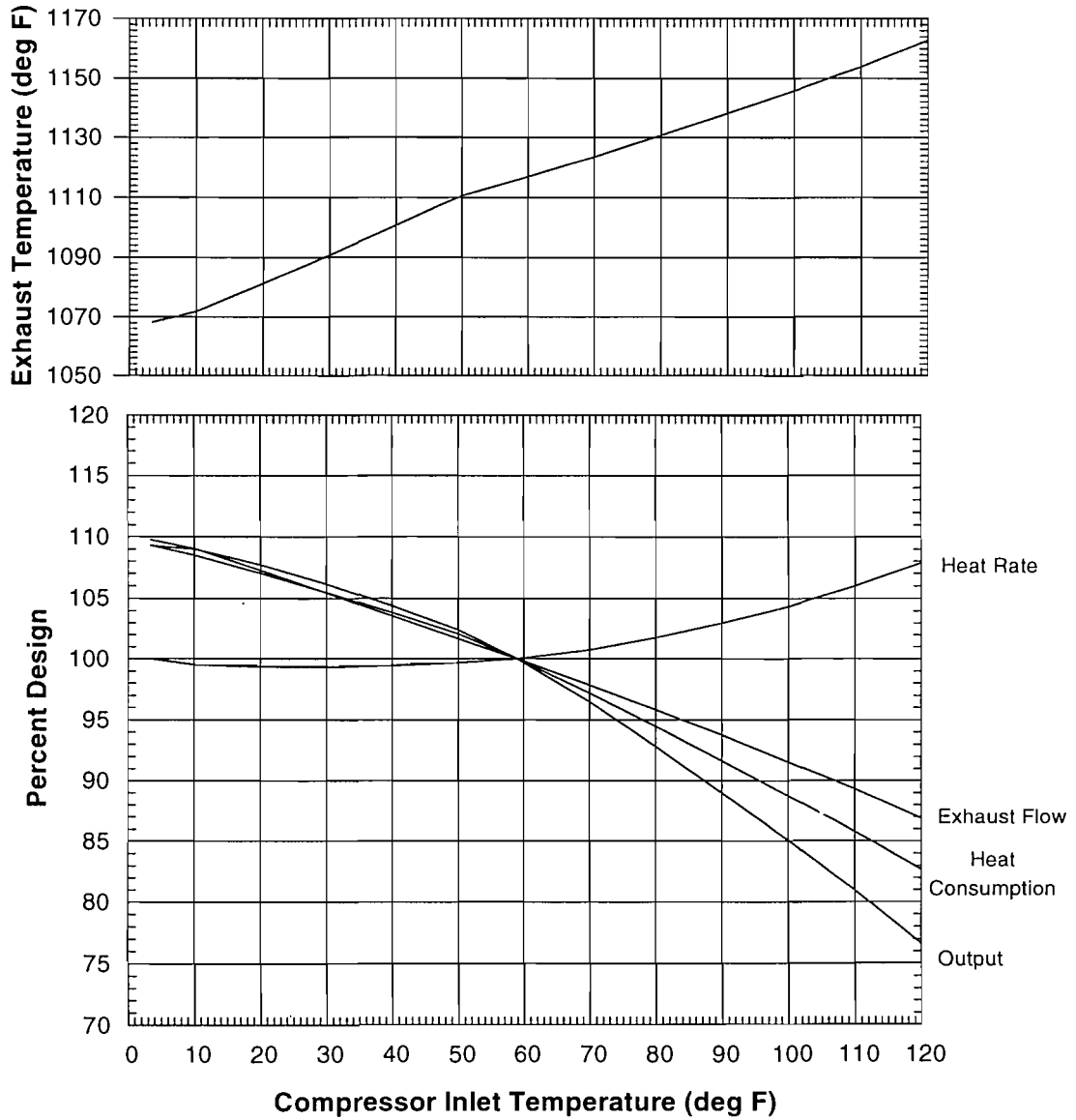
	% Effect on		Effect on
	Output	Heat Rate	Exhaust Temp.
4 in Water (10.0 mbar) inlet	-1.54	0.56	3.0F (1.7C)
4 in Water (10.0 mbar) exhaust	-0.56	0.56	3.0F (1.7C)



# GENERAL ELECTRIC MODEL PG7241(FA) GAS TURBINE

## Effect of Compressor Inlet Temperature on Output, Heat Rate, Heat Consumption, Exhaust Flow And Exhaust Temperature at Baseload

Fuel: Natural Gas  
Design Values on Curve 522HA851 Rev A  
DLN Combustor



## General Electric Model PG7241(FA) Gas Turbine

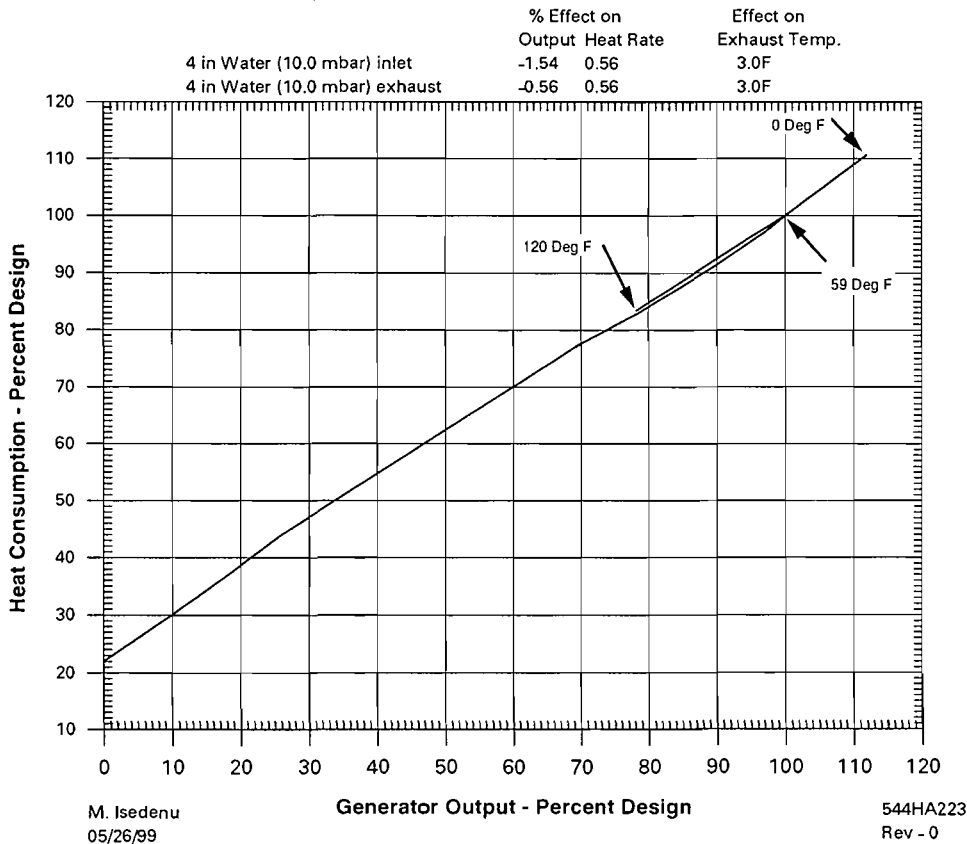
### Estimated Performance - Configuration: Distillate

Compressor Inlet Conditions 59F (15 C), 60% Relative Humidity  
Atmospheric Pressure 14.7 psia (1.013 bar)

Fuel		Distillate Fuel
Design Output	kW	182400
Design Heat Rate (LHV)	Btu (kJ)/kWh	9950 (10500)
Design Heat Cons (LHV)x10 <sup>6</sup>	Btu (kJ)/h	1814.9 (1915.2)
Design Exhaust Flow x 10 <sup>3</sup>	lb (kg)/h	3688 (1673)
Exhaust Temperature	deg. F (deg.C)	1090. (587.8)
MODE:BASE LOAD		

**Notes:**

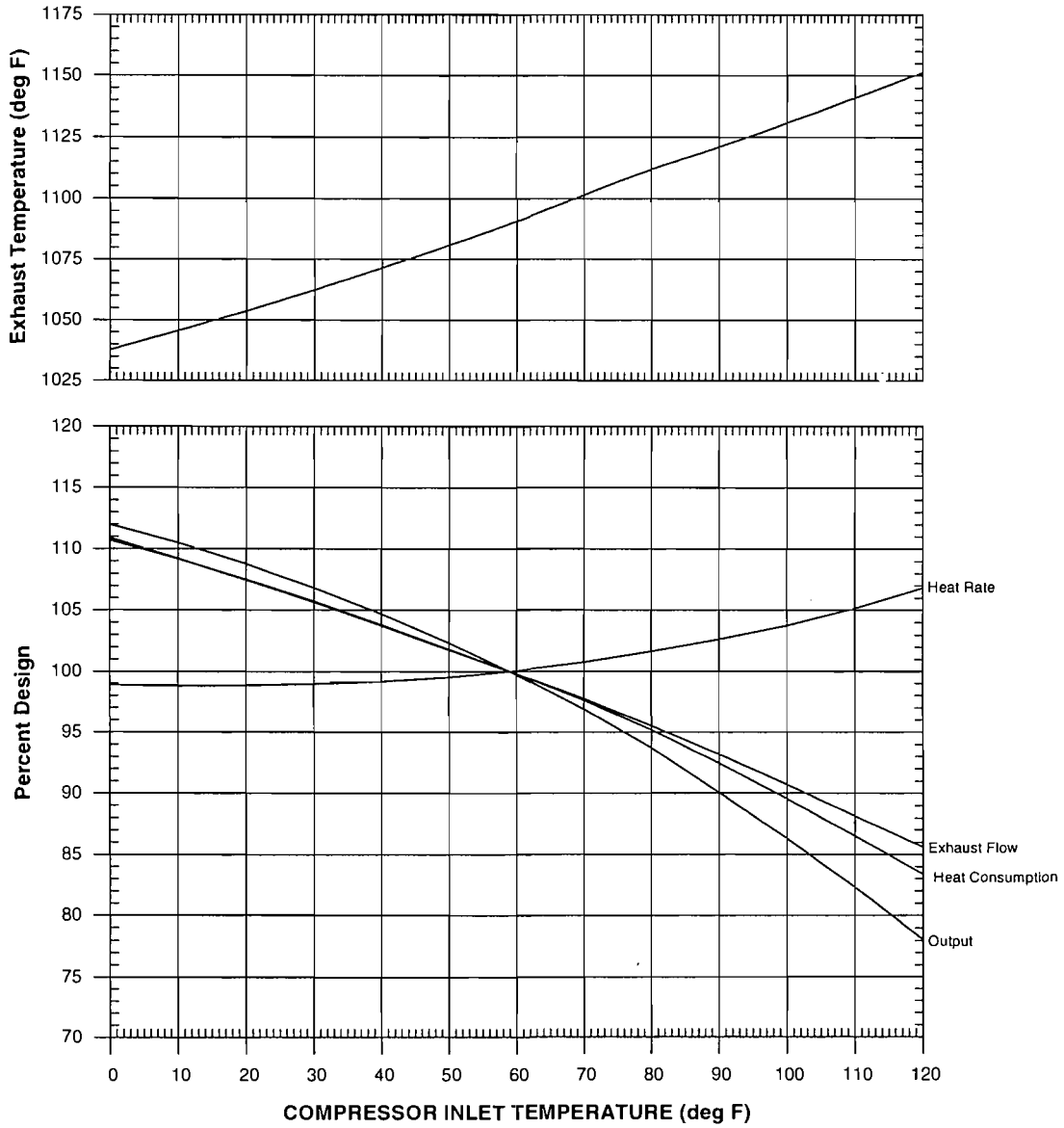
- Altitude correction on curve 416HA662 Rev A.
- Ambient temperature correction on curve 544HA225 Rev 0.
- Effect of modulating IGV's on exhaust temperature and flow on curve 544HA224 Rev 0.
- Humidity effects on curve 498HA697 Rev B - all performance calculated with a constant specific humidity of .0064 or less so as not to exceed 100% relative humidity.
- Plant Performance is measured at the generator terminals and includes allowances for the effects of inlet bleed heating, excitation power, shaft driven auxiliaries, and 3.0 in H<sub>2</sub>O (7.4 mbar) inlet and 5.5 in H<sub>2</sub>O (13.7 mbar) exhaust pressure drops and a DLN Combustor
- Water Injection for NO<sub>x</sub> @ 42 ppmvd
- Additional inlet and exhaust pressure loss effects:



# GENERAL ELECTRIC MODEL PG7241FA GAS TURBINE

Effect of Compressor Inlet Temperature on  
Output, Heat Rate, Heat Consumption, Exhaust Flow  
And Exhaust Temperature at Baseload

Fuel: Distillate  
Design Values on Curve 544HA223 Rev 0  
Combustor: DLN



## Memorandum

TO: Michael Clark, Finance and Accounting

FROM: Al Linero *AL* 2/10

DATE: February 10, 1999

SUBJ: TECO Polk Power Station Site Certification Fee  
PA 92-32, Module No. 8042

Attached with this memo is a check for \$7500. This fee should be applied toward the Site Certification modification fee of \$10,000. Buck Oven will inform the company that they must submit an additional \$2,500 before we begin work on TECO's request.

AL/kt

cc: B. Oven, PPS  
P. Adams, BAR  
C. H. Fancy, BAR

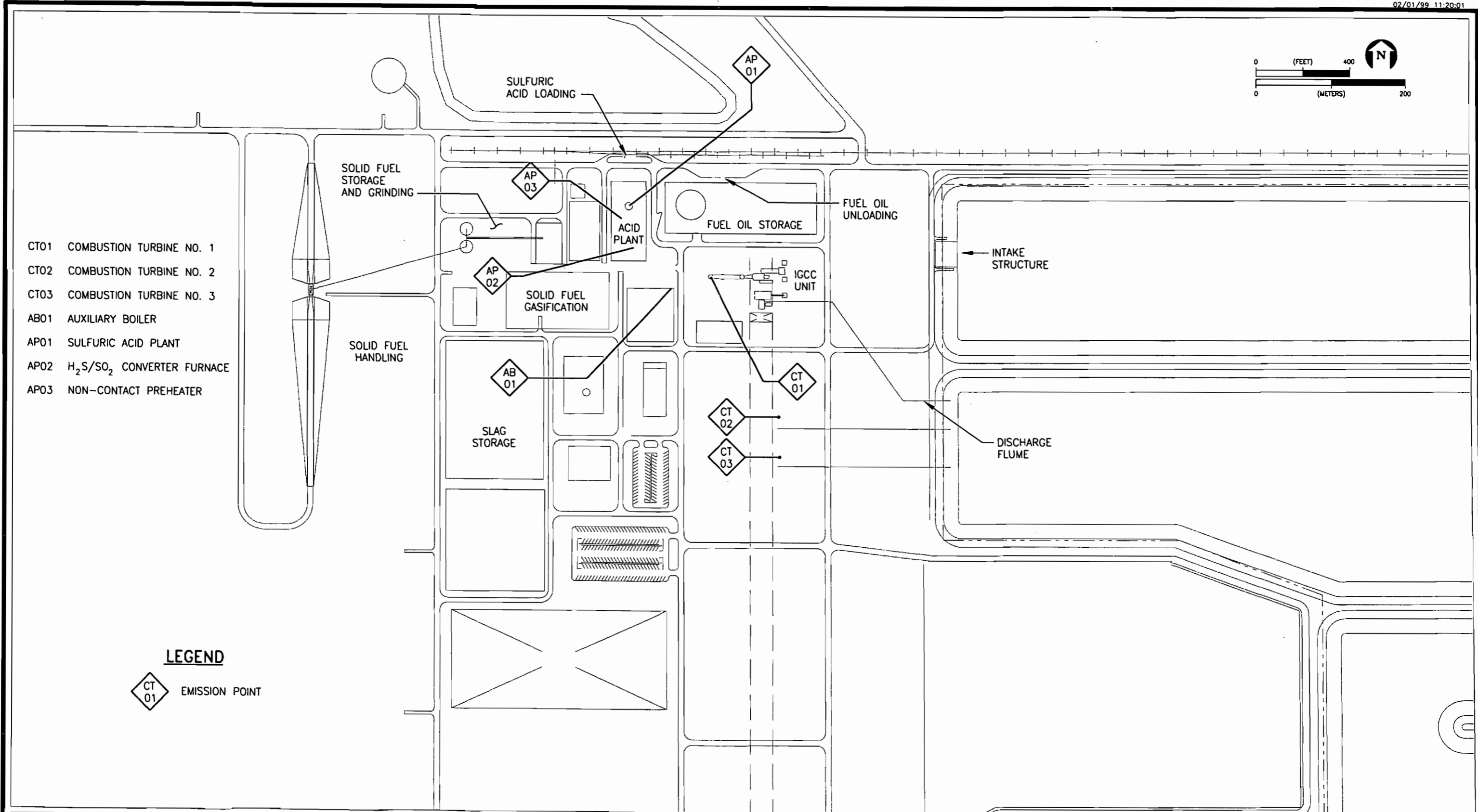
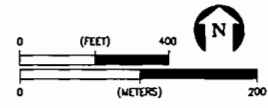
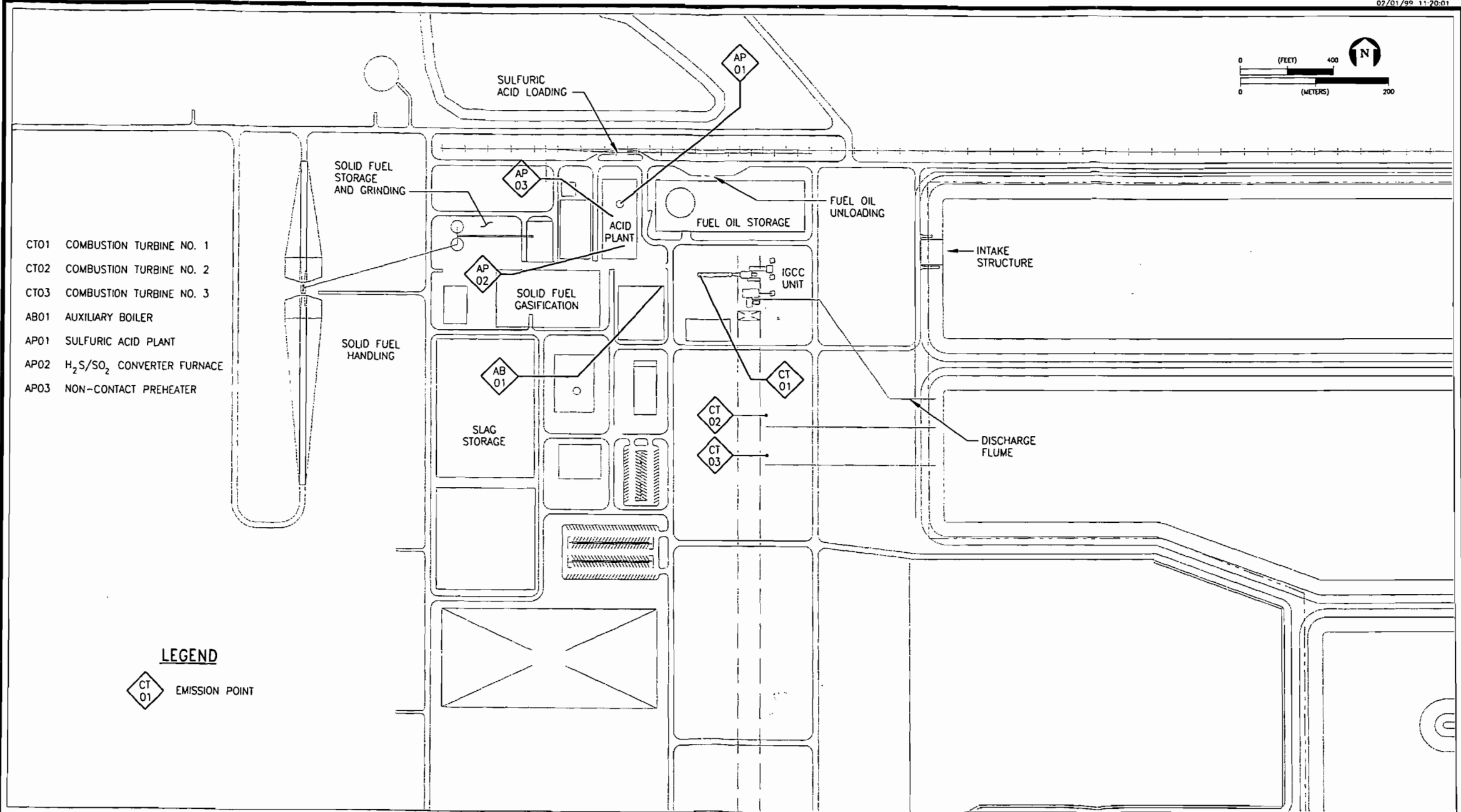


FIGURE 2-4.  
 POLK POWER STATION PLOT PLAN

Source: BECHTEL, 1994; ECT, 1999.





- CT01 COMBUSTION TURBINE NO. 1
- CT02 COMBUSTION TURBINE NO. 2
- CT03 COMBUSTION TURBINE NO. 3
- AB01 AUXILIARY BOILER
- AP01 SULFURIC ACID PLANT
- AP02 H<sub>2</sub>S/SO<sub>2</sub> CONVERTER FURNACE
- AP03 NON-CONTACT PREHEATER

**LEGEND**



FIGURE 2-4.  
POLK POWER STATION PLOT PLAN

Source: BECHTEL, 1994; ECT, 1999.





# AFFIDAVIT OF PUBLICATION

## THE LEDGER

### Lakeland, Polk County, Florida

Clean(er)  
Copy

Case No .....

STATE OF FLORIDA)  
COUNTY OF POLK)

Before the undersigned authority personally appeared Nelson Kirkland, who on oath says that he is Classified Advertising Manager of The Ledger, a daily newspaper published at Lakeland in Polk County, Florida; that the attached copy of advertisement, being a

Notice of Intent


in the matter of DEP File No.: PSD-FL-263

in the

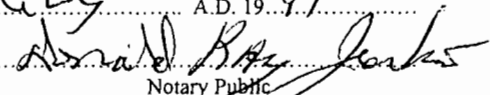
Court, was published in said newspaper in the issues of

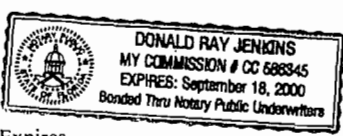
July 10, 1999

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

Signed   
Nelson Kirkland  
Classified Advertising Manager  
Who is personally known to me.

Sworn to and subscribed before me this 12TH  
day of July A.D. 19 99

  
Notary Public  
**DONALD RAY JENKINS**



(Seal)  
My Commission Expires.....

197729 C 823

### Attach Notice Here

**PUBLIC NOTICE OF INTENT TO ISSUE PSD PERMIT**

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
DEP File No. PSD-FL-263  
Tampa Electric Company - Polk Power Station  
Polk County

The Department of Environmental Protection (Department) gives notice of its intent to issue a permit under the requirements for the Prevention of Significant Deterioration (PSD) of Air Quality to Tampa Electric Company (TEC). The permit is to construct two nominal 165 megawatt (MW) natural gas and distillate fuel oil-fired combustion turbine-electrical generators with evaporative inlet coolers and two 114-foot stacks at the Polk Power Station at 9995 State Route 37 South, Mulberry, Polk County. A Best Available Control Technology (BACT) determination was required for particulate matter (PM/PM<sub>10</sub>), nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), sulfuric acid mist (SAM), and carbon monoxide (CO) pursuant to Rule 62-212.400, F.A.C. and 40 CFR 52.21. The applicant's name and address are Tampa Electric Company 6944, U.S. Highway 41 North, Apollo Beach, Florida 34711-6834.

The new units will be General Electric nominal 165 MW PG7241FA combustion turbines-electrical generators. The units will operate in simple cycle mode and intermittent duty. The units will operate primarily on natural gas and will be permitted to operate 4380 hours per year on gas and no more than 750 hours will be on maximum 0.05 percent sulfur distillate fuel oil.

NO<sub>x</sub> emissions will be controlled by Dry Low NO<sub>x</sub> (DLN) combustion. The units must maintain the manufacturer's initial "new and clean" performance guarantee of 9 parts per million by volume of 15 percent oxygen (ppm) and meet a continuous emission limit of 10.5 ppm. NO<sub>x</sub> will be controlled to 42 ppm by wet oxygen injection when firing fuel oil. Sulfuric acid mist, SO<sub>2</sub> and PM/PM<sub>10</sub> will be limited by use of clean fuels. Emissions of VOC and CO will be controlled by good combustion practices.

The maximum emissions in tons per year based on the original application are summarized below. CO emissions will be lower as a result of the Department's proposed BACT determination.

Pollutant	Maximum Potential Emissions	PSD Significant Emission Rate
PM/PM <sub>10</sub>	54	25/15
CO	300	100
NO <sub>x</sub>	581	40
VOC	18	40
SO <sub>2</sub>	120	40
Sulfuric Acid Mist	15	7

An air quality impact analysis was conducted. Maximum predicted impacts due to proposed emissions from the project are less than the applicable PSD Class I and Class II significant impact levels.

The Department will accept written comments and requests for a public hearing (meeting) concerning the proposed permit issuance action for a period of 30 (thirty) days from the date of publication of "Public Notice of Intent to Issue PSD Permit". Written comments should be provided to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit and require, if applicable, another Public Notice.

This PSD permitting action is being coordinated with a modification to the Site Certification Application submitted pursuant to the Power Plant Siting Act, Sections 403.501-519, F.S. If a petition for an administrative hearing on the Department's intent to issue PSD Permit is filed by a substantially affected person, that hearing shall be consolidated with any certification hearing pursuant to Section 403.507, F.S.

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

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel at the Department at 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to write notice under Section 120.50(3) of the Florida Statutes must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. Under Section 120.60(3), however, any person who asked the Department for notice of agency action may file a petition within fifteen days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition to the applicant at the address indicated above at the time of filing, the failure of any person to file a petition within the applicable time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28.106.205 of the Florida Administrative Code.

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

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

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

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

Dept. of Environmental Protection Bureau of Air Regulation 111 S. Magnolia Drive, Suite 4 Tallahassee, Florida 32301 Telephone: 850/488-0114 Fax: 850/722-6979	Dept. of Environmental Protection Southwest District Office 3804 Coconut Palm Drive Tampa, Florida 33619-8218 Telephone: 813/744-6100 Fax: 813/744-6084
Polk County Environmental Services Natural Resources & Drainage Division 4177 Ben Durranca Road Barrow, Florida 33830 941/534-3377 941/534-7374	

The complete project file includes the Draft Permit, the Technical Evaluation and Preliminary Determination, the BACT Determination, the application, and the information submitted by the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the New Resource Review Section at 111 South Magnolia Drive, Suite 4, Tallahassee, Florida 32301, or call 850/488-0114, for additional information.  
C-823 - 7-10-1999



TAMPA ELECTRIC

RECEIVED

FEB 08 1999

BUREAU OF AIR REGULATION

February 5, 1999

Mr. Clair Fancy  
Florida Department of Environmental Protection  
Bureau of Air Regulation  
111 Magnolia Drive, Suite 4  
Tallahassee, Florida 32301

Via FedEx  
Airbill No. 809689309646

Re: Tampa Electric Company

~~Big Bend Station Units 1 and 2~~ Polk Power Station  
~~Flue Gas Desulfurization (FGD) System~~ Tub Simple Cycle Turbines  
Construction Permit Application

PA 92-32

Module 8042  
Q50-F1-263

Dear Mr. Fancy:

Please find enclosed four (4) signed and sealed copies, including the Electronic Submission of Application (ELSA), of Tampa Electric Company's (TEC) permit application to construct two new simple-cycle combustion turbines at the Polk Power Station site. A check for \$7,500.00 to the Florida Department of Environmental Protection is enclosed to cover the processing fee per 62-4.050(4)(a)1.

TEC appreciates your timely review and processing of this construction permit application. If you should have any questions, please feel free to call me at (813) 641-5033.

Sincerely,

James Hunter  
Administrator - Air Programs  
Environmental Planning

EP\gm\jjh897

Enclosures

c: A.A. Linero, FDEP - Tallahassee  
R.D. Garrity, Ph.D., FDEP-Tampa ✓

CC: T. Newton ✓  
B. Owen ✓  
C. Holladay  
Polk Co. ✓  
EPA ✓  
NPS ✓  
File

Site Cert.

Original sent  
to M. Clark, F&A  
2/10/99


Tampa Electric Company

FLORIDA DEPT OF ENVIRONMENTAL

0904017

Invoice Date	Invoice Number	G/L Account	Description	Invoice Amount
2/3/99	PERMIT	M06471	PERMIT FEE POLK CT	7,500.00
Check Total				7,500.00

FOR SECURITY PURPOSES, THE BORDER OF THIS DOCUMENT CONTAINS MICROPRINTING

 <b>Tampa Electric Company</b> Post Office Box 3285 702 North Franklin Street Tampa, Florida 33601	NationsBank NationsBank of Georgia NA	<b>Check Number</b> 0904017 64-1278-8 611
PAY Seven Thousand Five Hundred Dollars and 00/100 Cents		<b>Check Date</b> 2/4/99
TO THE ORDER OF FLORIDA DEPT OF ENVIRONMENTAL PROTECTION		<b>Check Amount</b> *****\$7,500.00

Signature: Rawlth

THE REVERSE SIDE OF THIS DOCUMENT INCLUDES AN ARTIFICIAL WATERMARK - HOLD AT AN ANGLE TO VIEW