

Florida Department of  
Environmental Protection

Memorandum

TO: ~~Clair Fancy~~ *by AAL for OHT*  
THRU: Al Linero *AAL 9/6*  
FROM: Teresa Heron  
DATE: September 6, 2001  
SUBJECT El Paso Manatee Energy Center  
: 600 Megawatt Gas-fueled Power Plant  
DEP File No. 0810199-001-AC (PSD-FL-318)

Attached is the public notice package for construction of a 600 MW gas-fueled power plant near Piney Point in Manatee County. The plant will consist of a 250 MW combined cycle and two intermittent duty, simple cycle, 175 MW GE 7FA combustion turbines. Ancillary facilities include inlet air chillers, one 5-cell freshwater mechanical draft cooling tower, a gas-fired heater, one 2600-hp diesel generator, one 250-hp diesel fire pump, aqueous ammonia storage tank, two 500 gallons diesel storage tanks, and three (possibly 4) 135-foot stacks.

Nitrogen Oxides (NO<sub>x</sub>) emissions from the gas turbine will be controlled by Dry Low NO<sub>x</sub> (DLN-2.6) combustion. The applicant proposed an NO<sub>x</sub> emission limit of 3.5 (combined cycle) and 9 ppmvd (simple cycle) @15% O<sub>2</sub>. The NO<sub>x</sub> BACT standard has been determined to be 2.5 ppmvd @15% O<sub>2</sub> in a 24-hr average time. The simple cycle units are limited to 5,000 hour per year per unit. The turbines will burn natural gas only. 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 and the design of the GE unit.

Maximum predicted air quality impacts due to emissions from the El Paso project are less than the applicable PSD Class II significant impact levels, with the exception of 24-hour average PM<sub>10</sub>. Therefore, multi-source modeling was required for PM<sub>10</sub>. The modeling showed that the available increment has not been consumed. We are still awaiting input from the National Park Service following their review of the refined modeling performed by the applicant. We will consider their input during the comment period.

We included startup and shutdown considerations. We gave El Paso the opportunity to review and comment on the Work Practice proposal. They did not see a problem, but obviously reserve the right to comment during the 30-day comment period.

September 9 (Sunday) will be Day 74. I recommend your approval of the attached Intent to Issue.

AAL/th

Attachments



# Department of Environmental Protection

Jeb Bush  
Governor

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

David B. Struhs  
Secretary

## P.E. Certification Statement

**Permittee:**

DEP File No. 0810199-001-AC (PSD-FL-318)

El Paso Merchant Energy Company  
Manatee Energy Center  
Manatee County

**Project type:**

Project is construction of a 600 MW gas-fueled power plant consisting of three nominal 175-megawatt (MW) General Electric PG 7241FA combustion turbine-electrical generators .

Two of the units will operate in simple cycle mode and intermittent duty while the third will operate in combined cycle and continuous duty. The units will exhaust through separate 135-foot stacks. The units will be fired exclusively with pipeline natural gas. El Paso proposes to operate the simple cycle units up to 5,000 hours per year per unit.

The simple cycle units must meet a BACT nitrogen oxides limit of 9 parts per million by volume, dry, at 15% oxygen (ppmvd). The combined cycle unit must meet a limit of 2.5 ppmvd @15% O2 on a 24-hour basis by installing a selective catalytic reduction system. 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 pipeline quality natural gas.

Projected impacts from the proposed project emissions are all less than the applicable significant impact limits (SILs) corresponding to the surrounding Class II areas or the nearest Class I area (Chassahowitzka Wildlife Area). The project will not cause or contribute to a violation of any National Ambient Air Quality Standard or Increment.

*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).*

9/7/2001

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

Date

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9/7

FLORIDA ELECTRICAL POWER PLANT SITING ACT APPLICABILITY  
DETERMINATION

El Paso Manatee Energy Center

The meaning of electrical power plant, for the purpose of certification under the act “does not include any steam or solar electrical generating facility of less than 75 megawatts in capacity unless the applicant for such a facility elects to apply for certification under this act.” [403.503(13), F.S.]

“The provisions of the act shall apply to any electrical power plant as defined herein, except that the provisions of this act shall not apply to any electrical power plant or steam generating plant of less than 75 megawatts in capacity .....” [403.506(1), F.S.]

A combined cycle plant consists of two cycles. The first is the gas turbine cycle, also known as the *Brayton Cycle*. The second is the steam turbine or *Rankine Cycle*. [Steam, its Generation and Use, Babcock & Wilcox, 1992]

For combined cycles, the Department considers the Act to apply only when electricity generated from the electrical generator operated on the Rankine cycle equals or exceeds 75 MW, not including the separate electrical generator operated on the Brayton cycle.

In past permitting actions, the Department has accepted operational limitations on the gross electrical output from the steam turbine-electrical generator as the measure of capacity. [Okeelanta Cogeneration, Destec Tiger Bay, CPV Pierce]

The Department requires a clear description of the manner by which electrical power from the steam turbine-electrical generator will be limited to less than 75 MW.

The Department received an application from El Paso Merchant Energy Company for the Manatee Energy Center on March 28, 2001. The application included a copy of a letter from the Department dated August 25, 2000 acknowledging that the configurations proposed by Coastal (now El Paso) have the ability to equal or exceed 75 MW and requiring that any permit application to the Department “include description of engineering devices to limit delivery to the steam turbine” and “monitoring of the electric generation rate on a rolling hourly average to demonstrate that 75 MW is not equaled or exceeded.”

El Paso submitted a letter dated June 26, 2001 in response to the Department’s request for additional information following receipt of the application. El Paso stated the following:

*“The steam turbine electrical generator (STG) planned for the Manatee Energy Center (BEC) combined cycle (CC) unit will have a maximum generating capacity of 120 megawatts (MW). The CC unit will have a modern distributed control system (DCS) that will serve as a means to control STG operation utilizing plant instrumentation and equipment. In conjunction with the steam turbine governor, a control management system will be implemented that will limit the STG output to less than 75 MW. The power output of the STG will be recorded on the plant DCS for records purposes and reporting needs as required. The CC unit will feature hardware provisions that will allow diversion of steam produced by the heat recovery steam generator (HRSG) from the STG thereby*

limiting its output. The main hardware features that will limit STG electrical output include CTG steam mass augmentation, STG controls, and a STG steam bypass system. Each of the systems is described in the following sections.

#### **A. CTG Steam Mass Flow Augmentation**

- *The CC unit CTG will incorporate steam injection nozzles and design features that will allow a portion of the high-pressure steam generated by the HRSG to be diverted from the STG to the CTG. This introduction of steam to the CTG allows for a mass flow enhancement. The increased mass flow that results from steam injection will increase CTG output as well as fuel consumption. At ambient temperatures of about 50°F or less, steam mass flow augmentation will be limited by CTG equipment limitations. For instance, CTG backpressures could increase to levels beyond those recommended by the vendor. At these colder ambient temperature conditions, steam injection into the CTG will be curtailed and alternate means of steam diversion from the STG will be called on to a greater extent.*
- *The specifics of the limitations on CTG steam injection will be developed by the CTG vendor. Additionally, the specifics of steam introduction will be developed in conjunction with the CTG control systems for proper coordination with the dry low-NO<sub>x</sub> (DLN) combustor control algorithms.*
- *Steam flow to the CTG steam injection nozzles, including CTG control integration, will be controlled from a signal generated within the DCS. This control signal will operate a control valve that regulates steam flow by modulation of the valve seat or opening area thereby allowing steam flow modulation.*
- *Steam flow to the CTG injection nozzles will be measured with classical steam flow measurement devices such as an orifice plate or an annubar. The steam flow measurement device will have a differential pressure transmitter attached to pressure sensing lines that will monitor the process and produce a proportional 4-20 milliamp (ma) signal that will tie in to the plant DCS. This signal will be converted to flow and signals will be transmitted to the CTG combustion control systems as well as to the balance of the plant DCS. During base load operations, the steam flow to the CTG injection nozzles will likely be a fixed steam mass flow or fixed percent of CTG mass flow. Injection of steam will occur at 100 percent load only. During upsets/startups and conditions such as low ambient temperatures, the steam flow will be controlled to coordinate with CTG combustion control to allow stable operation and avoid surge and stall within the CTG. During these periods, alternate STG steam diversion paths will be used.*

### **B. Steam Turbine Generator (STG) Controls**

- *The STG will be fitted with an electronic governor and control system that will control the steam flow into the STG and hence the STG electrical output. Additional instrumentation will be used to adjust this control loop. For instance, condenser back pressure, intermediate pressure and low pressure steam flows, steam temperatures and pressure will each have a significant impact on the determination of the proper steam flow to the STG.*
- *The primary measurement of STG electrical output will be the main input to the STG governor control loops. This power measurement will be feed to the STG governor to compare to the primary set point. As an example, the primary set point may have a value of 74.9 MW. Following control system tuning, the set point will be adjusted to allow for control swings and upsets such that the hourly STG electrical production average will never exceed 75 MW.*

### **C. STG Steam Bypass System**

- *Whenever steam to the CTG injection nozzles and to all other locations are not sufficient to reduce STG output to the set point, the primary means of final control will be a STG steam bypass system. The STG steam bypass system will allow steam flow from the HRSG to bypass the STG and "dump" directly into the condenser. The DCS will generate a final control signal that will modulate this steam dump. A CC plant typically includes this hardware to allow for steam dumping during upsets or malfunctions. Additional control signals and associated hardware will regulate this dump steam as the final means of disposal of excess HRSG steam. In addition, an economizer bypass system may be used to reduce the flow of water passing through the economizer stage of the HRSG, which will reduce the flow-of steam produced.*

*The control systems described above will typically scan each instrument every second and recalculate and update the status and driving signals going to each field device. Following control system tuning, the control systems will regulate STG output to the required level.*

The Department accepts El Paso's operational description and concludes that the Manatee Energy Center project is not subject to the Florida Electrical Power Plant Siting Act.

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

Hamilton Oven, P.E. Administrator  
Power Plant Siting Office