TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

PROJECT

Draft Air Construction Permit No.1010017-007-AC
(PSD-FL-379)
New Mechanical Draft Helper Cooling Towers

COUNTY

Pasco

APPLICANT

Progress Energy Florida, Inc.
Anclote Power Plant
ARMS Facility ID No. 1010017

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Division of Air Resource Management
Bureau of Air Regulation
Air Permitting North Program

August 28, 2006

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1. GENERAL PROJECT INFORMATION

Applicant Name and Address

Progress Energy Florida, Inc.
Anclote Power Plant
1729 Baillies Bluff Road
Holiday, FL 34691

Authorized Representative: Jeff Swartz

Processing Schedule

5/9/06 Received the application for a minor source air pollution construction permit.
6/6/06 Application incomplete; Sent Request for Additional Information.
7/12/06 Received information on request for information; application complete.

Facility Description and Location

This facility consists of two fuel oil fired steam electric generating stations, E.U. ID No. -001 (Unit No. 1) and -002 (Unit No. 2). Unit No. 1 consists of a Combustion Engineering, Inc., Type Controlled Circulation, Radiant Reheat (CCRR) boiler/steam generator and steam turbine which drives a generator with a nameplate rating of 535 (summer)/540 (winter) Megawatts. Unit No. 2 consists of a Combustion Engineering, Inc., CCRR Type boiler/steam generator and steam turbine which drives a generator with a nameplate rating of 525 (summer)/530 (winter) Megawatts. Units No. 1 and No. 2 share a common stack. Also included in this permit are miscellaneous unregulated and insignificant emissions units and/or activities. Relocatable diesel fired generator(s) with a maximum heat input of 25.74 MMBtu/hour and a maximum rating of 2460 Kilowatts are permitted to be located at this facility and may be relocated to other Progress Energy facilities.
The UTM coordinates are Zone 17, 324.4 km East, and 3118.7 km North. This site is in an area that is in attainment (or designated as unclassifiable) for all air pollutants subject to a National Ambient Air Quality Standard (NAAQS).

Standard Industrial Classification Code (SIC)

SIC No. 4911 – Electrical Services

Regulatory Categories

Title III: The existing facility is identified as a potential major source of hazardous air pollutants (HAP).

Title IV: The existing facility has units subject to the acid rain provisions of the Clean Air Act.

Title V: The existing facility is a Title V major source of air pollution in accordance with Chapter 213, F.A.C.

PSD: The existing facility is a PSD-major facility in accordance with Rule 62-212.400, F.A.C.

Project Description

This project consists of the construction and operation of two mechanical draft cooling towers to replace the existing cooling towers at the facility due to their degraded condition. The new towers will be constructed from salt water corrosion resistant material and each tower will consist of 12 cells. The towers are expected to be 50-59 feet tall, and the stacks are expected to be 10-14 feet tall on top of the cooling towers. The towers are used primarily in the summer months in order reduce the discharge water temperature to meet the conditions of the facility's current water permit, and it is anticipated that the units will operate no more than 4500 hours per year. Brackish water used for cooling has an estimated total dissolved solids (TDS) of 29,000 parts per million. The existing circulating water pumps will be reused with no increase in throughput.

The cooling towers provide direct contact between the cooling water and air passing through the tower. Drift is created when small amounts of cooling water become entrained in the air stream and are carried out the tower. Particulate Matter is emitted as salt in the water droplets that escape as drift from the tower. Drift eliminators is the control technology used to control PM emissions caused by the cooling tower drift.

2. APPLICABLE REGULATIONS

State Regulations

This project is subject to the applicable environmental laws specified in Section 403 of the Florida Statutes (F.S.). The

Florida Statutes authorize the Department of Environmental Protection to establish rules and regulations regarding air quality as part of the Florida Administrative Code (F.A.C.). This project is subject to the applicable rules and regulations defined in the following Chapters of the Florida Administrative Code: 62-4 (Permitting Requirements); 62-204 (Ambient Air Quality Requirements, PSD Increments, and Federal Regulations Adopted by Reference); 62-210 (Permits Required, Public Notice, Reports, Stack Height Policy, Circumvention, Excess Emissions, and Forms); 62-212 (Preconstruction Review, PSD Review and BACT, and Non-attainment Area Review and LAER); 62-213 (Title V Air Operation Permits for Major Sources of Air Pollution); 62-296 (Emission Limiting Standards); 62-297 (Test Methods and Procedures, Continuous Monitoring Specifications, and Alternate Sampling Procedures).

General PSD Applicability

The Department regulates major air pollution sources in accordance with Florida's Prevention of Significant Deterioration (PSD) program, as approved by the EPA in Florida's State Implementation Plan and defined in Rule 62-212.400, F.A.C. A PSD review is required in areas currently in attainment with the state and federal Ambient Air Quality Standards (AAQS) or areas designated as "unclassifiable" for a given pollutant. A new facility is considered "major" with respect to PSD if it emits or has the potential to emit: 250 tons per year or more of any regulated air pollutant; or 100 tons per year or more of any regulated air pollutant and the facility belongs to one of the 28 PSD Major Facility Categories defined in Rule 62-210.200, F.A.C.; or 5 tons per year of lead.

For new projects at existing PSD-major sources, each regulated pollutant is reviewed for PSD applicability based on emissions thresholds known as the Significant Emission Rates defined in Rule 62-210.200, F.A.C. Pollutant emissions from the project exceeding these rates are considered "significant" and the applicant must employ the Best Available Control Technology (BACT) to minimize emissions of each such pollutant and evaluate the air quality impacts. Although a facility may be "major" with respect to PSD for only one regulated pollutant, it may be required to install BACT controls for several "significant" regulated pollutants.

PSD Applicability for Project

The Anclote Power Plant is an existing PSD-major facility located in Pasco County, which is an area that is currently in attainment with, or designated as "unclassifiable" for, each pollutant with a state or federal Ambient Air Quality Standard (AAQS). The applicant proposes to construct and operate two mechanical draft cooling towers to replace the existing cooling towers. The reuse of the existing circulating water pumps will result in no increases in throughput.

Emissions from the cooling towers are limited to PM and PM_{10} emissions. Based on the application, future PM emissions are estimated to be 108 tpy operating 4500 hours per year. Because PM emissions will exceed over 25 tons per year, a PSD review for this project is required. PM_{10} emissions were estimated to be only a fraction of this amount at less than one ton per year. The calculation was based upon the study, "Calculating Realistic PM_{10} Emissions from Cooling Towers" by Joel Reisman and Gordon Frisbie. Based on the study, the authors of the paper contend PM_{10} emissions increase with PM as the concentration of total dissolved solids (TDS) increases to about 4000 ppm. At TDS levels greater than 4000 ppm, the amount of PM_{10} sized particles will decrease while PM continues to increase. The paper states that at higher TDS, the drift droplets contain more solids and therefore, upon evaporation, result in larger particles for any given initial droplet size.

Table 1 on the following page graphs the correlation of PM to PM_{10} as the TDS of the water increases. With the estimated TDS of 29,000 ppm for the new cooling towers and a circulating flow rate of 660,000 gallons per minute, the report indicates large PM emissions with minimal PM_{10} emissions as indicated in the application. The estimated PM_{10} emissions do not exceed the 15 ton per year significant emission rate for PM_{10}.

The Department conducted a review of the BACT/RACT/LAER Clearinghouse for mechanical draft cooling towers between 2003 and 2006. Based upon the review the Department concludes that BACT for mechanical draft cooling towers is based upon drift eliminators. Additionally, BACT emission rates can be established as low as 0.0005% drift rate. It is noted that the lower end of the BACT range (0.0005%) is what the applicant has proposed as BACT for this project. In accordance with Rule 62-210.200(243), F.A.C., PM_{10} emissions are below the PSD significant rate. Because PM was the only pollutant that triggered a PSD review, a Class II air quality impact analysis as well as additional analysis of impacts due to the proposed project on soils, vegetation, visibility, growth, and air quality related values (AQRV's) in the nearest PSD Class I areas were not conducted (Rule 62-204.260(1) and (2), F.A.C.). Therefore, no air quality analysis is required. The Department agrees with the applicant and the designed cooling towers will have a designed drift rate of 0.0005% for each tower installed to control PM/PM10 emissions.

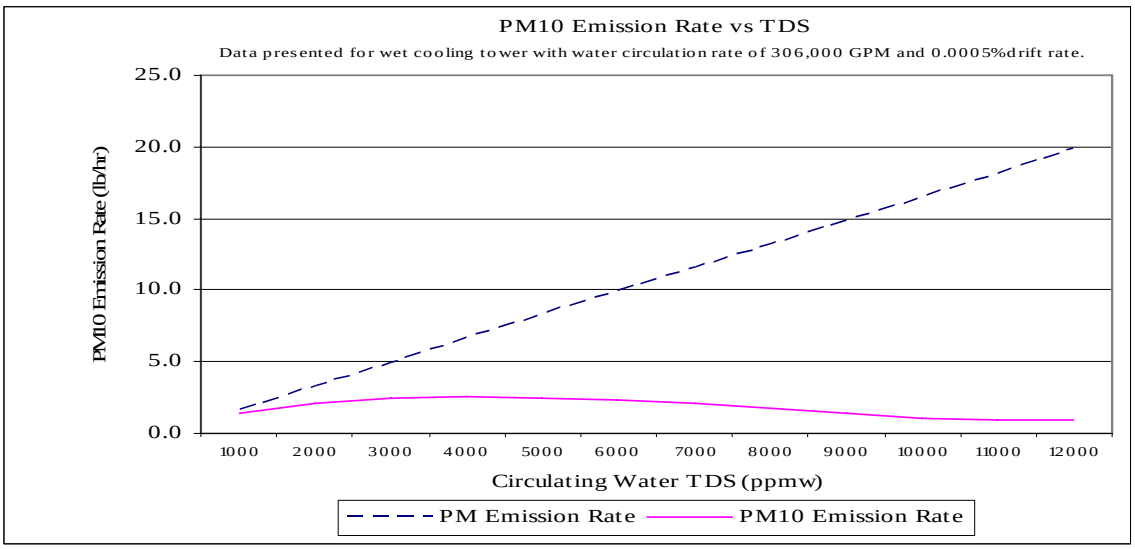

Table 1- PM10 emission rates vs. TDS

3. EMISSIONS STANDARDS

Brief Discussion of Emissions

The emission rates for PM and PM10 are not limited on a pound per hour or ton per year basis. Control for the unit will be based upon the design of the cooling towers to meet a drift rate of 0.0005%. However, operation of the unit will be limited to 4500 hours per year, which formed the basis for potential emissions in the application.

Draft Permit Requirements

Cooling Tower: The permittee is authorized to construct and operate two new mechanical draft cooling towers with the following nominal design characteristics: a circulating flow rate of 660,000 gallons per minute (330,000 gpm per tower); a design air flow of 36,000,000 acfm for both towers (18,000,000 per tower and 1,500,000 acfm per cell); drift eliminators and a drift rate of no more than 0.0005% of the circulating water flow for each tower. [Application No. 1010017-007-AC; Design]

Hours of Operation: The new cooling towers shall not operate more than 4500 hours per calendar year. [Application No. 1010017-007-AC]

Cooling Tower Design: The cooling towers shall be designed and maintained to achieve a drift rate of no more than 0.0005% of the circulating water flow. [Application 1010017-007-AC, Design]

Drift Rate: Within 60 days of commencing operation, the permittee shall notify the compliance authority that the cooling towers were constructed and installed to achieve the specific drift rate of no more than 0.0005% of the circulating flow rate. [Application 1010017-007-AC, Design]

Circulating Water Flow Rate: Upon request, the applicant shall provide a means for determining the circulating water flow rate through the new cooling tower. [Rule 62-4.070, F.A.C.]

Emissions Report: PM and PM10 emissions shall be reported as part of the annual operating report.

4. PRELIMINARY DETERMINATION

The Department makes a preliminary determination that the proposed project will comply with all applicable state and federal air pollution regulations as conditioned by the draft permit. This determination is based on a technical review of the complete application, reasonable assurances provided by the applicant, and the conditions specified in the draft permit. No air quality modeling analysis is required because the project does not result in a significant increase in the PM10 emissions. Bobby Bull is the project engineer responsible for reviewing the application and drafting the permit. Additional details of this analysis may be obtained by contacting the project engineer at the Department's Bureau of Air Regulation at Mail Station #5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.{Lastpage}

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