TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

APPLICANT

Progress Energy Florida, Inc.
299 First Avenue North, CN-77
St. Petersburg, Florida 33701
Crystal River Power Plant
Facility ID No. 0170004

PROJECT

Project No. 0170004-037-AC (PSD-FL-383E)
Application for Air Construction Permit Revision
Permanent Hydrated Lime Injection System

COUNTY

Citrus County, Florida

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Division of Air Resource Management
Office of Air Permitting and Compliance
Power Plant Group

September 6, 2012

1. GENERAL PROJECT INFORMATION

Air Pollution Regulations

Projects at stationary sources with the potential to emit air pollution are subject to the applicable environmental laws specified in Section 403 of the Florida Statutes (F.S.). The statutes authorize the Department of Environmental Protection (Department) to establish regulations regarding air quality as part of the Florida Administrative Code (F.A.C.), which includes the following applicable chapters: 62-4 (Permits); 62-204 (Air Pollution Control – General Provisions); 62-210 (Stationary Sources – General Requirements); 62-212 (Stationary Sources – Preconstruction Review); 62-213 (Operation Permits for Major Sources of Air Pollution); 62-296 (Stationary Sources - Emission Standards); and 62-297 (Stationary Sources – Emissions Monitoring). Specifically, air construction permits are required pursuant to Rules 62-4, 62-210 and 62-212, F.A.C.

In addition, the U. S. Environmental Protection Agency (EPA) establishes air quality regulations in Title 40 of the Code of Federal Regulations (CFR). Part 60 specifies New Source Performance Standards (NSPS) for numerous industrial categories. Part 61 specifies National Emission Standards for Hazardous Air Pollutants (NESHAP) based on specific pollutants. Part 63 specifies NESHAP based on the Maximum Achievable Control Technology (MACT) for numerous industrial categories. The Department adopts these federal regulations on a quarterly basis in Rule 62-204.800, F.A.C.

Facility Description and Location

The Progress Energy Florida, Inc., Crystal River Power Plant is an existing electrical generation power plant, which is categorized under Standard Industrial Classification Code No. 4911. The facility is located in Citrus County, north of Crystal River and west of U.S. Highway 19, Florida. The Universal Transverse Mercator (UTM) coordinates are Zone 17, 334.3 kilometers East and 3204.5 kilometers North. This site is in an area that is in attainment (or designated as unclassifiable) for all air pollutants subject to state and federal Ambient Air Quality Standards (AAQS).

Facility Regulatory Categories

- The facility is a major source of hazardous air pollutants (HAP).
- The facility has units subject to the acid rain provisions of the Clean Air Act.
- The facility is a Title V major source of air pollution in accordance with Chapter 213, F.A.C.
- The facility is a major stationary source in accordance with Rule 62-212.400, F.A.C., for the Prevention of Significant Deterioration (PSD) of Air Quality.
- The existing facility is subject to Power Plant Site Certification No. PA 77-09.

Project Description and History

Permit No. 0170004-013-AC authorized the installation of new selective catalytic reduction (SCR) systems on Units 4 and 5 to reduce NO_X. The purpose of the project was to implement the Clean Air Interstate Rule (CAIR) and the Clean Air Mercury Rule (CAMR). It did not trigger PSD preconstruction review.

Permit No. 0170004-016-AC (PSD-FL-383)) superseded Permit No. 0170004-013-AC and authorized the following new equipment in addition to SCR systems: new low-NO_X burners (LNB) for Units 4 and 5; new wet flue gas desulfurization (FGD) systems for Units 4 and 5 to reduce SO_2 and other acid gas emissions; a new acid mist mitigation (AMM) system for Units 4 and 5 to reduce sulfuric acid mist (SAM) emissions; upgraded electrostatic precipitators (ESP) for Units 4 and 5 to reduce particulate matter emissions; new stack configurations for Units 4 and 5; and a new carbon burn out unit. The purpose of that project was to implement the CAIR and CAMR, and it was subject to PSD preconstruction review.

Permit No. 0170004-026-AC (PSD-FL-383D), revised permit No. 0170004-016-AC (PSD-FL-383) to authorize the temporary installation and operation of a demonstration injection system at Units 4 and 5 using alternative sorbents to evaluate additional methods for reducing SAM emissions in order to utilize less ammonia.

This project, permit No. 0170004-037-AC (PSD-FL-383E), revises permit No. 0170004-026-AC (PSD-FL-383D) to authorize a permanent hydrated lime injection system at Units 4 and 5. Because permit No. 0170004-026-AC (PSD-FL-383D) is still an active permit, this revision project is being issued as a complete replacement permit containing the requested changes. All previous versions of permit No. PSD-FL-383 are null and void. Additions to the previous permit are shown in double underline format, while deletions are shown in ~~strike through~~ format. All changes shown throughout the draft permit are further highlighted in yellow for ease of identification.

As described below, the addition of this system will only result in a slight increase in particulate matter (PM) emissions, due to the sorbent handling and storage activities. However, any increase in actual emissions is considered to be a modification that requires an air construction permit to implement.

Hydrated Lime Injection Equipment: The applicant has requested the authority to install and operate a hydrated lime injection system and miscellaneous ancillary equipment for sulfuric acid mist (SAM) control. This permanent system is proposed to be used in lieu of the current ammonia injection system, although the current system will be retained for backup. The hydrated lime storage system for each unit will consist of the following primary components: a hydrated lime storage silo, which is controlled by a dust collector fabric filter (silo vent filter), rotary valves and blowers for pneumatic delivery of the hydrated lime, and hydrated lime injection lances. Because there is a new air emission source associated with the system for each of the two steam units, a total of two new emissions points are created. These new sources are related to potential emissions that occur when displaced air entrains dust particles as the hydrated lime storage silos are filled. A delivery truck will pneumatically fill the hydrated lime storage silo with hydrated lime for approximately six hours per day. The hydrated lime will be unloaded at 2,000 standard cubic feet per minute. Each hydrated lime silo has dedicated rotary valves and blowers for pneumatic delivery of the hydrated lime to sets of injection lances mounted in flue gas ducts at various locations along the flue gas path. The pneumatic conveyor is also controlled by the dust collectors on the hydrated lime storage silos.

Dust Collectors: A dust collector will be installed and operated on each hydrated lime storage silo to control emissions from the loading of the hydrated lime storage silo and unloading and transfer from the silo to the injection lances. The silo dust collector will have a flow rate of approximately 2,000 scfm during the loading operations, which are estimated to occur for 6 hours per day. Each dust collector shall be designed for a dust outlet specification of 0.015 grains/dry standard cubic feet (dscf).

Processing Schedule

6/18/12	Received the application for an air pollution air construction permit revision; application deemed complete.
9/4/12	Pre-draft permit emailed to applicant for review.
9/5/12	Pre-draft comments received from applicant.
9/6/12	Draft permit issued.

2. PSD APPLICABILITY

General PSD Applicability

For areas currently in attainment with the state and federal AAQS or areas otherwise designated as unclassifiable, the Department regulates major stationary sources of air pollution in accordance with Florida's PSD preconstruction review program as defined in Rule 62-212.400, F.A.C. Under preconstruction review, the Department first must determine if a project is subject to the PSD requirements ("PSD applicability review") and, if so, must conduct a PSD preconstruction review. A PSD applicability review is required for projects at new and existing major stationary sources. In addition, proposed projects at existing minor sources are subject to a PSD applicability review to determine whether potential emissions *from the proposed project itself* will exceed the PSD major stationary source thresholds. A facility is considered a major stationary source 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 following 28

PSD-major facility categories: fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input, coal cleaning plants (with thermal dryers), Kraft pulp mills, portland cement plants, primary zinc smelters, iron and steel mill plants, primary aluminum ore reduction plants, primary copper smelters, municipal incinerators capable of charging more than 250 tons of refuse per day, hydrofluoric, sulfuric, and nitric acid plants, petroleum refineries, lime plants, phosphate rock processing plants, coke oven batteries, sulfur recovery plants, carbon black plants (furnace process), primary lead smelters, fuel conversion plants, sintering plants, secondary metal production plants, chemical process plants, fossil fuel boilers (or combinations thereof) totaling more than 250 million British thermal units per hour heat input, petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels, taconite ore processing plants, glass fiber processing plants and charcoal production plants.

Once it is determined that a project is subject to PSD preconstruction review, the project emissions are compared to the "significant emission rates" defined in Rule 62-210.200, F.A.C. for the following pollutants: carbon monoxide (CO); nitrogen oxides (NO_X); sulfur dioxide (SO_2); particulate matter (PM); particulate matter with a mean particle diameter of 10 microns or less (PM_{10}); volatile organic compounds (VOC); lead (Pb); fluorides (Fl); sulfuric acid mist (SAM); hydrogen sulfide (H_2S); total reduced sulfur (TRS), including H_2S; reduced sulfur compounds, including H_2S; municipal waste combustor organics measured as total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans; municipal waste combustor metals measured as particulate matter; municipal waste combustor acid gases measured as SO_2 and hydrogen chloride (HCl); municipal solid waste landfills emissions measured as non-methane organic compounds (NMOC); and mercury (Hg). In addition, significant emissions rate also means any emissions rate or any net emissions increase associated with a major stationary source or major modification which would construct within 10 kilometers of a Class I area and have an impact on such area equal to or greater than 1 $\mu g/m^3$, 24-hour average.

If the potential emission exceeds the defined significant emissions rate of a PSD pollutant, the project is considered "significant" for the pollutant and the applicant must employ the Best Available Control Technology (BACT) to minimize the emissions and evaluate the air quality impacts. Although a facility or project 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 addition of this system will result in a slight increase in PM emissions due to the sorbent handling and storage activities. The emissions calculations for these insignificant units (baghouses) are presented in Appendix B of this document. The emissions estimates assume year-round operation and, therefore, are considered to be a conservative estimate of potential emissions. The baghouse control system will be designed to the minimum required specification and PM emissions are estimated at a design rate of 0.015 grains per standard cubic feet of exhaust gas flow. The potential emissions from the proposed permanent sorbent storage and injection system for Units 4 and 5 (i.e., the two baghouses) are considered to be insignificant, since the proposed activity will emit less than 5 tons per year of any criteria pollutant. New source review for the proposed project will not be triggered since the potential emission increases for $PM_{10}/PM_{2.5}$ are less than their respective significant emission rate increase thresholds (i.e., 15/10 tons per year). As shown in Appendix B, the potential to emit $PM_{2.5}$ for the project is only 0.6 tons per year.

Therefore, a PSD analysis is not required for this proposed permit revision.

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 in 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. Tom Cascio 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 Office of Air Permitting and Compliance, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.

APPENDIX B
PROJECT EMISSION CALCULATIONS

SUBJECT:	Proposed Permanent Sorbent Injection System Unit 4 and 5, Crystal River Power Plant, Florida				
Job No. **Ref.**	123-89507	**Made by:** **Checked:** **Reviewed:**	SHO	**Date:** **Sheet:**	4/10/2012 1 of 1

OBJECTIVE: Calculate the potential to emit (PTE) emissions from the proposed sorbent injection systems for Units 4 and 5 at Crystal River Power Plant.

APPROACH: Use manufacturer guaranteed emission factors and filtration efficiencies to calculate the potential to emit (PTE) for the proposed project.

SOLUTION: A delivery truck will pneumatically fill the storage silo directly with sorbent. The delivery truck will unload the sorbent at 2,000 scfm for a proposed duration of six hours a day to the storage silo. The proposed sorbent injection system may be installed on both units, Unit 4 and 5. See Figure 4 of the application for the proposed process diagram of the sorbent injection system.

Emission Factors:

Pollutant	Emission Factors	Units	Source
PM*	See PM2.5	Grains/ACF	Manufacture's Specifications
PM10*	See PM2.5	Grains/ACF	Manufacture's Specifications
PM2.5	0.015	Grains/ACF	Manufacture's Specifications

*PM and PM10 are incorporated in PM2.5

Parameters:

Flow Rate	2000	cfm/unit	
Hours of Operation	6	hrs/day	Assumed maximum
Number of Fabric Filters	2	fabric filter/unit	Assumed maximum

Calculations:

Unit 4:

2,000 ft3 / min	0.015 grains PM2.5 / ft^3	1 pound PM2.5 / 7000 grains PM2.5	60 minutes / 1 hour	6 hour / 1 day	365 days = / 1 year	563.1	lbs PM2.5 / year

Unit 5:

2,000 ft3 / min	0.015 grains PM2.5 / ft^3	1 pound PM2.5 / 7000 grains PM2.5	60 minutes / 1 hour	6 hour / 1 day	365 days = / 1 year	563.1	lbs PM2.5 / year

Proposed Project Total PM2.5:	1,126.3	lbs PM2.5 / year	=	0.6	ton PM2.5 / year

CONCLUSION: The PTE emissions from the proposed sorbent injection systems for Units 4 and 5 at Crystal River Power Plant will be considered insignificant since the proposed activity emits less than 5 TPY of any criteria pollutant. New source review for the proposed project will not be triggered since the PTE PM/PM10/PM2.5 emission estimates are less than the respective SER emission increase thresholds.