TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

APPLICANT

Gulf Power Company
One Energy Place
Pensacola, FL 32520

Lansing Smith Plant
Facility ID No. 0050014

PROJECT

Project No. 0050014-019-AC
Application for Minor Source Air Construction Permit
OpFlex PEAK Enhancement

COUNTY

Bay County, Florida

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Division of Air Resource Management
Air Permitting and Compliance Section
2600 Blair Stone Road, MS#5505
Tallahassee, Florida 32399-2400

June 30, 2011

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.

Glossary of Common Terms

Because of the technical nature of the project, the permit contains numerous acronyms and abbreviations, which are defined in Appendix A of this permit.

Facility Description and Location

Lansing Smith Plant is an existing electrical generating plant, which is categorized under Standard Industrial Classification Code No. 4911. The existing facility is located in Bay County at 4300 County Road, Lynne Haven, Florida. The map coordinates are: Zone 16; 625.02 kilometers East; and 3349.24 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). This facility consists of the following: two coal-fired boilers (EU 001 and EU 002); two simple cycle combustion turbines driving a single electrical generator (EU 003); and two gas-fired combined cycle combustion turbine electrical generator sets each with a duct-fired heat recovery steam generators (EU 004 and EU 005). The two combined-cycle combustion turbines are Acid Rain Units. Pulverized coal is the primary fuel for the boilers. Distillate fuel oil is used to fire the simple cycle combustion turbine and as a “back-up” fuel for the boilers. Natural gas is the only fuel allowed to be fired in the two combined-cycle combustion turbines.

Facility Regulatory Categories

- The facility is a major source of hazardous air pollutants (HAP).
- The facility operates 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.

Project Description

On April 29, 2001, Gulf Power Company submitted a complete application requesting authorization to incorporate the General Electric (GE) OpFlex Peak enhancement package designed to expand the peak power production profile for the existing unit 3 combined cycle combustion system (EU 004 and EU 005). The enhancement controls the fuel distribution, which will broaden the operating range of the combustion turbines to increase flexibility and profitability. The peak fire function provides the ability to safely operate at a higher firing temperature while maintaining optimal emissions levels when demand for more output capacity is at a premium.

Operation in the Opflex peak mode may result in a slight increase in the hourly nitrogen oxides (NOx) mass emission rate over other peaking options. However, current plant data indicates hourly NOx emissions rates of more than 100 lb/hour. The peak fire capability requires the installation of a Continuous Dynamics Monitoring (CDM) system to ensure that the combustion system parameters are kept at optimal performance. CDM is part of GE's remote dry low-NOx (DLN) tuning service.

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. An existing, new or modified facility is considered a major stationary source with respect to PSD if it emits or has the potential to emit:

- 5 tons per year or more of lead;
- 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 (includes fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input).

The regulated PSD pollutants include: 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 (F); sulfuric acid mist (SAM); hydrogen sulfide (H_2S); total reduced sulfur (TRS) including H_2S; reduced sulfur compounds including H_2S; and mercury (Hg). There are additional PSD pollutants specific to municipal waste combustors and landfills.

A PSD applicability review is required for all projects at new and existing major and minor stationary sources. Once it is determined that the existing facility is, or that the new or modified facility will be, a major stationary source, the project emissions increases are then compared to the "significant emission rates" defined in Rule 62-210.200, F.A.C. for the PSD pollutants. If the potential emissions increase exceeds the defined significant emissions rate of a PSD pollutant, the project is considered "significant" for the pollutant. Also, note that 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. For each significant PSD pollutant, 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 "significant" for several PSD pollutants.

PSD Applicability for Project

The project is located in Bay County, which is in an area that is currently in attainment with the state and federal AAQS or otherwise designated as unclassifiable. As provided in the application, the following table summarizes potential emissions and PSD applicability for the project.

Table A. Summary of the Applicant's PSD Applicability Analysis

Pollutant	Baseline Actual Emissions (TPY)	Projected Actual Emissions OpFlex (TPY)	Increased Due to Only Demand Growth (TPY)	Change in Emissions Due to OpFlex (TPY)	Significant Emissions Rate (TPY)	Subject to PSD?
CO	175.4	183.3	6.9	1.0	100	No
CO_2	1,285,964	1,344,101.5	50,977.8	7,159.7	75,000	No
NO_X	422.4	440.1	15.1	2.6	40	No

Pollutant	Baseline Actual Emissions (TPY)	Projected Actual Emissions OpFlex (TPY)	Increased Due to Only Demand Growth (TPY)	Change in Emissions Due to OpFlex (TPY)	Significant Emissions Rate (TPY)	Subject to PSD?
$PM/PM_{10}/PM_{2.5}$	77.2	80.6	3.0	0.4	25/15/10	No
SO_2	1.2	1.2	0.0	0.0	40	No
VOC	24.6	25.7	0.9	0.2	40	No

Notes:

a. "TPY" means tons per year.

b. Baseline actual emissions were calculated based on the highest consecutive 2-year average reported in the annual operating report for each pollutant during 2009 and 2010.

c. Projected actual emissions based on worst case heat input increases.

d. The increase from the project is the difference between the projected and baseline actual emissions, minus the actual emissions due only to demand growth.

As shown in the above table, total project emissions will not exceed the PSD significant emissions rates; therefore, the project is not subject to PSD preconstruction review.

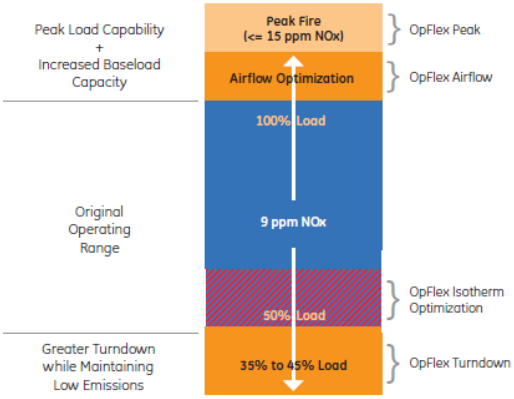
3. PROJECT DETAILS

General Electric Model No. PG7241 (FA) Combined-Cycle Combustion Turbine System (EU 004 – EU 005)

Gulf Smith Unit 3 is an existing "2-on-1" combined-cycle combustion turbine system with the following specifications:

- The nominal generating capacity is 566 megawatts (MW), at annual average site conditions, with duct burners.
- The maximum generating capacity is approximately 574 MW in combined cycle operation with power augmentation and evaporative cooling at 95º F.
- The maximum heat input rate to the combustion turbines is a nominal 1,927 million British thermal units per hour (MMBtu/hour) based on the lower heating value (LHV) of natural gas and a compressor inlet temperature of 65º F for each combustion turbine.
- The maximum heat input to the duct burners is a nominal 303 MMBtu/hour based on the lower heating value (LHV) of natural gas.
- Emissions are controlled by DLN combustors firing exclusively natural gas.
- Gulf Smith Unit 3 may operate with steam power augmentation limited to 1,000 hours/year.

General Electric Opflex - Operational Flexibility Enhancements for Combustion Turbines



General Electric developed a series of enhancements that include increased output, improved peak output and reduced fuel consumption. Some of the enhancements provided by GE are OpFlex Turndown, Airflow and Peak, which are designed to expand the operating profile of the Model No. PG7241 (FA) gas turbine. The applicant proposes to integrate the OpFlex Peak enhancement. This enhancement provides an increased output of the gas turbine above the operational range by adding peak load

functions. The benefits of the OpFlex enhancement include:

- Advanced fuel scheduling, a method of controlling fuel distribution;
- The ability to safely operate the turbine at a higher firing temperature while maintaining NO_x at less than or equal to 15 part per million (ppm) when demand for output capacity is at a premium;
- Capable of having up to 2.5% improved peak output generation capacity;
- Improved reliability with more stable combustor operation, which may result in same or lower combustion dynamics; and
- Increased revenue potential from higher base-load and peak-load output.

The Oplex Peak enhancement requires installation of a Continuous Dynamics Monitoring system to ensure that combustion system parameters are kept at optimal performance. Monitoring combustion dynamics provides early detection of combustion instabilities and can be used to tune an engine, minimize emissions and improve engine efficiency.

4. DEPARTMENT REVIEW

The applicant requests authorization to incorporate the OpFlex Peak enhancement on the existing Unit 3 combined cycle turbines with no temperature restrictions. The combustion turbines are currently allowed to operate either with duct burners or in a steam power augmentation mode limited to a maximum of 1,000 hours/year/unit. The applicant proposes to limit the total operation of the combustion turbines in the OpFlex Peak mode plus steam power augmentation mode to a combined 1,000 hours/year/unit. As provided by the application, the following table summarizes a comparison of the combustion turbines operating in OpFlex Peak mode and steam power augmentation mode at different temperatures:

Table B: Potential Emissions Comparison for One of the Combustion Turbines in Unit 3.

Pollutant	OpFlex Peak Mode[c]		PA Mode[c] @ 95 ºF	Increase Over PA Mode	Emission[d] Limits
	@ 95 ºF	@ 65 ºF			
NOx (lb/hr)	77	81	79	2	113.3
CO (lb/hr)	27	29	45	-16	116.6
UHC (lb/hr)	13	14	14	0	---
PM/PM10 (lb/hr)	9	9	9	0	43

Notes:

a. "PA" means steam power augmentation mode.

b. "UHC" unburned hydrocarbons, which are similar to VOC emissions.

c. The potential emissions are based on the vendor's specifications when a combustion turbine is operating in OpFlex Peak mode and in steam power augmentation mode at a compressor inlet temperature of 95º F and in OpFlex Peak mode at a compressor inlet temperature of 65º F.

d. The emission limits are for operation in the steam power augmentation mode.

As shown in the above table, the worst case scenario is when a combustion turbine operates in OpFlex peak mode at a compressor inlet temperature of 65º F. Based on vendor performance data, NOx emissions will increase by 2 lb/hour and CO emissions are decreased by 16 lb/hour when comparing operation in OpFlex Peak mode to steam power augmentation mode. In addition to individual emissions unit emission limits and the NO_x averaging plan requirements, the facility is required to comply with a facility-wide NO_x emissions cap of 6,666 TPY. The existing continuous emissions monitoring system (CEMS) will ensure compliance with all limits.

<u>NSPS Provisions</u>

Unit 3 at the Lansing Smith Plant is currently subject to the following applicable NSPS provisions in 40 CFR 60:

Subpart A (General Provisions), Subpart GG (Standards of Performance for Stationary Gas Turbines) and Subpart Da (Standards of Performance for Electric Utility Steam Generating Units – Duct Burners). At 65°F, the vendor indicates a maximum NOx emissions rate of 81 lb/hour (15 ppmvd @ 15% oxygen). Plant data currently indicates a maximum NOx emissions rates above 100 lb/hour. Therefore, the project is not expected to result in an increase the maximum hourly NOx emission rate and the project is not considered a modification under the New Source Performance Standards (NSPS). It will not be subject the new NOx provisions in Subpart KKKK (Standards of Performance for Combustion Turbines) in Title 40, Part 60 of the Code of Federal Regulations (40 CFR 60).

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 emissions. Tammy McWade 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.