TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

APPLICANT

Florida Power and Light Company
700 Universe Blvd.
Juno Beach, Florida 33408

Martin Power Plant
Facility ID No. 0850001

PROJECT

Draft Permit Revision No. 0850001-032-AC (PSD-FL-146H / PSD-FL-327F)
Application for Minor Source Air Construction Permit

Excess Emissions Revision

COUNTY

Martin County, Florida

PERMITTING AUTHORITY

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

Telephone: (850) 717-9000
Fax: (850) 717-9097

Revised October 18, 2013

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 Chapters 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 in Rule 62-204.800, F.A.C.

Facility Description and Location

The Florida Power and Light Company (FPL) operates the existing Martin Power Plant, which is categorized under Standard Industrial Classification Code No. 4911. The facility is located in Martin County at 21900 Southwest Warfield Boulevard in Indiantown, Florida. The UTM coordinates of the existing facility are Zone 17, 542.68 km East, and 2992.65 km North.

The existing facility consists of the following emissions units:

Emissions Units 001 and 002: Two oil and natural gas fired conventional fossil fuel steam electric generating stations (Units 1 and 2); the maximum capacity of each steam turbine driven electrical generator is 863.3 megawatts (MW).

Emissions Units 003 - 006: Two oil and natural gas fired combined cycle combustion turbine systems (two "2-on-1" sets) (Units 3 and 4), each gas turbine is nominally rated at 170 MW, with a matched unfired heat recovery steam generator (HRSG). Each pair of the gas turbines (3A/3B and 4A/4B) shares a common steam turbine driven electrical generator rated at 160 MW each. The total generating capacity of each 2-on-1 turbine system is approximately 500 MW.

Emissions Units 011, 012, 017 and 018: Collectively regulated as Unit 8, this unit is a "4-on-1" combined cycle system which consists of four oil and natural gas fired combustion turbine/HRSG systems with a single steam turbine electrical generator. Each of the four gas combustion turbines (8A, 8B, 8C and 8D) is nominally rated at 170 MW, with a matched 495 million British thermal units per hour (MMBtu/hr) gas-fired HRSG, and a single 470 MW steam turbine driven electrical generator that serves all four CT/HRSG systems, and associated support equipment. Nitrogen oxides (NO_X) emissions are controlled by using Dry Low NO_X (DLN) combustors for natural gas and steam injection for fuel oil firing. A selective catalytic reduction (SCR) system, in combination with the other NO_X controls, further reduces NO_X emissions during combined cycle operation. The total generating capacity of this combined cycle combustion turbine system is approximately 1,150 MW. There is also a solar thermal facility on-site that produces steam, which is used to augment the steam produced by the Unit 8 HRSGs, thus reducing fossil fuel use in the duct burners when adequate sunlight is available.

This facility also includes one auxiliary boiler, emergency generators, four hurricane emergency shelter stationary spark ignition engine driven generators, two storage oil tanks, a mechanical cooling tower, and four electrical fuel line heaters (to heat up the natural gas fuel prior to introduction into the CT, when needed). Also included in this permit are additional unregulated emissions units identified as facility-wide particulate matter (PM) and volatile organic compounds (VOC) emissions.

Figure 1. Aerial View of the FPL Martin Power Plant, Location near Indiantown and Lake Okeechobee

This site is in an area that is in attainment (or designated as unclassifiable) for all air pollutants subject to Ambient Air Quality Standards (AAQS).

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 62-213, 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 facility operates units subject to the National Emissions Standards for Hazardous Air Pollutants (NESHAP) of 40 CFR 63.
- The facility is subject to the Clean Air Interstate Rule (CAIR) set forth in Rule 62-296.470, F.A.C.
- Emissions units at this facility are <u>not</u> subject to Compliance Assurance Monitoring (CAM) for one or more of the following reasons: they do not trigger the potential pre-air pollution control device major source emission thresholds; they demonstrate continuous compliance with a continuous emission monitoring system (CEMS); they are not equipped with air pollution control device(s); they are equipped with device(s) which are considered to be inherent to the process/operation.
- The facility is identified as a major source of green house gas (GHG) pollutants.

Project Description

On May 14, 2013, FPL submitted an application for an air construction permit revision to change several of the underlying construction permit conditions related to excess emissions provisions for all of the gas combustion turbines during periods of startup, shutdown and malfunctions, and excess emissions while conducting DLN tuning as well as Full Speed No Load (FSNL) testing which is recommended by the equipment manufacturer following a major overhaul.

Because FPL is striving to gain more consistency in its Title V permits for the 7 FA combustion turbine fleet, it has proposed common language to certain specific conditions that pertain to like combustion turbines. This common language has evolved as FPL has gained experience in operating and maintaining these turbines and developing proper protocol. These changes, primarily affecting excess emissions identification during startup (both cold and warm), shutdown and malfunction periods, and during tuning sessions (including full speed no load trip tests and

green rotor run-in periods), are acceptable to the Department because proper operator management of these transient conditions results in less steady state emissions and is therefore beneficial to the environment.

The revised conditions will provide FPL more flexibility and consistency with other air construction permit revisions for similar units at other FPL facilities. Also, FPL requested that annual and renewal carbon monoxide (CO) tests be utilized in lieu of annual and renewal volatile organic compounds (VOC) testing for the gas combustion turbines, and to change the language to eliminate conditions pertaining to fuel oil firing for the Auxiliary Boiler EU007. In addition to these changes, FPL requested that the certification of CO monitors be allowed to use quality assurance procedures conforming to the requirements of 40 CFR 60 Part 75. Please refer to the associated air construction permit revision (permit No. 0850001-032-AC (PSD-FL-146H/PSD-FL-327F) document for the details of the changes.

The proposed project involves no physical changes and no obvious operational changes to the facility. It does not involve any maintenance, repair or replacement tasks. The request for an air construction permit revision was submitted in conjunction with the routine application to renew five-year facility Title V air operation permit No. 0850001-033-AV.

Processing Schedule

05/14/2013 Received the application for an air construction permit revision to be processed concurrently with Title V permit renewal.

08/09/2013 The Department issued a draft concurrent permit package.

08/23/2013 The Department received comments from the applicant on the draft permit package.

AIR POLLUTION REGULATIONS AND APPLICABILITY DETERMINATIONS

Department 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:

Table 1. Applicable Air-Related Rules from the Florida Administrative Code

Chapter	Description
62-4	Permits
62-17	Power Plant Siting
62-204	Air Pollution Control – General Provisions
62-210	Stationary Sources of Air Pollution – General Requirements
62-212	Stationary Sources – Preconstruction Review
62-213	Operation Permits for Major Sources (Title V) of Air Pollution
62-296	Stationary Sources – Emission Standards
62-297	Stationary Sources – Emissions Monitoring

2. PSD APPLICABILITY FOR PROJECT

The project will revise miscellaneous underlying air construction/PSD permit specific conditions. No physical construction is required or authorized. The project will not cause or authorize any increases in emissions nor change the allowable capacity of the units. Therefore, this project is not subject to PSD preconstruction review.

3. DEPARMENT PROJECT REVIEW

For the current project, the applicant has requested an air construction permit revision to revise several specific conditions of previously issued air construction permit Nos. PSD-FL-146 and 0850001-020-AC/PSD-FL-327C (previously revised permit Nos. 0850001-010-AC/PSD-FL-327 and.0850001-016-AC/PSD-FL-327B), for the combined cycle combustion turbine systems, Units 3 and 4 (two "2-on-1" sets, which consist of four General Electric combustion turbines (CT) with matched unfired heat recovery steam generators (HRSG)), and Unit 8 (one "4-on-1" set, which consists of four General Electric CT with gas-fired HRSG providing steam to a single steam turbine driven electrical generator).

Figure 2. Combined Cycle - Combustion Turbine with Heat Recovery Steam Generator

A. Changes to Specific Permit Conditions Based on Applicant's Request.

The applicant requested changes to Specific Condition 4 of the original air construction permit No. PSD-FL-146, for emission Units 003 - 006 and Specific Condition 16 of permit No. 0850001-020/PSD-FL-327C (previously revised permit Nos. 0850001-010-AC/PSD-FL-327 and 0850001-016-AC/PSD-FL-327B), for emission Units 011, 012, 017 and 018, as explained below:

1. FPL proposes changes to the language regarding excess emissions allowed and continuous emissions monitoring system (CEMS) data that may be excluded from the appropriate averaging periods during startup, shutdown and documented malfunctions of the combustion turbine/HRSG systems. FPL believes that they have gained experience in operating and maintaining their GE fleet and that the revised language would give them more flexibility in their operation. The proposed language will be consistent with the other air construction permit revisions for similar units at other FPL facilities.

   The Department agrees with these changes. Specifically:

   a. Specific conditions in 0850001-010-AC/PSD-FL-327 allow different methods of operation. The current permit does not include defined periods of normal operation of the combustion turbine/HRSG system for fuel switches, warm startup, shutdown and malfunction. Therefore, defined periods for "Gas Turbine/HRSG

System Warm Startup," "Shutdown Gas Turbine/HRSG System," and "Documented Malfunction" for the combustion turbine/HRSG systems are added to the permit language.

b. The word "excess" is changed to "excluded" to clearly indicate which data are allowed to be excluded from the averaging period.

c. Excess emissions of NO_X and CO resulting from startup, shutdown, or malfunction shall be excluded from CEMS data. The requested clarifications are made as shown in the draft permit revision document.

2. FPL requested that manufacturer required Full Speed No Load (FSNL) trip tests be added to the *Dry Low NO_X (DLN) tuning* specific condition for exclusion of data from the CEMS compliance demonstration with an advance notice to the compliance authority of at least one working (business) day.

   The Department agrees with FPL and the changes were made in the draft permit as requested. This flexible language has been approved for other FPL facilities recently in similar air construction permits.

3. FPL requested that annual and renewal CO tests be utilized as a surrogate in lieu of annual and renewal VOC emissions testing for the Units 3 and 4 gas combustion turbines (EU 003 – 006). The purpose of this change is to align this facility with the permit language in other FPL facilities which have recognized that VOC testing by an outside contractor is costly and overly burdensome to the facility considering that historical data indicates that VOC emissions are negligible.

   VOC emissions are formed due to incomplete combustion of fuel. Through the implementation of good combustion practices, FPL claims that these combustion turbines are very efficient at reducing VOC emissions to very low levels. Also, according to the manufacturer (GE), even lower VOC emissions have been achieved during recent tests of the DLN technology when firing gas.

   Based on the above reasons, the Department agrees that VOC testing for the gas combustion turbines only is required if the annual CO test indicates an exceedance of the CO standard. The specific condition related to the VOC testing requirements has been revised in the construction permit.

4. The auxiliary steam boiler, EU 007, was originally permitted under PSD-FL-146 to fire both natural gas and oil. The equipment necessary to burn fuel oil was not installed prior to the construction expiration date of the PSD permit. The current operations permit includes a permitting note stating, *"If it is ever desired to fire oil in this unit, a new source review applicability determination and related construction permit will be required to provide the authority to modify the unit and to evaluate current applicable regulations at the time of the request. Conditions within this subsection that pertain to the firing of oil have been retained due to their establishment in the underlying PSD permit; however, they shall not apply unless or until a construction permit is issued that provides the authority to modify the unit to accommodate oil firing".* In order to classify this unit as a "gas 1 unit" pursuant to 40 CFR 63, Subpart DDDDD, FPL requested to permanently eliminate any conditions pertaining to fuel oil firing for the Auxiliary Boiler from the PSD permit, and to clearly remove oil firing as a method of operation. To achieve this classification, specific condition 7 of permit No. PSD-FL-146, has been revised in the construction permit to restrict operation of the Auxiliary Boiler to the firing of only natural gas.

5. FPL requested that the protocol for certifying the CO monitors be expanded to allow the use of the quality assurance procedures contained in 40 CFR 75. This request is specifically for Unit 8 (EU's 011,012,017 and 018).

   The Department agrees with FPL and the changes were made in the draft permit as requested. This language has been approved for other FPL facilities recently in similar air construction and Title V permit revisions.

6. FPL elected to use 40 CFR Part 75 Appendix D, fuel flow monitoring for continuous sulfur dioxide (SO_2) emission monitoring in lieu of requiring a SO_2 CEMS for EU 001 and EU 002. The permittee may use the EPA Methods 6, 6A, 6B, or 6C test methods, incorporated by reference in Chapter 62-297, F.A.C., to demonstrate compliance; however, the permittee elected to demonstrate compliance using fuel sampling and analysis. This protocol is allowed because the emissions unit does not have an operating flue gas desulfurization device.

Pursuant to 40 CFR 60.45(b)(2), for a fossil-fuel-fired steam generator that does not use a flue gas desulfurization device, a CEMS for measuring SO_2 emissions is not required if the owner or operator monitors SO_2 emission by fuel sampling and analysis.

While modified conditions were issued in the early 1990's to increase the allowable sulfur content of the fuel oil being fired in these boilers and requirements for continuous demonstration of compliance imposed, the requirements for continuous monitoring were specified as that "which was required by 40 CFR 60.45". From correspondence related to the increase in allowable sulfur content, it is clear that continuous emissions monitoring systems (CEMS) were to have been installed on the stacks in order to demonstrate continuous compliance with the SO_2 limitations. However, 40 CFR 60.45 allows the use of fuel sampling and analysis to be used in place of a CEMS. Because this is allowed by the Federal rule and because these emissions units are predominantly firing natural gas, the Department agrees that the maintaining the stack CEMS is not necessary, provided the requirements for fuel sampling and analysis are met. Because the AC permit imposed compliance in accordance with 40 CFR 60.45 and did not specifically impose stack CEMS, no revisions to the AC permit are necessary and the recognition of the option to use fuel sampling and analysis will be added to the Title V air operation permit.

7. FPL Requested to use continuous monitoring in lieu of stack tests for demonstrating compliance with the SO_2 and NO_X emissions limits for Units 1 and 2. To accommodate this request, a new condition for Units 1 and 2 is created in the permit (see Specific Condition 9.)

8. FPL also requested that continuous compliance with the CO limits, as demonstrated by the CO CEMS, be utilized as a surrogate in lieu of annual and renewal VOC emissions testing for the Unit 8 gas combustion turbines (EU 011, 012, 017 and 018).

   For the same reasons given in item 3, above, the Department agrees that annual or renewal VOC testing for the gas combustion turbines only is required if the CO CEMS data indicates an exceedance of the CO standard. The specific condition related to the VOC testing requirements has been revised in the construction permit, accordingly.

B. Changes to Permits.

In general, the Department finds the requested changes acceptable based on the applicant's assurance that these Units are in compliance with all of the emissions limits. Where helpful, clarifications will be made to better define the language of the specific conditions.

See the draft permit for a detailed description of the changes being made as part of the project. These documents, along with all other associated documents in the issued permit package, can be accessed by entering the file number in the permit number field at this web link. http://www.dep.state.fl.us/air/emission/apds/default.asp

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.

Yousry (Joe) Attalla 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 Office of Permitting and Compliance at Mail Station #5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.