Duke Energy Florida, Inc. (DEF)
P. L. Bartow Power Plant
Facility ID No. 1030011
St. Petersburg, Florida

Title V Air Operation Permit Renewal
Permit No. 1030011-020-AV

APPLICANT

The applicant for this project is Duke Energy Florida, Inc. The P. L. Bartow Plant is located in Pinellas County at 1601 Weedon Island Drive, St. Petersburg. The applicant's responsible official is Mr. Christopher Bradley, Sr. Environmental Specialist.

FACILITY DESCRIPTION

Duke Energy Florida (DEF) operates the P.L. Bartow Plant, which is an existing power plant (SIC No. 4911). The plant is located at Weedon Island approximately 83 km south of the PSD Class I Chassahowitzka Wilderness Area.

This power plant consists of: four combined cycle combustion turbine-electrical generators (designated as Unit 4); four natural gas fired process fuel heaters; a diesel fueled emergency fire pump; two diesel fuel storage tanks; four simple cycle gas turbine peaking units (designated as Nos. P-1, P-2, P-3 and P-4); and insignificant emissions units.

The Duke Energy Bartow Plant consists of the following emissions units (E.U.):

E.U. ID	Emission Unit Description
Regulated Emissions Units	
-005	56 MW Gas Turbine Peaking Unit #P-1
-006	56 MW Gas Turbine Peaking Unit #P-2
-007	56 MW Gas Turbine Peaking Unit #P-3
-008	56 MW Gas Turbine Peaking Unit #P-4
-038	Unit 4A – One 215 MW (ISO) Combustion Turbine with Duct-fired Heat Recovery Steam Generator
-039	Unit 4B – One 215 MW (ISO) Combustion Turbine with Duct-fired Heat Recovery Steam Generator
-040	Unit 4C – One 215 MW (ISO) Combustion Turbine with Duct-fired Heat Recovery Steam Generator
-041	Unit 4D – One 215 MW (ISO) Combustion Turbine with Duct-fired Heat Recovery Steam Generator
-044	Four Nominal 3 MMBtu/hr Gas-fired Process Heaters
-046	One Nominal 300 horsepower Diesel-fueled Emergency Fire Pump
Insignificant Emissions Units and Activities	
Insignificant Emissions Units and Activities (See Appendix I-1.)	

Units 005-008 consists of four combustion turbines fired with natural gas and/or No. 2 fuel oil, manufactured by General Electric (model number MS7000) and designated as Gas Turbine Peaking Units #P-1, #P-2, #P-3 and #P-4. The manufacturer's fuel flow and heat input ratings for each turbine are 5,174 gallons per hour of No. 2 fuel oil, or 714 million cubic feet per hour of natural gas (corresponds to approximately 714 million Btu per hour , at 59 degrees F). The actual heat input rate of the turbine is a function of the ambient temperature. These combustion turbines are used as peaking units during peak demand times to run a nominal 56 MW generator

(each). Emissions from the combustion turbines are uncontrolled. Each combustion turbine has its own stack. Each combustion turbine began commercial operation in 1972.

Units 038 -041 designated as Unit 4 consists of four combined cycle combustion turbine-electrical generators with a nominal rating of 215 MW each at ISO conditions when practicing power augmentation; four duct-fired heat recovery steam generators (HRSGs) each equipped with a selective catalytic reduction (SCR) reactor and a nominal 500 million Btu per hour (MMBtu/hr) duct burner; and a single nominal 420 MW steam-electrical generator (STG). Each CT within the combined cycle unit system is permitted to operate in simple cycle by directing the exhaust to a bypass stack instead of the respective heat recovery steam generator exhaust stack. All eight stacks measure approximately 120 feet in height. All combined cycle CTs are equipped with evaporative coolers to condition incoming air at high ambient temperatures and wet injection capability for nitrogen oxides control when firing fuel oil or when practicing power augmentation. Each CT is allowed to fire backup low sulfur (<0.05% S) distillate fuel oil for 1,000 hours per year (hr/yr). These units commenced operation in November and December 2008.

Unit 044 consists of four small gaseous-fueled process heaters (3 MMBtu/hr) that serve Unit 4. The four process heaters are used for the purpose of heating the natural gas supply. These units commenced operation in November/December 2008.

Unit 046 consists of one nominal 300-hp (224 kW) emergency diesel engine-driven fire pump-and 500 gallon fuel oil storage tank that serves Unit 4. This unit commenced operation in November/ December 2008.

On June 1, 2009, the existing three (3) fossil fuel fired steam generating units were permanently shut down.

PROJECT DESCRIPTION

The purpose of this permitting project is to renew the existing Title V permit 1030011-016-AV. Also, this permitting action will revise some of the permit specific conditions.

PRIMARY REGULATORY REQUIREMENTS

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

Title IV: The facility operates unit (Unit 4) subject to the acid rain provisions of the Clean Air Act. Units 1, 2 and 3 were shut down on June 1, 2009. The allowances for SO_2 that were allocated for Units 1, 2 and 3 are preserved by the facility and will be allocated for new Unit 4 and Unit 5, if constructed. Retired Unit exemption form for Units 1, 2 and 3 was already provided and was included in previous Title V Permit 1030011-016-AV. The following emission units are currently subject to the Acid Rain Program.

Regulation	EU No(s).
40 CFR 75 Acid Rain Monitoring Provisions	038, 039, 040, 041

Title V: The facility is a Title V major source of air pollution in accordance with Chapter 62-213, Florida Administrative Code (F.A.C.).

PSD: The facility is a Prevention of Significant Deterioration (PSD)-major source of air pollution in accordance with Rule 62-212.400, F.A.C.

NSPS: The facility operates units subject to the New Source Performance Standards (NSPS) of 40 Code of Federal Regulations (CFR) 60. The following emission units at the facility are subject to NSPS requirements.

Regulation	EU No(s).
40 CFR 60, Subpart A, NSPS General Provisions	038, 039, 040, 041, 046
40 CFR 60, NSPS Subpart KKKK	038, 039, 040, 041
40 CFR 60, NSPS Subpart IIII	046

NESHAP: The facility operates units subject to the National Emissions Standards for Hazardous Air Pollutants (NESHAP) of 40 CFR 63. The following emission units at the facility are subject to NESHAP requirements.

Regulation	EU No(s).
40 CFR 63, Subpart A, NESHAP General Provisions	038, 039, 040, 041, 044, 046
40 CFR 63, Subpart DDDDD	044
40 CFR 63, Subpart YYYY	038, 039, 040, 041
40 CFR 63, Subpart ZZZZ	046

CAIR: The facility is subject to the Clean Air Interstate Rule (CAIR) set forth in Rule 62-296.470, F.A.C. The following emission units are currently subject to CAIR.

Regulation	EU No(s).
40 CFR 96: Clean Air Interstate Rule	005, 006, 007, 008, 038, 039, 040, 041

CAM: Compliance Assurance Monitoring (CAM) does not apply to any of the units at the facility. Unit 4 is equipped with Acid Rain continuous emissions monitoring systems (CEMS) that are also used to demonstrate continuous compliance with the nitrogen oxides (NO_X) limits.

GHG: The facility is identified as a major source of greenhouse gas (GHG) pollutants.

Standard Industrial Classification (SIC) Code: 4911 – Electrical Generation.

North American Industry Classification System (NAICS) Code: 221112 - Fossil Fuel Electric Power Generation.

Florida Power Plant Siting Act (Siting): The facility was not certified pursuant to Siting under 403.501-519, F.S. or Chapter 62-17, F.A.C. [Design; Letter from Applicant to Siting Office dated December 19, 2005]

PROCESSING SCHEDULE AND RELATED DOCUMENTS

These documents and all related correspondence are on file with the permitting authority:
Title V Application received May 19, 2014
Draft Title V permit sent out on July 21, 2014
Publication of the Public Notice on July 25, 2014
Title V Permit Renewal No. 1030011-020-AV. Effective date January 1, 2015

PROJECT REVIEW

Several changes/revisions/deletions were made as part of this permit renewal.

1. The following Section I paragraphs were deleted from permit 1030011-016-AV:
   - Subsection A, Facility Description last two paragraphs (deletion of bullets fourth and fifth).
   - Subsection B, Summary of Emissions Units Table (deletion of E.U. 004, 045, 047 and Appendix U).
   - Subsection C, Applicable Regulation Tables (deletion of regulation related to E.U. 004).
2. The following Section III subsections were deleted from permit 1030011-016-AV:
   - Subsection A - One 15.5 MMBtu/hr Bartow-Anclote Pipeline Heating Boiler (E.U. 004).
   - Subsection C - Three Relocatable Diesel Generators (E.U. 047); Subsection C.
   - Subsection F - Two Nominal 3,500,000 gallon Distillate Fuel Oil Storage Tanks (E.U. 045)
3. The following Appendix was deleted from permit 1030011-016-AV:
   - Appendix U, List of Unregulated Emissions Units and/or Activities.
4. Updates to Section I, Subsection C: Applicable Regulations to include 40 CFR 60, Subpart DDDDD.

5. Updates to Section II, Facility Wide Conditions: Revisions to Conditions FW.7 and FW.8.

6. Updates to entire Section III subsections to read as follows in new Permit 1030011-020-AV:
   - A. E.U. 005 – 008: Four 56 MW Gas Turbine Peaking Units.
   - B. E.U. 038 – 041: Four ("4-on-1") 215 MW Combined Cycle Gas Turbines.
   - C. E.U. 044 - Four 3 MMBtu/hr Gas-fired Process Heaters.
   - D E.U. 046 - One 300 horsepower Diesel-fuel Emergency Fire Pump.

7. Detailed revisions to Section III, new Subsection B (old subsection D) *Siemens SGT6-501 F gas turbine-electrical generator set (Units 4A-4D)*:

   A. Changes to the language references from dry low NOx (DLN) to ultra-low NOx (ULN) throughout Section III, Subsection B in order to maintain consistency.

   B. Deletion of the language for the submission of the manufacturer's performance curves (or equations) from *Subsection B - Specific Condition No. B.10, Permitted Capacity* since these curves were already submitted during the initial compliance testing.

   C. Revision of *Subsection B - Specific Condition No. B.14, Restricted Operation* to include the compliance metric of 4.7 billion cubic feet per year instead of the 9,736 hours per year aggregate for the four DBs during any consecutive 12-month period.

   D. Revision and clarification *of Specific Condition No. B. 16, New Source Performance Standards* by adding NOx limits language while operating at or <u>above</u> 75% peak load on gas or oil and <u>below</u> 75% peak load in units of ppm corrected to 15% oxygen.

   E. Revisions to several paragraphs of *Subsection B - Specific Condition No. B. 23, Excess Emissions Allowed and Allowable Data Exclusion:*

      a. Change to the documental malfunction time metric in the first paragraph of this Condition from "2 hours" to "120 minutes" since 120 minutes non-continuous is equivalent to 2 hours.

      b. Change to the *Steam Turbine/HRSG System Cold Startup* timing from "at least 48 hours" to "24-hours or longer".

      c. Addition of new condition to define a *Hot Startup of the Steam Turbine/HRSG* provisions.

      d. Modification of the *CT/HRSG System Cold Startup* definition by deleting language referring to the steam drum pressure and replacing it by a more specific language: "CT/HRSG starting up and blending into combined cycle service after that CT/HRSG has seen off-line for 4 hours or longer."

      e. Deletion to the reference to the *Simple Cycle Start up* provisions as requested.

      f. Addition of a Compliance Requirements table for clarity for this condition.

   F. Revision to paragraph d. of *Subsection B - Specific Condition No. B. 27, CEM Data Requirements* to revise the references to ultra-low NOx (ULN).

   G. Revision to *Subsection B - Specific Condition No. B.31, Annual Compliance Tests* to specifically identify by separate paragraphs the specific Annual Compliance Test for each pollutant.

   H. Adding the sulfur analysis method ASTM D7039-07 for fuel oil containing 2 to 500 ppm sulfur to *Specific Condition No. B.38, Fuel Sulfur Records*.

8. Section III - Subsection C (old subsection E) *Four Small Gaseous-fueled Process Heaters (3 MMBtu/hr*): Addition of Subpart DDDDD applicable requirements in new Specific Conditions C.1 & C.9.

9. Section III - Subsection D (old subsection G) *One nominal 300-hp emergency diesel fire pump engine and 500 gallon fuel oil storage tank*: Revision to the allowable hours of operation of this unit (40 hour/year) in *Specific Condition D. 3* to reflect the applicable rule requirement or up to 100 hours for maintenance and testing in accordance with the 40 CFR Part 60, Subpart IIII – Standards of Performance for Stationary Compression

Ignition Internal Combustion Engine, specifically, Part 60.4211(f). In addition the sulfur analysis method ASTM D7039-07 was added to Specific Condition D.13 (old G.8) for fuel oil containing 2 to 500 ppm sulfur.

10. Updates to Section IV, Acid Rain with new application.
11. Updates to Section V, Clean Air Interstate Rule (CAIR) with new application.
12. Updates to Section VI, Appendix I – List of Insignificant Emissions Units and/or Activities by adding the two diesel fuel storage tanks (EU 045) and additional proposed activities (refer to Application 1030011-020-AV).
13. Updates to Section VI: Inclusion of Appendix DDDDD, NESHAP, Subpart DDDDD for Industrial, Commercial, and Institutional Boilers and Process Heaters in the Appendices section.
14. Updates to Section VI: Revision to Appendices RR, TV and TR with the latest versions.

CONCLUSION

This project renews Title V air operation permit No. 1030011-016-AV, which had an effective date of January 1, 2009. This Title V air operation permit renewal is issued under the provisions of Chapter 403, Florida Statues (F.S.), and Chapters 62-4, 62-210, 62-213 and 62-214, F.A.C.