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PERMITTEE

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Juno Beach, Florida 33408

Authorized Representative:
Brad Williams, Plant General Manager

Air Permit No. PSD-FL-327E
Project No. 0850001-026-AC
Martin Power Plant Unit 8
Combustion Turbine Improvements
Permit Expires: March 31, 2012
Martin County

PROJECT

This is the final air construction permit, which modifies original Permit No. PSD-FL-327 that authorized the construction of Unit 8 a "4-on-1" combined cycle system. This revision authorizes the replacement and upgrade of certain components on the gas turbines, a nominal 1,150 megawatts (MW) combined cycle unit. The proposed work will be conducted at the existing Martin Power Plant, which is an electric utility power plant categorized under Standard Industrial Classification No. 4911. The existing facility is located in Martin County at 21900 Southwest Warfield Boulevard in Indiantown, Florida. The UTM coordinates are Zone 17, 542.68 km East and 2992.65 km North.

This final permit is organized into the following sections: Section 1 (General Information); Section 2 (Administrative Requirements); Section 3 (Emissions Unit Specific Conditions); Section 4 (Appendices). Because of the technical nature of the project, the permit contains numerous acronyms and abbreviations, which are defined in Appendix A of Section 4 of this permit. As noted in the Final Determination provided with this final permit, only minor changes and clarifications were made to the draft permit.

STATEMENT OF BASIS

This air pollution construction permit is issued under the provisions of: Chapter 403 of the Florida Statutes (F.S.) and Chapters 62-4, 62-204, 62-210, 62-212, 62-296 and 62-297 of the Florida Administrative Code (F.A.C.). The permittee is authorized to conduct the proposed work in accordance with the conditions of this permit. This project is subject to the general preconstruction review requirements in Rule 62-212.300, F.A.C. and is not subject to the preconstruction review requirements for major stationary sources in Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality.

Executed in Tallahassee, Florida
For the Division of Air Resource Management

(DRAFT)

_____ _____
(Name) (Date)

_____
(Print Name of Designated Representative)

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this Final Air Permit package (including the Final Determination and Final Permit with Appendices) was sent by electronic mail, or a link to these documents made available electronically on a publicly accessible server, with received receipt requested before the close of business on _____ to the persons listed below.

Mr. Brad Williams, FPL: david.williams@fpl.com
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Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to Section 120.52(7), Florida Statutes, with the designated agency clerk, receipt of which is hereby acknowledged.

(DRAFT)

_____ _____
(Clerk) (Date)

FACILITY DESCRIPTION

This facility consists of two oil and natural gas fired conventional fossil fuel steam electric generating stations (Units 1 and 2), two oil and natural gas fired combined cycle units (Units 3 and 4), four oil and natural gas fired combined-cycle combustion turbines (Unit 8), and associated support equipment.

Units 1 and 2 are fossil fuel fired steam electric generators consisting of boiler/steam generators which drive single reheat turbine generators, and are equipped with low nitrogen oxides (NO_X) dual fuel firing burners to reduce emissions of NO_X, and multicyclones, with fly ash reinjection, to control particulate matter emissions. The maximum capacity of each generator is 863.3 megawatts (MW).

Units 3 and 4 combined cycle combustion turbine systems (two "2-on-1" sets) consist of two General Electric Model PG7221 FA combustion turbines (CT) each nominally rated at 170 MW, with a matched unfired heat recovery steam generator (HRSG) and a 160 MW single steam turbine-electrical generator that serves the pair of gas turbines/HRSG systems. In addition, each system also includes inlet foggers installed at the compressor inlet to each of the CT units which reduce the turbine inlet air temperature. The temperature reduction improves the heat rate and increases power due to the cooler/denser inlet air. NO_X emissions are controlled by using dry low NO_X combustors for natural gas with steam injection for fuel oil firing. Steam injection is also used for power augmentation. The total generating capacity of each turbine system is approximately 500 MW.

Unit 8 combined cycle combustion turbine system ("4-on-1") consists of four General Electric Model PG7241 FA turbines (also known as the 7FA.03), each nominally rated at 170 MW, with a matched 495 million British thermal units per hour (mmBtu/hr) gas-fired HRSG, and a 470 MW single steam turbine-electrical generator that serves all four gas turbines/HRSG systems. In addition, the system also includes an automated gas turbine control system, inlet air filtration systems, evaporative inlet air cooling systems, exhaust stacks that are 120 feet in height and 19 feet in diameter, and associated support equipment. Natural gas is the primary fuel, with very low sulfur distillate oil as a limited backup fuel. Emissions of carbon monoxide (CO), particulate matter (PM/PM_{10}), sulfur dioxide (SO_2), and volatile organic compounds (VOC) are minimized by the efficient combustion of these clean fuels at high temperatures. Dry low-NO_X (DLN) combustion technology for gas firing and water injection for oil firing reduce NO_X emissions during simple cycle operation. A selective catalytic reduction system in combination with the other NO_X controls further reduces NO_X emissions during combined cycle operation. The total generating capacity of this turbine system is approximately 1,150 MW.

There is also a solar thermal facility on-site that produces steam, which is used in Unit 8 HRSG, thus reducing fossil fuel use when adequate sunlight is available.

This facility also includes one auxiliary boiler, two diesel generators (one unregulated), two storage oil tanks, a mechanical cooling tower, and four electrical heaters. Also included in this permit is an additional unregulated emissions unit identified as facility-wide PM and VOC emissions.

PROPOSED PROJECT

The applicant proposes to upgrade the four CTs associated with Unit 8 during an otherwise routine maintenance outage. The changes will increase the efficiency and power output of each CT by installing new hot gas path components, combustion liners, flow sleeves and new control software characteristic of the more recent GE Model 7FA.04 CT to increase firing temperature. Details of the project are provided in the application and the enclosed Technical Evaluation and Preliminary Determination. The combined-cycle combustion turbines are Acid Rain Units. The following emission units (EU) are affected by this air construction permit.

EU No.	Emission Unit Description
011	Combustion Turbine with Heat Recovery Steam Generator (CT 8A)
012	Combustion Turbine with Heat Recovery Steam Generator (CT 8B)
017	Combustion Turbine with Heat Recovery Steam Generator (CT 8C)
018	Combustion Turbine with Heat Recovery Steam Generator (CT 8D)

FACILITY REGULATORY CLASSIFICATION

- 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 (CAA).
- 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(PSD), F.A.C.
- The facility operates units subject to the New Source Performance Standards (NSPS) of 40 Code of Federal Regulations (CFR) 60.
- The facility operates units subject to the National Emissions Standards for Hazardous Air Pollutants (NESHAP) of 40 CFR 63.

SECTION 2. ADMINISTRATIVE REQUIREMENTS (DRAFT)

1. Permitting Authority: The permitting authority for this project is the Office of Permitting and Compliance, Division of Air Resource Management, Florida Department of Environmental Protection (Department). The Office of Permitting and Compliance mailing address is 2600 Blair Stone Road (MS #5505), Tallahassee, Florida 32399-2400. All documents related to applications for permits to operate an emissions unit shall be submitted to the Departments Southeast District at: 400 North Congress Avenue, Suite 200, West Palm Beach, Florida 33401.

2. Compliance Authority: All documents related to compliance activities such as reports, tests, and notifications shall be submitted to the Departments Southeast District at: 400 North Congress Avenue, Suite 200, West Palm Beach, Florida 33401.

3. Appendices: The following Appendices are attached as a part of this permit: Appendix A (Citation Formats and Glossary of Common Terms); Appendix B (General Conditions); and Appendix C (Common Conditions).

4. Applicable Regulations, Forms and Application Procedures: Unless otherwise specified in this permit, the construction and operation of the subject emissions units shall be in accordance with the capacities and specifications stated in the application. The facility is subject to all applicable provisions of: Chapter 403, F.S.; and Chapters 62-4, 62-204, 62-210, 62-212, 62-213, 62-296 and 62-297, F.A.C. Issuance of this permit does not relieve the permittee from compliance with any applicable federal, state, or local permitting or regulations.

5. New or Additional Conditions: For good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions, and on application of the permittee, the Department may grant additional time. [Rule 62-4.080, F.A.C.]

6. Modifications: The permittee shall notify the Compliance Authority upon commencement of construction. No new emissions unit shall be constructed and no existing emissions unit shall be modified without obtaining an air construction permit from the Department. Such permit shall be obtained prior to beginning construction or modification. [Rules 62-210.300(1) and 62-212.300(1)(a), F.A.C.]

7. Source Obligation: At such time that a particular source or modification becomes a major stationary source or major modification (as these terms were defined at the time the source obtained the enforceable limitation) solely by exceeding its projected actual emissions, then the requirements of subsections 62-212.400(4) through (12), F.A.C., shall apply to the source or modification as though construction had not yet commenced on the source or modification. [Rule 62-212.400(12), F.A.C.]

8. Application for Title V Permit: This permit authorizes construction of the permitted emissions units and initial operation to determine compliance with Department rules. A Title V air operation permit is required for regular operation of the permitted emissions unit. The permittee shall apply for a Title V air operation permit at least 90 days prior to expiration of this permit, but no later than 180 days after commencing operation. To apply for a Title V operation permit, the applicant shall submit the appropriate application form, compliance test results, and such additional information as the Department may by law require. The application shall be submitted to the appropriate Permitting Authority with copies to the Compliance Authority. [Rules 62-4.030, 62-4.050, 62-4.220 and Chapter 62-213, F.A.C.]

9. Actual Emissions Reporting: This permit is based on an analysis that compared baseline actual emissions with projected actual emissions and avoided the requirements of subsection 62-212.400(4) through (12), F.A.C. for several pollutants. Therefore, pursuant to Rule 62-212.300(1)(e), F.A.C., the permittee is subject to the following monitoring, reporting and recordkeeping provisions as described in Section 3, Specific Condition No. 4.

10. NSPS, Subpart KKKK Applicability Determination: The permittee shall submit an applicability analysis related to 40 CFR 60, Subpart KKKK – Standards of Performance for Stationary Combustion Turbines with the Title V Permit application required by Section 2, Condition 8 above and as detailed in Section 3, Specific Condition No. 4.

B. UNIT 8 COMBINED CYCLE - GAS TURBINES (EU 011, 012, 017, 018)

This section of the permit addresses the following emissions units.

EU No.	Emission Unit Description
011	Combustion Turbine with Heat Recovery Steam Generator (CT 8A)
012	Combustion Turbine with Heat Recovery Steam Generator (CT 8B)
017	Combustion Turbine with Heat Recovery Steam Generator (CT 8C)
018	Combustion Turbine with Heat Recovery Steam Generator (CT 8D)

Each EU consists of a nominal 170 MW General Electric Model PG 7241 FA (series 7FA.03) gas turbine-electrical generator set, an automated gas turbine control system, an inlet air filtration system, an evaporative inlet air cooling system, a heat recovery steam generator (HRSG) each equipped with a 495 mmMBtu/hr natural gas fired duct burner, a stack, and associated support equipment. Steam from each HRSG is delivered to the single steam turbine-electrical generator, which has a nominal capacity of 470 MW. The total nominal generating capacity of the "4 on 1" combined cycle unit system is 1,150 MW. Each stack is 120 ft tall (19 ft diameter). At a compressor inlet air temperature of 59° F, each gas turbine heat input (LHV) is approximately ~~1,600~~ 1,660 mmBtu/hr (gas) and ~~1,811~~ 1,885 mmBtu/hour (oil). The exhaust flow rate is 1,004,200 actual cubic feet per minute (acfm) (gas) and 1,193,900 acfm (oil) at a temperature of 202° F and 295° F, respectively.

The units are fired with natural gas as the primary fuel and distillate oil as a restricted alternate fuel. The efficient combustion of natural gas at high temperatures minimizes emissions of CO, PM/PM_{10}, SAM, SO_2, and VOC. NO_X emissions are reduced by Dry Low-NO_X (DLN) combustion technology (simple cycle mode). A selective catalytic reduction (SCR) system combined with Dry Low-NO_X (DLN) combustion technology further reduces NO_X emissions during combined cycle mode. These emissions units commenced commercial operation in June 2005.

Each gas turbine is equipped with continuous emissions monitoring system (CEMS) to measure and record CO and NO_X emissions as well as flue gas oxygen or carbon dioxide content.

PREVIOUS APPLICABLE REQUIREMENTS

1. Other Permits: The conditions of this permit supplement all previously issued air construction and operation permits for these emissions units. Unless otherwise specified, these conditions are in addition to all other applicable permit conditions and regulations. [Rule 62-4.070, F.A.C.]

MODIFIED PERMIT CONDITIONS

Changes referring to original Permit No. PSD-FL-327 and the subsequent modifications and amendments for this project, Permit PSD-FL-327E (Project 0850001-026-AC), will identify each specific condition as currently modified and show the new revisions. New text will be shown with double underline and deleted text will be shown with ~~strikethrough~~.

2. Permitted Capacity - Gas Turbines: Specific Condition III.A.6 of PSD-FL-327 is replaced with the with the following condition:

   The maximum heat input rate to each gas turbine is ~~1,600~~ 1,660 mmBtu per hour when firing natural gas and ~~1,811~~ 1,885 mmBtu per hour when firing distillate oil (based on a compressor inlet air temperature of 59° F, the LHV of each fuel, and 100% load). Heat input rates will vary depending upon gas turbine characteristics, ambient conditions, alternate methods of operation, and evaporative cooling. The permittee shall provide manufacturer's performance curves (or equations) that correct for site conditions to the Permitting and Compliance Authorities within 45 days of completing the initial compliance testing. Operating data may be adjusted for the appropriate site conditions in accordance with the performance curves and/or equations on file with the Department. [Rule 62-210.200(PTE), F.A.C.]

EQUIPMENT

3. Combustion Turbine Improvements on Unit 8: The permittee is authorized to conduct the following work on Unit 8 including the replacement of various components of the Series 7FA.03 gas turbines with upgraded components of the Series 7FA.04 version including (but not limited to) the following:

   - New hot gas path components;
   - New combustion liners and flow sleeves; and
   - New control software.

   [Application No. 0850001-026-AC]

REPORTING REQUIREMENTS

{Permitting Note: Continuous compliance with the CO and NO_X standards will be demonstrated by CEMS. Other required stack tests may be conducted during the next scheduled period in accordance with existing permit conditions.}

4. Actual Emissions Reporting: This permit is based on an analysis that compared baseline actual emissions with projected actual emissions and avoided the requirements of subsection 62-212.400(4) through (12), F.A.C. for several pollutants. Therefore, pursuant to Rule 62-212.300(1)(e), F.A.C., the permittee is subject to the following monitoring, reporting and recordkeeping provisions.

   a. The permittee shall monitor the emissions of any PSD pollutant that the Department identifies could increase as a result of the construction or modification and that is emitted by any emissions unit that could be affected; and, using the most reliable information available, calculate and maintain a record of the annual emissions, in tons per year on a calendar year basis, for a period of 5 years following resumption of regular operations after the change. Emissions shall be computed in accordance with the provisions in Rule 62-210.370, F.A.C., which are provided in Appendix C of this permit.

   b. The permittee shall report to the Department within 60 days after the end of each calendar year during the 5-year period setting out the unit's annual emissions during the calendar year that preceded submission of the report. The report shall contain the following:

      1) The name, address and telephone number of the owner or operator of the major stationary source;
      2) The annual emissions calculations pursuant to the provisions of 62-210.370, F.A.C., which are provided in Appendix C of this permit;
      3) If the emissions differ from the preconstruction projection, an explanation as to why there is a difference; and
      4) Any other information that the owner or operator wishes to include in the report.

   c. The information required to be documented and maintained pursuant to subparagraphs 62-212.300(1)(e)1 and 2, F.A.C., shall be submitted to the Department, which shall make it available for review to the general public.

   d. For this project, the permittee estimated the following baseline actual emissions: 82.75 tons/year of CO; 195.25 tons/year of NO_X; 14.68 tons/year of SO_2; 44.72 tons/year of VOC; 40.33 tons/year of PM/PM_{10}; and 2.25 tons/year of sulfuric acid mist (SAM).

   e. The Department has identified NO_X and CO as the only PSD-pollutants that could reasonably increase as a result of this modification. The permittee shall use the installed CEMS to determine and report the actual annual emissions of NO_X and CO for the purpose of comparisons with baseline actual emissions.

   [Application 0850001-026-AC; and Rules 62-212.300(1)(e) and 62-210.370, F.A.C.]

5. NSPS, KKKK Applicability Determination: The permittee shall conduct tests in accordance with 40 CFR 60, Appendix C - Determination of Emission Rate Change. The permittee shall submit the data with

the Title V Permit application required by Section 2, Condition 8 above. The submittal shall include a preliminary inference whether the short-term NO_X emission rates (in pounds per hour), while operating in the normal combined cycle mode and burning natural gas, after the change are greater than before the change with 95% confidence and an analysis regarding the applicability of 40 CFR 60, Subpart KKKK – Standards of Performance for Stationary Combustion Turbines. The tests shall be conducted using the installed NO_X CEMS with the units operated as if a manual test were being performed. Valid data using the averaging time which would be required if a manual emission test were being conducted shall be used. The number (n) of runs shall be between 20 and 29. [Application 0850001-026-AC]