Florida Department of Environmental Protection

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PERMITTEE

Tampa Electric Company
P.O. Box 111
Tampa, FL 33601-0111

Authorized Representative:
Karen Sheffield, Director Polk Power Station

Air Permit No. 1050233-027-AC
Permit Expires: December 31, 2015
Minor Air Construction Permit

Polk Power Station
HTSC/CCS Demonstration Project

PROJECT

This is the final air construction permit, which authorizes the installation and operation of a high-temperature syngas cleanup system (HTSC) and an integrated carbon capture and sequestration (CCS) system. The proposed work will be conducted at the existing Polk Power Station, which is a electrical generating plant categorized under Standard Industrial Classification No. 4911. The existing facility is located in Polk County at 9995 State Route 37 South in Mulberry, Florida. The UTM coordinates are Zone 17, 402.45 km East, and 3067.35 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). As noted in the Final Determination provided with this final permit, no changes 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.

Upon issuance of this final permit, any party to this order has the right to seek judicial review of it under Section 120.68 of the Florida Statutes by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department of Environmental Protection in the Office of General Counsel (Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000) and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The notice must be filed within 30 days after this order is filed with the clerk of the Department.

Executed in Tallahassee, Florida

Jeffery F. Koerner
2011.11.17 14:16:26 -05'00'

(Electronic Signature and Date)

Jeffery F. Koerner, Program Administrator
Office of Permitting and Compliance
Division of Air Resource Management

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) 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 the date indicated below to the following persons.

Ms. Karen Sheffield, TECO: kasheffield@tecoenergy.com
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Mr. Byron Burrows, TECO: btburrows@tecoenergy.com
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Ms. Lynn Scearce, DEP PC Reading File: lynn.scearce@dep.state.fl.us
Ms. Barbara Friday, DEP PP Reading File: barbara.friday@dep.state.fl.us

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.

Lynn Scearce
2011.11.17 14:25:33 -05'00'

(Electronic Signature of Clerk and Date)

FACILITY DESCRIPTION

Polk Power Station is an electric power plant, which is categorized under Standard Industrial Classification Code No. 4911. The existing Polk Power Station is located in Polk County at 9995 State Road 37 South in Mulberry, Florida. The UTM coordinates are Zone 17, 402.45 km East, and 3067.35 km 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).

The facility is an integrated gasification combined-cycle (IGCC) plant consisting of Unit 1 (EU 001) a 260 megawatt (MW) (electric) combined cycle combustion turbine, which fires synthesis gas (syngas) produced from gasification of solid fuels including coal and petroleum coke (petcoke) or No. 2 fuel oil; an auxiliary boiler (EU 003), which fires No. 2 fuel oil; a sulfuric acid plant (EU 004); a solid fuel handling system (EU 005); a solid fuel gasification system (EU 006); Units 2 and 3 (EU 009 and 010) are two nominal 165 MW simple cycle gas turbines firing either natural gas or No. 2 fuel oil; and, Units 4 and 5 (EU 011 and 012) are two nominal 165 MW simple cycle gas turbines that fire only natural gas.

PROPOSED PROJECT

The project consists of installation and operation a pre-commercial scale demonstration high-temperature syngas cleanup system (HTSC) and an integrated carbon dioxide (CO_2) capture and sequestration (CCS) system at the Polk Power Station. The demonstration project will include a high-temperature desulfurization process, trace contaminant removal process and direct sulfur recovery process. These cleanup systems will be integrated with the existing IGCC Unit 1. Emission sources associated with this demonstration project includes two small heaters, one sorbent storage hopper, on regenerator fines storage bin and one amine surge drum.

A slipstream of syngas from the IGCC plant will be treated in the cleanup systems to simulate commercial operations. The high-temperature desulfurization process will remove 99.9 percent (%) of the sulfur in the syngas. The trace contaminant removal process will reduce arsenic, selenium and mercury concentrations in the syngas. The direct sulfur recovery process will convert sulfur dioxide (SO_2) to commercial-grade elemental sulfur. The high level of sulfur removal in the high-temperature desulfurization process will provide a syngas stream from which activated methyldiethanolamine (aMDEA) will be used to capture up to 90% of the CO_2 in the cleaned syngas. A pressurized pipeline will transfer the compressed CO_2 to an onsite injection well for injection and sequestration in a deep saline aquifer geologic formation.

The demonstration project is planned to commence construction in March 2012 and be completed by April 2013. The goal for the operation phase is to achieve at least 8,000 hours of operation during the approximate 18 month demonstration period, which is expected to be completed in the third quarter of 2015.

This project will add the following emissions units.

EU No.	Emission Unit Description
015	High-Temperature Syngas Cleanup System (HTSC) and Carbon Capture and Sequestration System (CCS)

FACILITY REGULATORY CLASSIFICATION

- The facility is not 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.
- The facility operates units subject to the New Source Performance Standards in Part 60, Title 40 of the Code of Federal Regulations (CFR).

SECTION 2. ADMINISTRATIVE REQUIREMENTS

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.

2. Compliance Authority: All documents related to compliance activities such as reports, tests, and notifications shall be submitted to the Southwest District Office at: 13051 N. Telecom Parkway, Temple Terrace, Florida 33637-0926.

3. 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.

4. 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.]

5. 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.]

6. Source Obligation:

   (a) 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.]

7. 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.]

B. HTSC and CCS System Demonstration Project (EU 015)

This section of the permit addresses the following emissions units.

EU No.	Emission Unit Description
015	High-Temperature Syngas Cleanup System (HTSC) and Carbon Capture and Sequestration System (CCS)

{Permitting Note: The temporary cleanup systems will be integrated with the existing integrated coal gasification combined-cycle (IGCC) Unit 1 to remove more than 99.9% of sulfur in the synthetic gas (syngas) slipstream and capture 90% of the carbon dioxide (CO_2) in the clean syngas slipstream for subsequent geological sequestration. The demonstration project is planned to commence construction in March 2012 and be completed by April 2013. The goal for the operation phase is to achieve at least 8,000 hours of operation during the approximate 18 month demonstration period, which is expected to be completed in the third quarter of 2015.

COMPLIANCE WITH EXISTING PERMIT CONDITIONS

1. Existing Permits: This permit supplements all existing valid permits. The permittee shall continue to comply with all applicable conditions from valid air construction and facility Title V operation permits. [Permit No. 1050233-026-AV]

EQUIPMENT

2. High-Temperature Syngas Cleanup System: The permittee is authorized to install and operate the following processes:
   a. High-temperature desulfurization process;
   b. Trace contaminant removal process; and
   c. Direct sulfur recovery process.

   [Application No. 1050233-027-AC]

3. Carbon Capture and Sequestration System: The permittee is authorized to install and operate the following processes:
   a. Water gas shift reactor system;
   b. Low-temperature gas cooling system.
   c. Activated amine CO_2 capture system.
   d. CO_2 compression and drying system.
   e. CO_2 deep well injection sequestration system.

   [Application No. 1050233-027-AC]

4. High-Temperature Desulfurization Process Startup Heater: The permittee is authorized to install and operate the startup process heater that will fire propane, natural gas and ultra-low sulfur diesel (ULSD) fuel oil with a design heat input rate of approximately 24 million British thermal units (MMBtu)/hour. [Application No. 1050233-027-AC]

5. Direct Sulfur Recovery Process Tailgas Recycle Heater: The permittee is authorized to install and operate the tailgas recycle heater that will fire only propane with a design heat input rate of approximately 2 MMBtu/hour. [Application No. 1050233-027-AC]

6. Miscellaneous Ancillary Equipment: The permittee is authorized to install and operate the adsorber sorbent hopper, aMDEA surge drum and regenerator fines bin. [Application No. 1050233-027-AC]

PERFORMANCE RESTRICTIONS

7. Hours of Operation: The hours of operation for the temporary high-temperature syngas cleanup system and integrated CO_2 capture and sequestration system are not limited (8,760 hours per year).