**FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION**
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**PERMITTEE**

Tampa Electric Company
702 North Franklin Street
Tampa, Florida 33602

Authorized Representative:
Byron Burrows, Manager – Air Programs

Air Permit No. 0570039-065-AC
Permit Expires: January 1, 2016
Minor Air Construction Permit

Big Bend Station
Units 1 – 4 Natural Gas Igniters Project

**PROJECT**

This is the final air construction permit, which authorizes the removal of the existing fuel oil igniters and the installation of new igniters and associated equipment that will allow the fossil fuel fired steam generating boilers (Units 1 – 4) to burn natural gas instead of fuel oil during startup, shutdown, flame stabilization, and as a supplemental fuel. The proposed work will be conducted at the existing Big Bend Station, which is an electric power facility categorized under Standard Industrial Classification No. 4911. The existing facility is located in Hillsborough County at 13031 Wyandotte Road in Apollo Beach, Florida. The UTM coordinates are Zone 17, 363.15 kilometers (km) East and 3074.91 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); and 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.

**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* Jeffrey 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 Air Permit package 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.

Mr. Byron Burrows, TEC: btburrows@tecoenergy.com
Mr. Robert Velasco, TEC: ravelasco@tecoenergy.com
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Ms. Barbara Friday, DEP OPC: barbara.friday@dep.state.fl.us
Ms. Lynn Scearce, DEP OPC: lynn.scearce@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.

## FACILITY DESCRIPTION

Tampa Electric Company operates the Big Bend Station, which is an electric power facility. The Big Bend Station is a nominal 2,028 megawatt (MW) electric generation facility. This facility consists of four fossil fuel fired boiler electrical generating units (Units 1 – 4); four steam turbine electrical generators; one simple-cycle combustion turbine (CT No. 1); solid fuels, fly ash, limestone, gypsum, slag, bottom ash storage and handling facilities; and, fuel oil storage tanks.

## PROPOSED PROJECT

The applicant, Tampa Electric Company, is requesting to replace the existing fuel igniters and associated equipment that will allow the fossil fuel fired steam generating boilers (Units 1 – 4) to burn natural gas instead of fuel oil as a supplemental fuel. The applicant is proposing the following changes to the boilers:

- Replace 24 fuel oil igniters on each boiler (Units 1 through 3) with natural gas igniters.
- Replace 20 fuel oil igniters on Unit 4 with natural gas igniters.
- Replace and/or modify the existing guide tubes on each boiler.
- Install new natural gas igniter piping and valve stations.
- Modify the igniter guns to accommodate the firing of natural gas.
- Modify and upgrade the entire ignition system to accommodate firing natural gas.
- Modify the windbox wall on each boiler to install the new igniters.

According to the applicant, the proposed ignition systems will have the capacity to co-fire with natural gas or operate on natural gas only during low loads; therefore is requesting to increase the use of natural gas as a supplemental fuel. The conversion to natural gas will not increase steam production rate of the boilers.

The following existing emissions units (EU) will be affected by this project.

| EU ID | Emission Unit Description |
|---|---|
| 001 | Fossil Fuel Fired Steam Generator Unit No. 1 |
| 002 | Fossil Fuel Fired Steam Generator Unit No. 2 |
| 003 | Fossil Fuel Fired Steam Generator Unit No. 3 |
| 004 | Fossil Fuel Fired Steam Generator Unit No. 4 |

## 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.
- 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 does operate units subject to the New Source Performance Standards (NSPS) of 40 Code of Federal Regulations (CFR) 60.
- The facility does operate units subject to the National Emissions Standards for Hazardous Air Pollutants (NESHAP) of 40 CFR 63.

## SECTION 2. ADMINISTRATIVE REQUIREMENTS

1. Permitting Authority: The permitting authority for this project is the Office of Permitting and Compliance in the Division of Air Resource Management of the 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 Environmental Protection Commission of Hillsborough County at: 3629 Queen Palm Drive, Tampa, Florida 33619. Phone: 813/627-2600

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); Appendix C (Common Conditions); and Appendix D (Common Testing Requirements).

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. Construction and Expiration. The expiration date shown on the first page of this permit provides time to complete the physical construction activities authorized by this permit, complete any necessary compliance testing, and obtain an operation permit. Notwithstanding this expiration date, all specific emissions limitations and operating requirements established by this permit shall remain in effect until the facility or emissions unit is permanently shut down. For good cause, the permittee may request that that a permit be extended. Pursuant to Rule 62-4.080(3), F.A.C., such a request shall be submitted to the Permitting Authority in writing before the permit expires. [Rules 62-4.070(4), 62-4.080 & 62-210.300(1), F.A.C.]

8. 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 virtue of a relaxation in any enforceable limitation which was established after August 7, 1980, on the capacity of the source or modification otherwise to emit a pollutant, such as a restriction on hours of operation, 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.

   (b) 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.]

9. 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. Fossil Fuel Fired Steam Generator Units 1 – 4 (EU 001 – EU 004)

This section of the permit addresses the following emissions units.

| EU ID | Emission Unit Description |
|---|---|
| 001 | Fossil Fuel Fired Steam Generator Unit No. 1 |
| 002 | Fossil Fuel Fired Steam Generator Unit No. 2 |
| 003 | Fossil Fuel Fired Steam Generator Unit No. 3 |
| 004 | Fossil Fuel Fired Steam Generator Unit No. 4 |

Fossil fuel fired steam generating Units 1 through 4 have a combined electrical generating output of 1,821 MW. Units 1 through 3 each have a design electrical generating capacity of 445 MW. Unit 4 has a design electrical generating capacity of 486 MW. The fuel fired in all four units consists of coal, or a coal/petroleum coke blend containing a maximum of 20% petroleum coke by weight, or coal blended with coal residual generated from the Polk Power Station, or a coal/petroleum coke blend further blended with coal residual generated from the Polk Power Station, and on-site generated fly ash. In addition to the fuels allowed to be burned during normal operation, each unit currently burns new No. 2 fuel oil during startup, shutdown, flame stabilization, and during the start of an additional solid fuel mill on an already operating unit. This minor air construction permit authorizes the replacement of the existing fuel oil igniters with natural gas igniters, MaxFire Series 100 Gas Igniters (or equivalent to), to burn natural gas during startup, shutdown, flame stabilization, and as a supplemental fuel.

Nitrogen oxide ($NO_X$) emissions are controlled by low $NO_X$ burners (LNB), selective catalytic reduction (SCR) system, and Unit 4 also has a separated overfire air system (SOFA) system to further control $NO_X$. Particulate matter (PM) emissions from each unit are controlled by dry electrostatic precipitator (ESP), while sulfur dioxide ($SO_2$) emissions are controlled by wet flue gas desulfurization (FGD). Continuous opacity monitoring systems (COMS) are used to measure opacity. Units 1 through 3 are equipped with continuous emissions monitoring systems (CEMS) to measure $NO_X$, $SO_2$, and carbon dioxide ($CO_2$). Unit 4 is equipped with CEMS to measure $NO_X$, $SO_2$, $CO_2$, and carbon monoxide (CO). Unit 1 began operation in 1970, Unit 2 began operation in 1973, Unit 3 began operation in 1976, and Unit 4 began operation in 1985.

*{Permitting notes: Fossil Fuel Fired Steam Generator Unit Nos. 1 - 4 are regulated under the federal Acid Rain Program for Phase II $SO_2$ and $NO_X$; Rule 62-296.405(1), F.A.C., Fossil Fuel Steam Generators with More than 250 million Btu per Hour Heat Input; Rule 62-296.700(6), F.A.C., RACT PM - O&M Plan; Compliance Assurance Monitoring (CAM), adopted and incorporated by reference in Rule 62-204.800, F.A.C.; and, Rule 62-296.470, F.A.C., Clean Air Interstate Rule (CAIR). These emissions units are also regulated under a Consent Final Judgment (DEP vs. TEC) dated December 16, 1999. Units 1 - 3 were formerly regulated under the federal Acid Rain Program as Phase I $SO_2$ substitution units. Unit 4 is regulated under NSPS - 40 CFR 60, Subpart Da, Standards of Performance for Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978, adopted and incorporated by reference in Rule 62-204.800(8)(b)2., F.A.C.; Rule 212.400(5), F.A.C., Prevention of Significant Deterioration [PSD-FL-040]; and Power Plant Siting Certification [PA 79-12].}*

### 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.]

### EQUIPMENT

2. Fossil Fuel Fired Steam Generator Units 1 - 4: The permittee is authorized to remove the existing fuel oil igniters and to install natural gas igniters, natural gas igniter piping and valve station, modify and upgrade the Burner Management System and associated equipment for Units 1 - 4 in order to burn natural gas instead of fuel oil during startup, shutdown, flame stabilization and as a supplemental fuel. [Design and Application]

**PERFORMANCE RESTRICTIONS**

3. Design and Permitted Capacities:

   a. Design Capacity: The design heat input rate from the combustion of coal or coal and natural gas combined are as follows:

| Unit No. | Heat Input MMBtu/hour |
|---|---|
| 1 | 4,037 |
| 2 | 3,996 |
| 3 | 4,115 |
| 4 | 4,330 |

*{Permitting Note: These design heat input rates are based on the original design of each unit for firing coal with a certain lower heating value (LHV) that was used to design each boiler. At any given time, the actual heat input rate is a function of the actual demand load, the coal mass firing rate, and the fuel properties of the coal being fired at that time. Although the above design capacity is not intended as an operational restriction, the permittee shall obtain the appropriate air construction permits before making any physical or operational changes that would increase the actual heat input rate capability of the unit.}*

   b. Permitted Capacity:

      (1) The annual heat input rates from the combustion of natural gas while co-firing coal and natural gas during the annual calendar year shall not exceed the following:

| Unit No. | Heat Input MMBtu/year |
|---|---|
| 1 | 5,015,495 |
| 2 | 4,295,353 |
| 3 | 5,029,622 |
| 4 | 5,534,935 |

      (2) Units 1 – 4: The annual heat input rate to Units 1 - 4 from firing natural gas during low-load operation shall not exceed 1,514,460 million British thermal Units (MMBtu) during the calendar year.

*{Permitting Note: The higher heating value (HHV) of coal is approximately 23.6 MMBtu/tons of coal and the natural gas HHV is approximately 1,020 MMBtu/million cubic feet of gas. Low-load natural gas firing is when the SCR controls are not operating and does not include natural gas fired during startup, shutdown and flame stabilization.}*

[Rules 62-4.160(2), 62-210.200(PTE), and 62-296.405(1), F.A.C.; Permit No. 0570039-053-AC; Design and Application]

4. Authorized Fuels:

   a. *Coal and Coal Blends.*

      (1) Coal is the primary fuel burned in Units 1 - 4.

      (2) Coal and Coal Blends: Units 1 – 4 are authorized to burn coal, or a coal/petroleum coke blend, or coal blended with raw coal residual, or a coal/petroleum coke blend further blended with raw coal residual. In any case, the petroleum coke content of any fuel blend shall not exceed 20% by weight during normal operation.

      (3) Raw Coal Residual: The proposed work shall not increase the permitted firing of 200 tons/day of raw coal residual in Units 1 - 4 combined.

      (4) Fly Ash Residual: Units 1 – 4 are authorized to re-inject on-site generated fly ash residual for energy.

b. *Natural Gas.*

(1) Natural gas is authorized to be fired during low-load operation, startup, shutdown, flame stabilization, and during the start of an additional solid fuel mill on an already operating unit.

(2) Natural gas is authorized to be fired in combination with coal during normal operation as a supplemental fuel.

*{Permitting note: During normal operation the SCR controls will be in use.}*

[Rule 62-210.200(PTE), F.A.C.; Permit No. 0570039-053-AC; and Application]

5. Restricted Operation: The hours of operation are not limited (8760 hours per year). [Rules 62-4.070(3) and 62-210.200(PTE), F.A.C.]

**TESTING REQUIREMENTS**

6. Volatile Organic Compounds (VOC) Initial Testing: Emissions of VOC shall be tested on the first available steam generating unit (Units 1 – 4) when firing coal during normal operation prior to the conversion to natural gas igniters and once again on the same steam generating unit after the conversion is complete when co-firing coal and natural gas. The test data shall be used to provide reasonable assurance that the VOC emission factors used in the application for the combustion of natural gas was a good representation in determining future potential VOC emissions and to ensure PSD is not triggered.
[Rules 62-4.070(3), F.A.C.]

*{Permitting note: If the tests show that VOC emissions factor is higher on Units 1 – 4, a construction permit will be submitted prior to exceeding the PSD threshold for VOC to revise the allowable annual heat input rates to escape PSD.}*

7. Test Requirements: The permittee shall notify the Compliance Authority in writing at least 15 days prior to any required tests. Tests shall be conducted in accordance with the applicable requirements specified in Appendix D (Common Testing Requirements) of this permit. [Rule 62-297.310(7)(a)9, F.A.C.]

8. Test Methods: Required tests shall be performed in accordance with the following reference methods.

| Method | Description of Method and Comments |
|---|---|
| 1-4 | Traverse Points, Velocity and Flow Rate, Gas Analysis, and Moisture Content |
| 25A | Method for Determining Gaseous Organic Concentrations (Flame Ionization) |

The above methods are described in Appendix A of 40 CFR 60 and are adopted by reference in Rule 62-204.800, F.A.C. No other methods may be used unless prior written approval is received from the Department. [Rules 62-204.800 and 62-297.100, F.A.C.; and Appendix A of 40 CFR 60]

**RECORDS AND REPORTS**

9. Operational Records: To demonstrate compliance with the operational restrictions in Specific Condition 3.b., the permittee shall establish and maintain the following records when natural gas is being fired in steam generator Units 1 - 4:

a. Record daily the natural gas heat input rate when each unit is co-firing coal and natural gas during normal operation;

b. Record daily the natural gas heat input rate when each unit is firing natural gas during low-load operation;

c. Record daily the natural gas heating value, which shall be obtained from the natural gas transmission company and kept on file and made available to the Department upon request;

d. Within 30 calendar days following each month, calculate each units natural gas heat input rate when co-firing coal and natural gas for the month and total for the calendar year; and

e. Within 30 calendar days following each month, calculate all four units combined natural gas heat input rate during low-load operation for the month and total for the calendar year.

[Rule 62-4.070(3), F.A.C.]

10. 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 calendar years following the year in which resumption of regular operations after the change occurred. 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. The permittee shall compute and report annual emissions in accordance with Rule 62-210.370(2), F.A.C. as provided by Appendix C of this permit. For this project, the permittee shall use the following methods in reporting the actual annual VOC and NOx emissions for Units 1 – 4:

(1) When calculating the actual annual emissions of VOC, the permittee shall use the heat input rates of Units 1 – 4 and VOC emission factor established from the test data obtained from the first available steam generating unit (Units 1 – 4) to determine and report the actual annual emissions of VOC.

(2) The permittee shall use data collected from the CEMS to determine and report the actual annual emissions of NOx for Units 1 – 4 during all operating modes.

(3) Unless otherwise approved by the Department, the permittee shall use the same emissions factors for reporting the actual annual emissions of VOC as used in the application to establish baseline emissions.

(4) As defined in Rule 62-210.370(2), F.A.C., the permittee shall use a more accurate methodology if it becomes available.

*{Permitting Note: Baseline emissions of $NO_X$ and VOC were determined to be 4,700.4 tons/year and 95.7 tons/year, respectively.}*

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