



**TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION**

APPLICANT

Tampa Electric Company
Post Office Box 111
Tampa, Florida 33601-0111

Big Bend Station
Facility ID No. 0570039

PROJECT

Project No. 0570039-074-AC
Application for Minor Source Air Construction Permit
SO₂ Emissions Reduction Project

COUNTY

Hillsborough 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

January 15, 2015

1. GENERAL PROJECT INFORMATION

1.1. 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.

1.2. Glossary of Common Terms

Because of the technical nature of the project, the permit contains numerous acronyms and abbreviations, which are defined in Appendix A of this permit.

1.3. Facility Description and Location

Tampa Electric Company (TEC) Big Bend Station is an electric power facility consisting of four key fossil fuel fired steam generating units (Units 1 – 4). The facility is categorized under Standard Industrial Classification Code No. 4911. The existing Big Bend Station is located in Hillsborough County at 13031 Wyandotte Road in Apollo Beach, Florida. The UTM coordinates of the existing facility are Zone 17, 363.15 kilometers (km) East, and 3074.91 km North. This site is an area that is in attainment (or designated as unclassifiable) for all pollutants subject to a National Ambient Air Quality Standard (NAAQS) except for a small nearby area designated as nonattainment for the 1-hour SO₂ standard. **Figure 1** shows the location of TEC Big Bend Station in Florida while **Figure 2** shows a view of the Big Bend Station.



Figure 1. Location of TEC Big Bend Station.



Figure 2. TEC Big Bend Station.

The Big Bend Station is a nominal 1,892 megawatt (MW) electric generation facility. This facility consists of four fossil fuel fired electrical generating Units 1 – 4; four steam turbine electrical generators (STEG); two simple-cycle combustion turbines (SCCT) 4A and 4B sharing a common electrical generator; solid fuels, fly ash, limestone, gypsum, slag, bottom ash storage and handling facilities; and fuel oil storage tanks.

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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 burns new No. 2 fuel oil during startup, shutdown, flame stabilization, and during the startup of an additional solid fuel mill on an already operating unit.

For each unit, nitrogen oxide (NO_x) emissions are controlled by low-NO_x burners and a selective catalytic reduction system, particulate matter (PM) emissions are controlled by a dry electrostatic precipitator, and sulfur dioxide (SO₂) emissions are controlled by wet flue gas desulfurization (FGD). Unit 4 also has a separate over-fire air system to further control NO_x emissions. Continuous opacity monitoring systems (COMS) are used to measure opacity. Units 1 through 4 are equipped with continuous emissions monitoring systems (CEMS) to measure NO_x, SO₂, and carbon dioxide (CO₂). Unit 4 is also equipped with CEMS to measure carbon monoxide (CO). These units began operation in 1970 (Unit 1), 1973 (Unit 2), 1976 (Unit 3), and 1985 (Unit 4).

S Units 4A and 4B consist of one PWPS FT8-3® SwiftPac® aero-derivative SCCT-electrical generator to operate in simple cycle mode. The SwiftPac® consists of two combustion turbines coupled to one common generator having a nominal gross generation capacity of 62 MW. Each SCCT is allowed to fire pipeline-quality natural gas and ultra-low sulfur distillate fuel oil. Each SCCT is equipped with water injection to minimize NO_x emissions and an oxidation catalyst to minimize CO and volatile organic compounds (VOC) emissions.

Only the following emissions units are affected by this project.

TABLE 1 – AFFECTED EMISSION 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

1.4. 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 operates units subject to the Clean Air Interstate Rule (CAIR) set forth in Rule 62-296.470, F.A.C.
- 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 does operate units subject to the New Source Performance Standards (NSPS) of 40 CFR 60.
- The facility does operate units subject to the National Emissions Standards for Hazardous Air Pollutants (NESHAP) of 40 CFR 63.

1.5. Project Description

The purpose of the project is to reduce SO₂ emissions and ambient impacts from the facility. Specifically, the draft permit establishes an SO₂ emissions cap of 3,162 pounds per hour (lb/hour) based on a 30-day rolling average over existing fossil fuel fired electrical generating units (Units 1 – 4, combined). Over the years, TEC has made substantial upgrades to the controls to reduce SO₂ emissions including: the installation of wet FGD

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scrubbers; splitting Units 3 and 4 ducts to exhaust through individual stacks and to remove FGD bypass capabilities; and removing FGD bypass capabilities for Units 1 and 2 prior to exhausting through a shared stack. More recently, TEC made the following improvements to enhance the performance of the FGD systems to increase removal efficiency and further reduce SO₂ emissions:

Units 1 and 2 FGD System

- Add FGD tower wall ring to deflect the flue gas away from the walls of the towers.
- Replace slurry nozzles in FGD tower absorber with new double-headed nozzles to increase the number of spray nozzles and enhance gas-liquid contact within the towers.

Units 3 and 4 FGD System

- Replace slurry nozzles in FGD Absorber Towers A and B with new double-headed nozzles to increase the number of spray nozzles and enhance gas-liquid contact within the towers for better SO₂ removal efficiency.
- In FGD Absorber Towers C and D: replace slurry nozzles with new redesigned spray headers to increase the number of spray nozzles and enhance gas-liquid contact within the towers; install larger motors on the recycle pumps for the spray headers to boost head pressure and improve the spray pattern; and relocate the dual-flow trays in each tower to a lower elevation to increase effectiveness.
- Replace the flue gas inlet ductwork to FGD Absorber Tower C to reduce pressure loss and balance the uneven gas flow distribution between Absorber Towers C and D.

1.6. Processing Schedule

On August 29, 2014, the Division received the application for a minor air pollution construction permit. The application was deemed complete on September 28, 2014.

2. NEW SOURC REVIEW (NSR) APPLICABILITY

The Department regulates major NSR in accordance with Florida's preconstruction review program pursuant to Rule 62-212, F.A.C. The Big Bend Station is an existing PSD major stationary source. The proposed project will reduce potential and actual SO₂ emissions from Units 1 through 4. Because potential and actual SO₂ emissions will be reduced and there are no expected emission increases of any other regulated pollutants, major NSR does not apply.

3. DEPARTMENT REVIEW

Again, the purpose of the project is to reduce SO₂ emissions and ambient impacts from the facility. Specifically, the draft permit establishes an SO₂ emissions cap of 3,162 pounds per hour (lb/hour) based on a 30-day rolling average over existing fossil fuel fired electrical generating units (Units 1 – 4, combined). Compliance will be demonstrated by the existing CEMS. In addition to the recent improvements to the wet FGD systems, TEC is currently replacing the existing fuel igniters (Permit No. 0570039-065-AC) and associated equipment to allow Units 1 - 4 to burn natural gas instead of fuel oil during startup, shutdown and flame stabilization.

3.1. Wet FGD System

Wet FGD is a process that removes SO₂ from exhaust flue gas in fossil fuel power plants such as coal and oil fired combustion units. When coal or oil is burned, approximately 95% of the sulfur present in the fuel is converted into SO₂ under standard temperature conditions. Traditionally, a FGD system consists of a caustic scrubbing liquid to absorb SO₂ present in the exhaust gas stream. In the FGD scrubbing systems used by TEC, the scrubbing liquid contains limestone to enhance the absorption of SO₂ and other acid gases. The FGD systems employ two stages: one for FGD sludge removal and the other for SO₂ removal. Limestone FGD systems are capable of removing SO₂ with efficiencies of more than 90%. Based on the SO₂ acid rain CEMS data for recent years, Units 1 through 4 will be able to comply with the proposed SO₂ emissions cap based on a 30-day rolling average in the draft permit.

3.2. Conclusion

Based on the application and the SO₂ CEMS data from the acid rain program, the Department has reasonable assurance that Units 1 through 4 will comply with the SO₂ emissions cap in the draft permit, which includes:

- SO₂ emissions from all four fossil fuel fired steam generating units (Units 1 - 4, combined) shall not exceed 3,162 lb/hour based on a 30-day rolling average. The new standard applies at all times including periods of startup and shutdown. Although TECO requested an effective date of August 31, 2017, the wet FGD system is fully functional with recent upgrades in place that were installed to ensure compliance with the new Mercury Air Toxics Standards (MATS) rule. Also, existing SO₂ emissions data shows that the combined emissions from Units 1 – 4 previously met the proposed cap more than 96% of the time – without an operational target and before the scrubber upgrades. The Department established an effective date for the SO₂ emissions cap of within 180 days of completing construction of the last natural gas igniter authorized by Permit No. 0570039-065-AC, but no later than June 1, 2016.
- Continuous compliance with the SO₂ emissions cap shall be demonstrated using data collected from the existing SO₂ CEMS. The CEMS data shall be used to determine, monitor and report the actual emissions of SO₂ for Units 1 – 4 during all operating modes including periods of startup and shutdown.
- If an exceedance of the SO₂ emission cap occurs, the permittee shall notify the Compliance Authority within one business day. The permittee shall submit a report to the Compliance Authority within 15 days of occurrence detailing the nature and cause of the exceedance, describing corrective actions taken, and identifying when the unit was returned to compliance.
- The applicant shall comply with the notification, record keeping and reporting requirements identified in the permit.

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. The project will reduce SO₂ emissions as well as ambient impacts in the vicinity of the facility. 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. Tammy McWade 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, by phone at (850) 717-9086 or by email at tammy.mcwade@dep.state.fl.us.