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BUREAU OF AIR REGULATION

May 23, 2003

Ms. Cindy Phillips
Florida Department of
Environmental Protection
111 South Magnolia Drive, Suite 4
Tallahassee, FL 32301

Via FedEx
Airbill No. 7915 9922 1706

**Re: Tampa Electric Company
Big Bend Station, Units 1-4
Application No. 0570039-013-AV
Request for Additional Information**

Dear Ms. Phillips:

Tampa Electric Company (TEC) has received the Florida Department of Environmental Protection's (the Department's or FDEP) request for additional information (RAI), dated August 29, 2002, addressing TEC's Big Bend Station Title V permit revision application. The Title V revision application was submitted to the Department in June 2002. In November of 2002, TEC requested an extension of the RAI to May 31, 2003. The FDEP granted the extension on December 18, 2002 to allow the continued evaluation of the impact that coal residual combustion has on nitrogen oxides (NO_x) and carbon monoxide (CO) emissions.

This correspondence is intended to provide a response to each specific issue raised by the Department in the RAI. For your convenience, TEC has restated each point and provided a response below each specific issue

FDEP Comment 1

The NO_x and CO testing required by Specific Condition No. 4 (Permit No. 0570039-012-AC) has not been completed. According to the application, TEC does not anticipate the completion of the testing until October 2002. Because TEC has not provided reasonable assurance that the burning of coal residual will not cause a significant net emissions increase, processing of the permit revision application can not be completed until the required tests have been conducted, submitted, and reviewed by Department and/or EPC personnel.

TEC Response

Background

In June 2002 TEC submitted a Title V operations permit revision application to the Department reflecting changes to operations at Big Bend Station. The Title V permit revision application addressed the use of coal residual fuel in Units 1 through 4.

In response to TEC's Title V operation permit revision application, in August 2002 the Department requested NO_x and CO stack test data to assess the effects of combusting coal residual fuel. The requested NO_x and CO stack test data was submitted with correspondence to the Department dated September 30, 2002.

In order to further evaluate coal residual emissions, TEC submitted a letter to the Department dated September 30, 2002 requesting that the expiration date of Permit No. 0570039-012-AC be extended to allow continued use of coal residual at Big Bend Station prior to issuance of a revised Title V operation permit. In response to this request, the Department extended the expiration date of Permit No. 0570039-012-AC to June 30, 2003 in a letter to TEC dated October 28, 2002. TEC has conducted additional CO and NO_x testing; these test results are summarized below.

Test Results

According to Section III, Specific Condition 4, TEC is required to perform stack testing to evaluate NO_x and CO emissions due to the combustion of coal residual. Enclosed, please find emissions reports for stack tests performed on October 23 and 24, 2002 for Unit 1 (EU.ID. 001), on April 23 and 24, 2003 for Unit 2 (EU.ID. 002) on November 12 and 13, 2002 for Unit 3 (EU.ID. 003), and on April 1 and 2, 2003 for Unit 4 (EU.ID. 004).

As stated in the Summary of Results for EU.ID. 001- 004, the average NO_x rate was derived from the Continuous Emissions Monitoring Systems (CEMS) and the average CO rate was derived using United States Environmental Protection Agency (USEPA) Test Methods 10 and 19. Table 1 below summarizes the NO_x and CO emission rates for baseline fuels, coal residual fuel blend tests, and the change in emission rates:

TABLE 1 – BIG BEND UNIT 1

Parameter	October 23, 2002 (Baseline)	October 24, 2002 (Coal Residual)	Difference
CO, tons/yr	3,168	2,289	-878
NO _x , tons/yr	12,318	13,032	714

TABLE 2 – BIG BEND UNIT 2

Parameter	April 23, 2003 (Baseline)	April 24, 2003 (Coal Residual)	Difference
CO, tons/yr	6,767	6298	-469
NO _x , tons/yr	8,583	9,949	1,366

TABLE 3 – BIG BEND UNIT 3

Parameter	November 12, 2003 (Baseline)	November 13, 2003 (Coal Residual)	Difference
CO, tons/yr	22,161	25,180	3,019
NO _x , tons/yr	10,241	10,478	237

TABLE 4 – BIG BEND UNIT 4

Parameter	April 1, 2003 (Baseline)	April 2, 2003 (Coal Residual)	Difference
CO, tons/yr	1,019	530	-489
NO _x , tons/yr	5,365	5,612	247

As is shown in the test results in the previous section, CO emission levels are highly variable. CO emissions are the product of incomplete combustion. In theory, boilers can mix air with fuel at stoichiometric amount oxygen for the combustion process. In practice, for safety and other considerations combustion conditions dictate the amount of additional or "excess air" that must be supplied to assure that all fuel is burned. Combustion efficiency (i.e., heat rate) is improved by operating the boiler with a minimum amount of excess air. However, insufficient combustion air will result in incomplete combustion. Balancing the combustion conditions is not a simple engineering task, because greater efficiency may reduce CO emissions but in turn lead to possible increases in NO_x emissions.

Combustion conditions that can lead to decreased efficiency, and in turn increased CO, include the following:

- **Burner/control system tolerances**
- **Furnace slagging**
- **Variations in boiler temperature, pressure, and relative humidity**
- **Control instrument accuracy and hysteresis**
- **Excess Oxygen levels**
- **Fuel fineness and distribution**
- **Natural variations in fuel composition**

The purpose of performing comparison testing is to isolate the impact of the change in question. In this case, TEC was attempting to isolate the impacts of blending 5 percent coal residual with a 95 percent coal/petcoke blend. Because of the small amount of coal residual that is blended with the fuel mix, it is important to ensure that all other operational parameters are kept as consistent as possible between the baseline and the blend tests. Although TEC attempted to achieve operational consistency between the baseline and blend tests, it has become apparent that CO emissions are more highly variable than anticipated. The additional testing performed proved that CO is highly variable because during the first series of tests performed in 2002 showed a significant increase in CO emissions. However, the additional testing indicated insignificant CO emission rate changes for Big Bend Station Units 1, 2, and 4.

Combustion conditions that can lead to increased NO_x emissions, include the following:

- **Thermal NO_x**
- **Prompt NO_x mechanism**
- **Fuel-bound nitrogen**
- **Excess Oxygen levels**

Thermal NO_x is produced when nitrogen and oxygen in the combustion air combine at high flame temperatures. Fuel NO_x is produced when nitrogen in the fuel combines with the excess oxygen in the combustion air and is only a problem with fuel oils containing fuel bound nitrogen. Prompt NO_x is formed during the early, low temperature states of combustion and is insignificant.

The fuel bound nitrogen contents of the solid fuels burned at the Big Bend Station are shown below in Table 5:

Fuel Type	Wt % (as received)	Wt % (DAF)	Wt % (Lb / MMBTU)	Wt % (HHV- BTU/Lb)
Sub-Bituminous Coal	0.71	1.01	0.79	(as received)
Bituminous Coal	1.42	1.7	1.15	9039
Pet Coke	1.62	1.77	1.16	12413
Coal Residual	0.66	1.18	0.89	14011

The amount of fuel bound nitrogen content in coal residual is comparable to other coal types as can be seen in Table 5. Therefore, the increase in NO_x emissions is truly not as a result of the coal residual, but more so of the variability in combustion.

Conclusion

Due to the lack of any technical reason why a small fuel blend of coal residual (i.e., 5% blend) would significantly alter NO_x and CO emissions. TEC believes that the available stack data simply reflects the normal short-term variability in NO_x and CO emission rates that occur with or without the combustion of coal residual. Accordingly, TEC believes it is reasonable to conclude that combustion of a small amount of coal residual fuel blend will not significantly change CO or NO_x emission rates. TEC plans to continue to evaluate the NO_x CEMS data to determine the effect of coal residual combustion over longer time periods.

In addition, NO_x emissions from the Big Bend Station will be significantly reduced in the future. As a result of the Consent Decree and the Consent Final Judgement that TEC entered with Environmental Protection Agency (EPA), the Department of Justice (DOJ) and the Department, TEC is required to install NO_x controls on all Big Bend units. Low NO_x burners have been installed in all four units at this time and TEC is investigating other different NO_x controls.

FDEP Comment 2

On page 10 of the application, Facility Supplemental Information, a waiver was requested for items 2 through 5 (Facility Plot Plan, Process Flow Diagram(s), Precautions to Prevent Emissions of Unconfined Particulate Matter, and Fugitive Emissions Identification). The comment field states "Items 1. through 5. Previously submitted – reference Big Bend Station initial Title V operation permit application." However, since the current revision application is to incorporate the handling and firing of coal residual, which includes the construction of a storage and handling building, items 2 through 5 should be resubmitted to include the new building and conveyor system(s).

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TEC Response

Enclosed in Attachment B are the Facility Plot Plan, Process Flow Diagram(s), Precautions to Prevent Emissions of Unconfined Particulate Matter (PM), and Fugitive Emissions Identification documents.

FDEP Comment 3

The Control Equipment/Method Description on page 77 of the application, states that the "Building is enclosed on three sides with natural, draft ventilation provided for safety reasons." Are there any openings in the building besides the unenclosed fourth side? If so, please give a more detailed description of these openings, including type, size, number and height from ground.

TEC Response

Besides the unenclosed fourth side, the other three sides have two ventilation spaces. The ventilation space is an opening that is 48 inches in height and spans the width of each side. The height of the opening is approximately 25 feet from the ground. The next opening is about 43 feet from the ground. Please reference the green highlighted section of the final residual building drawing enclosed in Attachment C.

FDEP Comment 4

Please submit an Operation and Maintenance Plan for the coal residual fuel storage building and conveyors as specified in 62.296.700(6)(c).

TEC Response

Enclosed is Attachment D is an Operation and Maintenance Plan for the coal residual fuel storage building.

FDEP Comment 5

In accordance with Rule 40 CFR 64.5(a)(2), a CAM Plan must be submitted as part of an application for a significant permit revision. Please submit a CAM Plan for Boiler Units 1 through 4, or submit a justification for not doing so.

TEC Response

FDEP has adopted the federal EPA Compliance Assurance Monitoring (CAM) requirements by reference per Rule 62-204.800(11), F.A.C. The EPA CAM regulations are codified in 40 Code of Federal Regulations (CFR) Part 64, *Compliance Assurance Monitoring*.

The CAM requirements of 40 CFR Part 64 are applicable to emission units that are:

- (a) subject to an emission limitation for a specific pollutant,
- (b) have potential pre-control device emissions greater than the Title V major source thresholds for that pollutant, and
- (c) use a control device to achieve compliance.

CAM plans are required for affected emission units on a pollutant-by-pollutant basis.

For modification projects that require a significant Title V permit revision, proposed Part 64 monitoring must be included with the Title V permit revision application per 40 CFR §64.5(a)(2). This requirement applies to *large pollutant-specific emission units* (i.e., units with potential-to-emit, including controls, greater than the Title V major source thresholds). The proposed 64 monitoring that must be included in the Title V permit revision application only applies to those *pollutant-specific emission units* for which the proposed permit revision is applicable. A pollutant-specific emission unit means an emission unit considered separately with respect to each regulated air pollutant.

For the coal residual project, the Title V permit revision is applicable to Big Bend Station Units 1 – 4 (EU.ID. 001 – 004), coal residual storage fugitives (EU.ID. 037), and coal residual transfer fugitives (EU.ID. 038). Neither EU.ID. 037 nor EU.ID. 038 use a *control device*, as defined by Part 64, to achieve compliance and therefore are not subject to CAM. In addition, neither EU.ID. 037 nor EU.ID. 038 qualifies as a *large pollutant-specific emission unit*.

For Big Bend Station Units 1 –3, FINAL Permit Revision No.: 0570039-010-AV contains emission limitations for opacity, PM, and sulfur dioxide (SO₂). Units 1 –3 each qualify as *large pollutant-specific emission units* for both PM and SO₂ and use control devices (i.e., Electrostatic Precipitator (ESP) and Flue Gas Desulfurization (FGD) controls) to achieve compliance. Accordingly, CAM requirements potentially apply

o Units 1 –3 for opacity, PM and SO₂. Opacity and SO₂ are presently monitored continuously in accordance with 40 CFR Part 75. The existing Units 1 – 3 continuous opacity monitoring systems (COMS) and SO₂ continuous emissions monitoring systems (CEMS) are presumptively considered satisfying CAM requirements per §64.3(d)(2). Therefore, proposed 40 CFR Part 64 monitoring for Units 1 –3 is potentially required for PM only as part of the Title V permit revision application.

For Big Bend Station Unit 4, FINAL Permit Revision No.: 0570039-010-AV contains emission limits for opacity, PM, CO, SO₂, and NO_x. Unit 4 qualifies as a *large pollutant-specific emission*

unit for all of these air pollutants. Control devices (i.e., ESP and FGD controls) are used to achieve compliance with the PM and SO₂ emission limitations. Unit 4 does not use a control device, as defined by Part 64, to achieve compliance for either NO_x or CO. Accordingly, CAM requirements potentially apply to Unit 4 for opacity, PM and SO₂. Opacity and SO₂ are presently monitored continuously in accordance with 40 CFR Part 75. The existing Unit 4 COMS and SO₂ CEMS are presumptively considered to satisfy CAM requirements per §64.3(d)(2). Therefore, proposed 40 CFR Part 64 monitoring for Unit 4 is potentially required for PM only as part of the Title V permit revision application.

The Part 64 CAM requirements apply only to *significant* Title V permit revisions. The intent of this provision is to exempt minor Title V permit revisions (e.g., administrative and *de minimis* permit revisions) from CAM requirements. The coal residual project did not alter any existing Title V permit PM emission limitations or any PM monitoring, testing, record-keeping, reporting, and compliance certification requirement for Units 1 – 4. In addition, a PM annual emission cap, reflecting actual average PM emissions for 1999/2000, was imposed for Units 1 – 4 to ensure that no actual PM increases would occur due to the firing of coal residual. According, TEC does not believe the coal residual Title permit revision is significant with respect to PM and therefore is not subject to CAM requirements at this time. TEC also notes that Big Bend Station FINAL Permit Revision No.: 0570039-010-AV has a permit renewal application due date of July 5, 2004 and that required CAM plans will be submitted at that time as part of the Title V renewal process.

FDEP Comment 6

The conclusion to the submitted Corrective Action Plan states that TEC has installed low NO_x burners on Unit 1 and a neural network on Unit 2. When were these projects done, and under what authority?

TEC Response

TEC installed the low NO_x burners on Unit 1 and a neural network on Unit 2 under the authority of the Consent Decree. Specific Condition 35 of the Consent Decree requires that, "On or before December 31, 2001, Tampa Electric shall submit to EPA for review and comment a plan to reduce NO_x emissions from Big Bend Units 1, 2 and 3, through the expenditure of up to \$3 million Project Dollars on combustion optimization using commercially available methods, techniques, systems, or equipment, or combinations thereof. Subject only to the financial limit stated in the previous sentence, for Units 1 and 2 the goal of the combustion optimization shall be to reduce the NO_x Emission Rate by at least 30% when compared against the NO_x Emissions Rate for these Units during calendar year 1998, which the United States and Tampa Electric agree was 0.86 lb/mmBTU. For Unit 3 the goal of the combustion optimization shall be to reduce the NO_x Emissions Rate by at least 15% when compared against the NO_x Emission Rate for this Unit during calendar year 1998, which the United States and Tampa Electric agree was 0.57 lb/mmBTU."

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As stipulated in the Consent Decree from the verbiage above, TEC submitted an Early NO_x Reduction Plan on February 23, 2001 to both EPA and the Department. As stated in the Early NO_x Reduction Plan and the NO_x Corrective Action Plan, TEC installed low NO_x burners for Unit 1 during an outage in March 2001 and a neural network for Unit 2 during an outage in February 2001 resulting in a reduction of NO_x emissions.

TEC appreciates the cooperation and consideration of the Department in this matter. If you have any questions, please contact Ms. Dru Latchman or me at (813) 641-5034.

Sincerely,



Laura R. Crouch
Manager - Air Programs
Environmental Affairs

EA/bmr/DNL166

Enclosures

cc: Mr. Scott Sheplak, FDEP
Mr. Jerry Kissel, FDEP-SW (enc)
Mr. Sterlin Woodard, EPCHC (enc)