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DIVISION OF AIR
RESOURCE MANAGEMENT

May 9, 2012

Jeffrey F. Koerner, Program Administrator
Florida Department of Environmental Protection
Division of Air Resource Management
Office of Air Permitting and Compliance
2600 Blair Stone Road, M.S. 5505
Tallahassee, Florida 32399-2400

Via FedEx
Airbill No.7983-7308-6177

Re: Tampa Electric Company - Big Bend Station
Title V Permit Number 0570039-045-AV
Unit 3 Boiler Improvement Projects
Air Permit Application 3208-1
Amendment and RAI Response
Facility ID No. 0570039

0570039-058-AC

Dear Mr. Koerner:

Tampa Electric Company (TEC) submitted an air construction permit application (No. 3208-1) on March 25, 2012. This application requests physical modification and replacement of boiler components on Boiler No. 3. On April 9, 2012, TEC received a request for additional information (RAI) from the Florida Department of Environmental Projection ("Department"). Pursuant to their request, TEC is providing the responses in the sections below.

Comment 1
Please provide the design heat input rate for Big Bend Units 3, in terms of mmBtu per hour, following the planned modifications on the nose and super heater sections of this boiler. Please also indicate the method of determining heat input for purposes of stack testing in the event you want to use a method other than the current method of fuel sampling and analysis and belt scales.

Response 1

Proposed Heat Input Rate
The boiler was originally designed to operate up to 4115 mmBtu per hour. This project targets a nominal heat input condition of around 4052 mmBtu per hour. This is within 1% of the original design heat input using the same calculation metric. The reported disparity between these design heat input rate is well within the reported propagation error of ±200 mmBtu per hour. Therefore, based upon the meeting with the Department on March 29, 2012 and heat input RAI response letter, dated April 9, 2012, TEC proposes to demonstrate unit capacity of Unit No. 3 during the

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compliance testing to within 10% of its true value or current permitted heat input rate pursuant to Chapter 62-297.310(5)(b) F.A.C. A summary of the boiler performance and requested heat input rate is shown in **Table 1**.

Table 1. Unit 3 Boiler Heat Input Summary.

System	Project Heat Input (mmBtu/hr)	Permitted Heat Input (mmBtu/hr)	Requested Heat Input (mmBtu/hr)
Unit 3	4,052	4,115	4,115

Proposed Heat Input Determination

TEC proposes to use a specific heat metric to demonstrate unit capacity during compliance testing. The metric calculates the heat input as the product of the gross heat rate (Btu/kWh) and gross power output (MW). The gross power output (MW) will be measured on a 4-hour rolling average. The gross unit heat rate will use a 3-month rolling "seasonal" average based on monthly heat rates from the Generation, Fuels & Performance Report (GFP). The monthly unit heat rate will be calculated as the ratio of monthly heat input and power output using the gravimetric fuel sampling methods described in Section 2.0 of the air permit application No. 3030-1. The gross heat input is specifically calculated as follows:

$HI = HR \times P / 1000$

where,

HI = Calculated gross heat input (mmBtu/hr)
HR = Calculated average unit heat rate (Btu/kWh) based on a 3 month rolling "seasonal average"
P = Gross power output (MW) based on a 4 hour rolling average

This metric has shown good agreement with other well established metrics such as the ASME boiler efficiency method and coal throughput measurements. Comparisons between the boiler efficiency method and the proposed metric have shown very good agreement up to approximately 3%.

In contrast, CEMS-derived heat input and the proposed metric have not shown good agreement. Typically, the CEMS-derived heat input has been observed in excess of 15% of the proposed metric. A simple linear correction of the CEMS-derived heat input to account for these biases is not technically feasible since the response is highly non-linear and will provide inconsistent results. TEC believes this metric (even corrected) is not an appropriate metric for compliance purposes.

Comment 2

Please provide a detailed description of the work to be done on Unit 1 and Unit 3 ESPs if you would like to include these projects in the construction permit for Unit 3 changes, Project #58. Include any vendor guarantees for these ESP improvements and indicate how the improved performance will be demonstrated following this work.

Response 2
TEC hereby submits an amendment to air construction application No. 3208-1 to include upgrades to Unit No. 3 electrostatic precipitator to complete the requirements of the consent decree and consent final judgment. Upgrade to the Unit 1 electrostatic precipitator will be made in spring FY 2015. The existing and proposed upgrades to Unit No. 3 electrostatic precipitator are discussed below. No vender guarantees are associated with this projects.

Existing Electrostatic Precipitator Configuration
The original electrostatic precipitators (precipitators) were supplied by Research Cottrell. The two precipitators, upper and lower, are installed in a piggyback arrangement. Each precipitator casing contains four mechanical fields measuring 30 feet high by 9 feet long in the direction of gas flow. Each casing contains two chambers with a gas-tight partition.

The upper casing was previously rebuilt with a 12-inch gas passage width with rigid discharge electrodes (RDEs) in all fields. There are 40 gas passages in each field for a total of 80 gas passages. The lower casing has weighted wires discharge electrodes (WDEs) in the first three mechanical fields. These fields contain 53 gas passages at 9-inch spacing. The fourth mechanical field was rebuilt using a 12-inch gas passage and RDE design configuration similar the upper casing.

Proposed Electrostatic Precipitator Configuration
This project will rebuild the precipitator to complete the wide plate spacing and rigid electrodes enhancements, increase the T/R sectionalization, and upgraded precipitator control system as required by the consent decree. The proposed modifications to the Unit No. 3 precipitator include the following:

- Convert the first three mechanical fields of the lower precipitator from weighted wire electrodes with 9-inch plate spacing to rigid electrodes with 12-inch plate spacing.
    - 246 Grounded collecting plate electrodes, nominally 9 feet by 30 feet.
    - 480 Rigid discharge electrodes for inlet fields.
    - 960 Rigid discharge electrodes for fields that are not inlet fields.

- Reposition existing rappers and install additional rappers that are required for the new plates and rigid discharge electrodes to achieve a ratio of 1,200 square foot of collector plate area per rapper.

- Install sixteen (16) high frequency power supplies, all related voltage bus ducts, and accessories to convert the existing sixteen electrical fields (2 X 8) of the lower precipitator to thirty-two (32) electrically isolated fields (4 X 8).

- Install sixteen (16) high frequency power supplies, all related voltage bus ducts, and accessories to convert the existing sixteen electrical fields (2 X 8) of the upper precipitator to thirty-two (32) electrically isolated fields (4 X 8).

- Install an automatic voltage controls for all the T/R sets and high frequency power supplies on the upper and lower precipitators.

- Install automatic voltage control and rapper control system for all the rappers on the upper and lower precipitators.

The 12 inch plate spacing and use of high frequency power supplies will allow a larger sized supply to be used at a higher average voltage in each electrically isolated field of the precipitator. This higher average voltage will increase the migration velocity of particulate towards the collector plate's thus increasing overall efficiency. The improved automatic voltage control and rapping system will allow for an increased response time to events occurring during the operation of the precipitator that may negatively affect particulate collection.

Proposed Performance
TEC intends to demonstrate the improved performance through the annual stack testing requirements. EPA Method 5B will be utilized to the demonstrate compliance in the stack.

Proposed Title V Permit Modifications
Pursuant the heat input RAI letter response, TEC would like to reiterate the following modifications to Condition A.2. The proposed revision establishes a heat input calculation methodology to demonstrate capacity during annual stack testing only. Additions are shown as double underlines while deletions are shown as strikethroughs. All proposed changes are shown in yellow highlight.

A.2 Permitted Capacity during Compliance Testing. The nominal heat input rates shall be used solely as a guide to demonstrate the maximum heat input rates during annual stack testing to comply with the emission limitations. The heat input rate shall be limited to within 10% of its true value or nominal heat input rate to account for variances in equipment, instrumentation and calculations. The ~~maximum~~ nominal heat input rates are as follows:

Unit No.	~~MMBtu/hr~~ Nominal Heat Input (mmBtu/hr)
1	4,037
2	3,996
3	4,115

[Rules 62-4.160(2), ~~62-210.200 (Definitions - Potential to Emit (PTE));~~ and, 62-296.405(1), F.A.C.; and, Permit Nos. 0570039-014-AC (Unit Nos. 1 - 4) and 0570039-022-AC (Unit No. 3); and, Rule 62-297.310(5)(b)]
Heat Input. The heat input shall be calculated as the product of the gross heat rate (Btu/kWh) and gross power output (MW). The gross power output shall be measured on a 4-hour rolling average. The gross unit heat rate will use a 3-month rolling "seasonal" average based on calculated monthly heat rates. These rates shall be determined by the amount of coal bunkered, composite coal analyses and gross power output for the month. The composite fuel samples shall be collected by on-site personnel in accordance with ASTM standards.

The permittee and the Department agree that the CEMS-derived heat input used for the Federal Acid Rain Program conservatively overestimates the heat input for this unit. The CEMS shall not be used for compliance purposes, including annual compliance certification.

TEC requests an amendment to air permit application (No. 3208-1) to incorporate the aforementioned modifications. Please contact me at (813) 228-4232 or Byron Burrows at (813) 228-1282, if you have any questions or comments.

Sincerely,

Robert A. Velasco, P.E., BCEE, QEP
Air Programs
Environmental, Health & Safety

EHS/iym/RAV146

cc Cindy Zhang-Torres DEP
Diana Lee, EPCHC

Owner/Authorized Representative Statement

Complete if applying for an air construction permit or an initial FESOP.

1. Owner/Authorized Representative Name: **Byron T. Burrows**

2. Owner/Authorized Representative Mailing Address...
   Organization/Firm: **Tampa Electric Company**
   Street Address: **P.O. Box 111**
   City: **Tampa** State: **FL** Zip Code: **33601-0111**

3. Owner/Authorized Representative Telephone Numbers...
   Telephone: **(813) 228 - 4111** ext. Fax: ( ) -

4. Owner/Authorized Representative E-mail Address: **btburrows@tecoenergy.com**

5. Owner/Authorized Representative Statement:

   I, the undersigned, am the owner or authorized representative of the corporation, partnership, or other legal entity submitting this air permit application. To the best of my knowledge, the statements made in this application are true, accurate and complete, and any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department.

   Signature

   5/9/12
   Date

Professional Engineer Certification

1. Professional Engineer Name: **Robert A. Velasco**
   Professional Engineer Job Title: **Senior Environmental Engineer**
   Registration Number: **57190**
2. Professional Engineer Mailing Address...
   Organization/Firm: **Tampa Electric Company**
   Street Address: **702 N. Franklin St**
   City: **Tampa** State: **FL** Zip Code: **33602**
3. Professional Engineer Telephone Numbers...
   Telephone: **(813) 228 - 4232** ext. Fax: ( ) -
4. Professional Engineer E-mail Address: **ravelasco@tecoenergy.com**
5. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this application for air permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

(3) If the purpose of this application is to obtain a Title V air operation permit (check here ☐, if so), I further certify that each emissions unit described in this application for air permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance plan and schedule is submitted with this application.

(4) If the purpose of this application is to obtain an air construction permit (check here ☒, if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here ☐, if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

(5) If the purpose of this application is to obtain an initial air operation permit or operation permit revision or renewal for one or more newly constructed or modified emissions units (check here , if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

ROBERT A. VELASCO No. 57190 STATE OF FLORIDA PROFESSIONAL ENGINEER

Signature 5/9/2012
Date

(seal)

* Attach any exception to certification statement.

Tampa Electric Company
Big Bend Power Station
Facility ID No. 0570039

Air Permit Application 3208-1
Amendment and RAI Response

Professional Engineer Exceptions Statement

1. Professional Engineer Name: **Robert A. Velasco, P.E.**
   Registration Number: **57190**
2. Professional Engineer Address...
   Organization/Firm: **Tampa Electric Company**
   Street Address: **P.O. Box 111**
   City: **Tampa** State: **FL** Zip Code: **33601**
3. Professional Engineer Telephone Numbers...
   Telephone: **(813) 228 - 4232** Fax: **(813) 228 - 1308**
4. Professional Engineer E-mail Address: **ravelasco@tecoenergy.com**
5. Professional Engineer Statement:
   (1) Engineering opinions and information included herein provides reasonable assurance of meeting the requirements of Chapter 62-210.300 F.A.C.;
   (2) Engineering information included herein is believed to be correct to the best of the Engineer's knowledge;
   (3) Emission information is based on acceptable techniques available for calculating emissions or estimating emissions from designated emission sources;
   (4) Seal does not certify or attest to the accuracy of work or information prepared by others who are qualified to perform such services. This includes, but not limited to drawings, specifications, vendor information, engineering test data, laboratory data, correspondences, personnel communication etc.; and
   (5) The Engineer is not responsible for subsequent deviations made by others without the Engineer's written consent.