



TAMPA ELECTRIC

January 24, 2006

Mr. Al Linero P.E.,
Florida Department of Environmental Protection
Division of Air Resource Management
111 South Magnolia, Suite 4
Tallahassee, FL 32301

**Re: Tampa Electric Company
Big Bend Station
Air Construction Permit Project No.: 0570039-023-AC
Fly Ash Carbon Burnout (CBO™) Technology**

RECEIVED

JAN 25 2006

BUREAU OF AIR REGULATION

**Via FedEx
Airbill No. 7913 4909 5209**

Dear Mr. Linero:

Tampa Electric Company (TEC) has received your letter dated October 25, 2005 requesting additional information with regard to the air construction permit application requesting authorization to install the fly ash carbon burnout (CBO™) technology at Big Bend Station. This correspondence is intended to provide a response to each specific issue raised by the Department of Environmental Protection (Department). For your convenience, TEC has restated each point and provided a response below to each specific issue.

TEC Responses to Department Comments

Department Comment 1:

Your application states that this project is not subject to New Source Review (NSR) based on interpretation of specific language contained in the FDEP Consent Final Judgment and the EPA Consent Decree. It appears that the Rule for the Prevention of Significant Deterioration (PSD) applies to the project. This is based on the potential emission increase of at least nitrogen oxides and carbon monoxide emissions (Rule 62-212.400, F.A.C.). We understand that EPA Region 4 is reviewing these issues. Please provide the latest status of your deliberations with EPA.

TEC Comment 1:

The CBO™ project is a minor modification to Big Bend Station Units 3 and 4 that is not subject to PSD review under either 40 Code of Federal Regulations (CFR) 52.21(a)(2) or Rule 62-212.400, Florida Administrative Code (F.A.C.). Accordingly, it will require a minor air construction permit and a revision to the Big Bend Station Title V air operation permit from the Department. The CBO™ project is not a major modification, as that term is defined in section 40 CFR 52.21(b) and Rule 62-210.200, F.A.C., because there will not be a significant emissions increase for any regulated NSR pollutant.

This interpretation is consistent with other CBO™ permits in EPA Regions 3 and 4 and is based on the fact that the CBO™ project is not a new emissions unit, but instead constitutes both a physical change and a change in the method of operation of the Big Bend Units 3 and 4. The emissions after installation of the CBO™ are expected to be several thousand tons per year less than pre-change actual emissions from these units. Because post-change actual NO_x emissions are in fact lower than pre-change actual NO_x emissions, there is no NO_x emissions increase above the significance threshold of 40 tons per year, and

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the project is thus not a major modification due to NO_x emissions. Actual CO emissions from Big Bend Units 3 and 4 after installation of the CBOTM are expected to be only slightly more than pre-change actual CO emissions from these units. This CO emissions increase is less than the CO significance level of 100 tons per year; thus, the project is also not a major modification for CO emissions. Enclosed in Attachment A are the corresponding graphs for NO_x and CO emissions data.

It should be noted that the CBOTM project includes, in addition to the CBOTM unit itself, several ash handling sources that are appropriately considered new emissions units for PSD applicability purposes. However, these emissions units emit only small quantities of particulate matter and they have no material effect on PSD applicability.

In summary, the CBOTM project does not justify PSD review and a BACT analysis because there will be no significant emissions increase of any pollutant as a result of the modifications to Big Bend Station Units 3 and 4 that will be needed to accommodate the CBOTM project. TEC believes that EPA Region 4 concurs with the calculation methodology and permitting rationale set forth above.

Department Comment 2:

Please provide test samples of fly ash (at both the pre-processing and post-processing stages through the CBOTM) from an appropriate plant (e.g., Winyah Station).

TEC Comment 2:

TEC has requested PMI to transmit under separate cover, feed and product ash samples from a commercial CBOTM plant from which samples were taken in 2004. Enclosed in Attachment B is a summary of the third party mercury mass balance testing performed in 2002 at a commercial CBOTM plant using EPA approved test methods. This 2002 third party mercury mass balance testing, which was presented to the Department previously and similarly presented to EPA and other states, demonstrates that: i) the levels of mercury from a commercial CBOTM plant do not trigger PSD limits; and ii) mercury that is a constituent on the raw feed ash, after being processed in a CBO unit, exits as a constituent on the CBOTM product ash. The mass balance demonstrates that the CBOTM flue gas is not a significant source of additional mercury emissions. In addition, TEC has previously submitted the calculations that demonstrate mercury emissions from the CBOTM do not trigger PSD in a letter dated September 27, 2005. TEC and PMI reiterate our willingness to review such data with the Department.

Although TEC has requested PMI to provide newer commercial CBOTM samples from its licensee, PMI has been unable to obtain such samples. TEC understands that additional samples may allow the Department to perform additional testing but as noted in other Department precedents, *Booker Creek Preservation, Inc. v. Mobil Chemical Co.*, 481 So.2d 10, 13 (Fla. 1st DCA 1986) and *Haile Community Assoc. v. Florida Rock Industries*, 1996 WL 784994 at *15, "Reasonable assurance does not require an applicant to ... perform every known test or ... experimental technology...." There is no requirement to provide absolute guarantees. See *VQH Development, Inc. v. DEP & Manasota-88, Inc.*, 1993 WL 350072, OGC Case No. 92-2243, DOAH Case No. 92-7456, (DEP Aug. 13, 1993); *Gerace v. S.M.G., Inc.*, 2003 WL 21423964 at *19, DEP Case No. 03-0544, OGC Case No. 02-1158, DOAH Case Nos. 02-3639, 02-3640, 02-3817, 02-3819, 02-3823, 02-3827, 02-3829, 02-3836, 02-3838, 02-3839, 02-3860, 02-3863, 02-3865, 02-3875, 02-3877 and 02-3880, (DEP Apr. 21, 2003) (citing *Manasota-88, Inc. v. Agrico Chemicals, Co.*, 12 F.A.L.R. 1319, 1325 (DER Feb. 19, 1990)); *McCormick, et al. v. City of Jacksonville*, 12 FALR 960 (DER OGC No. 88-0389, Jan. 22, 1990).

Mr. Al Linero
January 24, 2006
Page 3 of 3

Therefore, while TEC re-asserts PMI's willingness to provide the Department the ash from PMI's licensee should such ash be provided, TEC does not believe that PMI's inability to provide new samples should delay the Department's processing of TEC's application.

Department Comment 3:

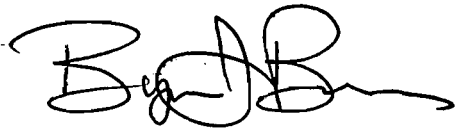
You indicated in your response that there are no existing CBO™ system exhausts that are routed to an SCR control system. You further noted that Progress Materials, Inc. (PMI) indicates there are two CBO™ installations currently under construction in the Northeast and mid-Atlantic Region. At both of these locations, the CBO™ exhaust will be routed through the power plant's SCR system. Please provide the names of these locations if possible so we can obtain information about these sites.

TEC Comment 3:

Two CBO™ locations are being constructed which will have the location of the CBO™ exhaust gas inlet prior to the SCR. These locations are Brayton Point, Massachusetts and Chesapeake, Virginia. The Virginia DEQ would be willing to speak with you and provide information related to the Virginia CBO™ installation. Please contact Mr. Troy Breathwaite at (757) 518-2006.

TEC understands that with the submission of this additional information, the Department will continue to process the CBO™ air construction permit application for Big Bend Station in an expeditious manner. If you have any further questions regarding this air construction permit application, please contact me or Shelly Castro at (813) 228-4408.

Sincerely,



Byron T. Burrows, P.E.
Manager – Air Programs
Environmental, Health & Safety

EHS/rfk/SSC247

c/enc David Lloyd, EPA Region 4
Jason Waters, FDEP SW
Alice Harmon, EPCHC

Enclosures

ATTACHMENT A

**TAMPA ELECTRIC COMPANY
BIG BEND STATION**

Graphical NO_x and CO Emissions Data

Figure 1. Big Bend Unit 3 & 4 Nitrogen Oxides (NO_x) Emissions

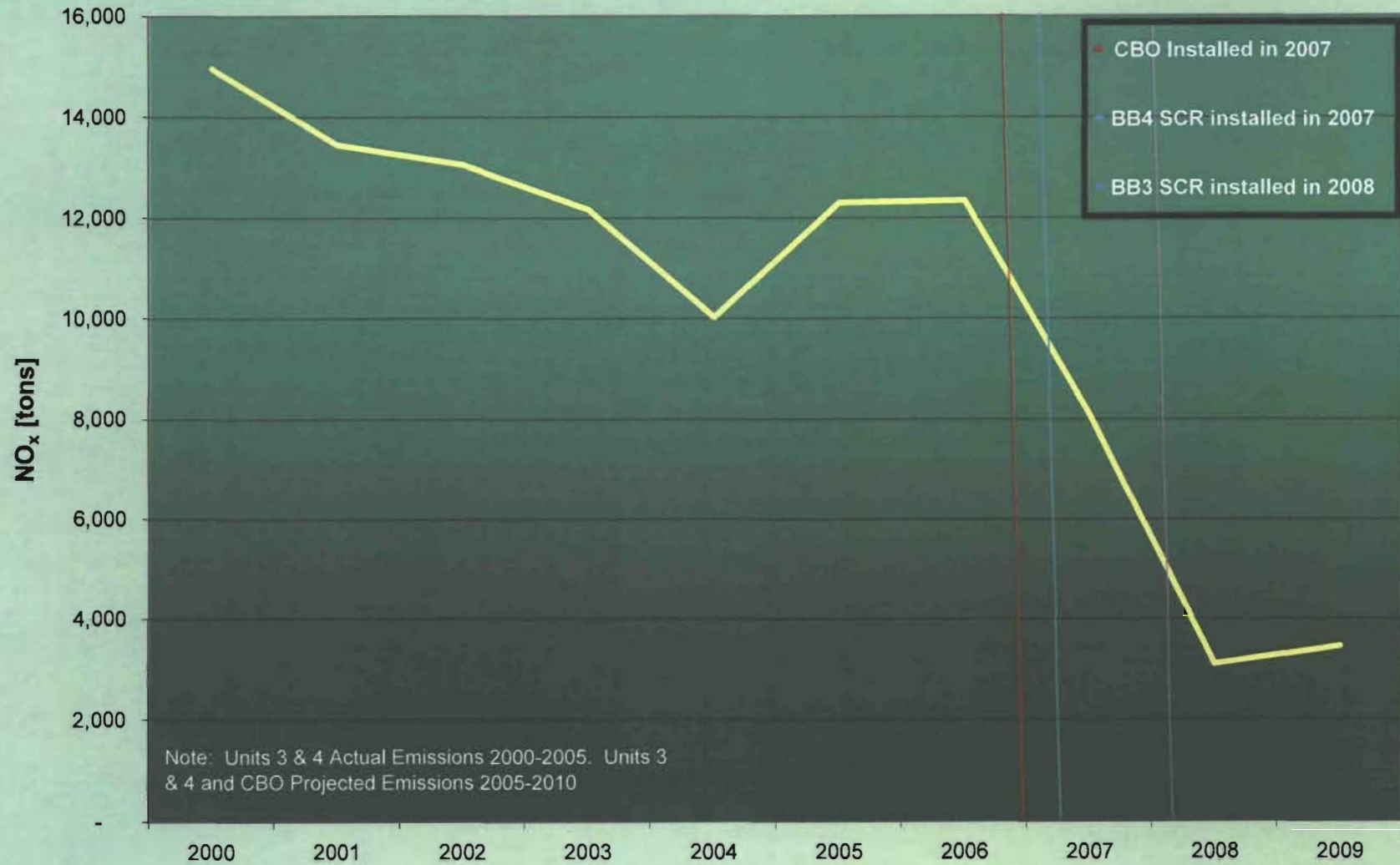
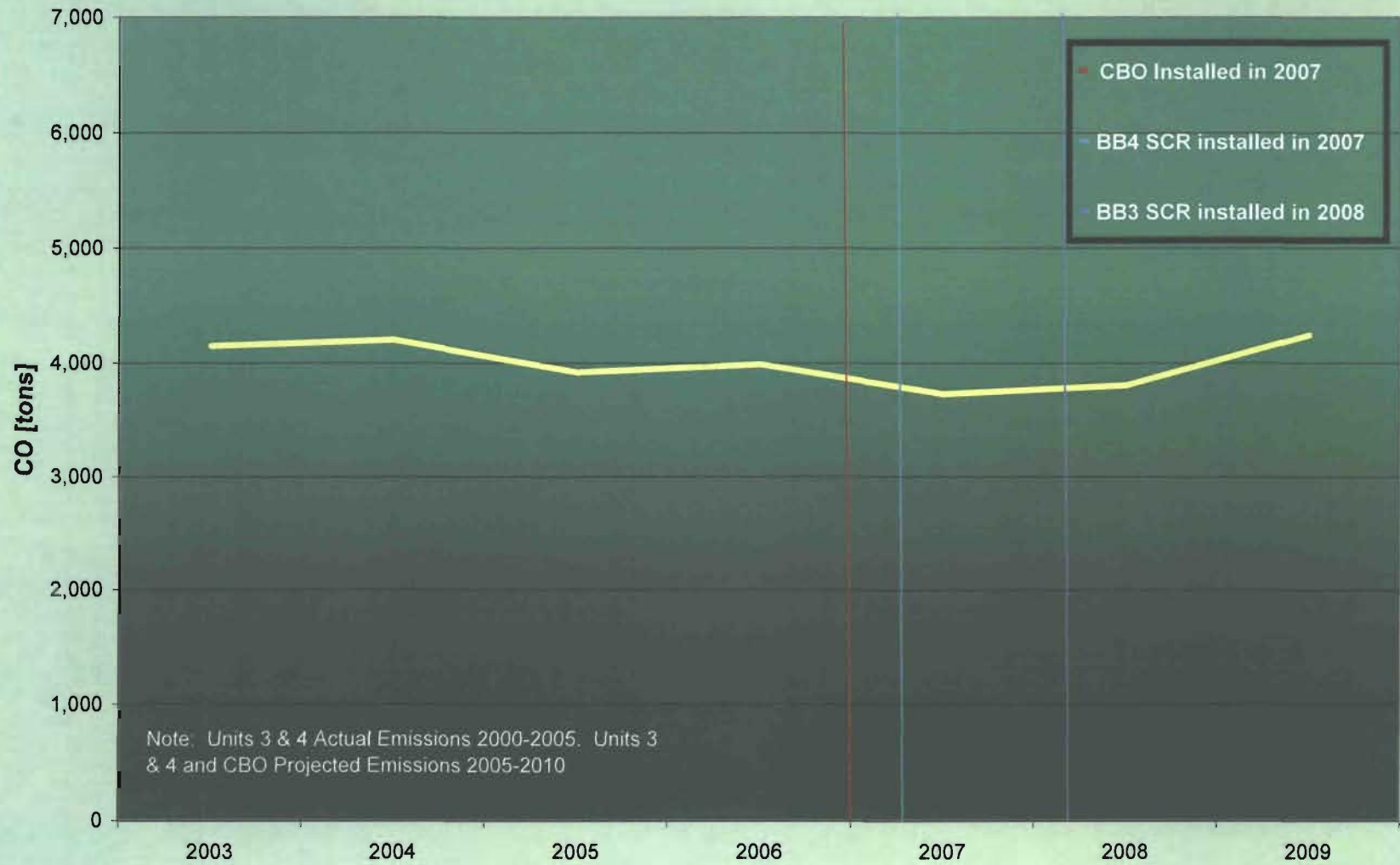


Figure 2. Big Bend 3 & 4 Carbon Monoxide (CO) Emissions



ATTACHMENT B

**TAMPA ELECTRIC COMPANY
BIG BEND STATION**

2002 Third Party Mercury Mass Balance Testing Summary

Mercury Mass Balance for CBO™ Process

Run	Hg-Feed mg/hr	Hg-Product mg/hr	Hg-BHO mg/hr	Prod+BHO mg/hr	Material Balance %
1	13,159	12,395	12	12,407	94
2	9,899	9,778	19	9,797	99
3	11,193	12,119	37	12,156	109
Average					101

Testing confirms that Hg remains bound to ash



PMI

A Progress Fuels Company



Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Colleen M. Castille
Secretary

October 25, 2005

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Ms. Karen Sheffield, General Manager
Big Bend Station
Tampa Electric Company
Post Office Box 111
Tampa, Florida 33601-0111

Re: **Big Bend Station**
DEP File No. **0570039-023-AC**
Fly Ash Carbon Burn-out (CBO) Technology

Dear Ms. Sheffield:

Thank you for your letter received on September 28, 2005, written in response to our request for additional information concerning your air construction permit application received on August 8, 2005, for the subject project. However, we must deem your application still *incomplete*, because we need further information relative to the following items:

- Your application states that this project is not subject to New Source Review based on interpretation of specific language contained in the FDEP Consent Final Judgment and the EPA Consent Decree. It appears that the Rule for the Prevention of Significant Deterioration (PSD) applies to the project. This is based on the potential emission increase of at least nitrogen oxides and carbon monoxide emissions (Rule 62-212.400, F.A.C.). We understand that EPA Region 4 is reviewing these issues. Please provide the latest status of your deliberations with EPA.
- Please provide test samples of fly ash (at both the pre-processing and post-processing stages through the CBO) from an appropriate plant (e.g., Winyah Station).
- You indicated in your response that there are no existing CBO system exhausts that are routed to an SCR control system. You further noted that Progress Materials, Inc. (PMI) indicates there are two CBO installations currently under construction in the Northeast and mid-Atlantic Region. At both of these locations, the CBO exhaust will be routed through the power plant's SCR system. Please provide the names of these locations if possible so we can obtain information about these sites.

When we receive this information, we will continue processing your application. If you have any questions, please contact Project Engineer Tom Cascio at 850-921-9526.

Rule 62-4.050(3), F.A.C., requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature. Permit applicants are advised that Rule 62-4.055(1), F.A.C., requires applicants to respond to requests for information within

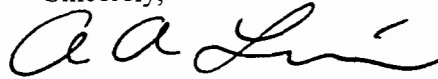
"More Protection, Less Process"

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Ms. Karen Sheffield, General Manager
Big Bend Station
Page 2 of 2

90 days, unless the applicant has requested in writing, and has been granted, additional time within 90 days.

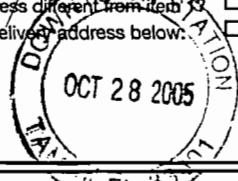
Sincerely,

A handwritten signature in black ink, appearing to read "A. A. Linero". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

A. A. Linero, P.E.
Program Administrator
Permitting South Section

Cc: Thomas Davis, P.E.
Shelly Castro, TEC
Alice Harman, EPCHC
Jason Waters, FDEP-SWD
David Lloyd, EPA Region 4

SENDER: COMPLETE THIS SECTION	COMPLETE THIS SECTION ON DELIVERY
<ul style="list-style-type: none"> Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired. Print your name and address on the reverse so that we can return the card to you. Attach this card to the back of the mailpiece, or on the front if space permits. 	<p>A. Signature <input checked="" type="checkbox"/> Agent <input checked="" type="checkbox"/> Addressee</p> <p>B. Received by (Printed Name) C. Date of Delivery</p>
<p>1. Article Addressed to:</p> <p>Ms. Karen Sheffield, General Manager Big Bend Station Tampa Electric Company Post Office Box 111 Tampa, Florida 33601-0111</p>	<p>D. Is delivery address different from item 1? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If YES, enter delivery address below:</p> <p>3. Service Type <input checked="" type="checkbox"/> Certified Mail <input type="checkbox"/> Express Mail <input type="checkbox"/> Registered <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Insured Mail <input type="checkbox"/> C.O.D.</p> <p>4. Restricted Delivery? (Extra Fee) <input type="checkbox"/> Yes</p>
<p>2. Article Number (Transfer from service label)</p>	<p>7001 0320 0001 3692 1865</p>



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<p>Ms. Karen Sheffield, General Manager Big Bend Station Tampa Electric Company Post Office Box 111 Tampa, Florida 33601-0111</p>													

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TAMPA ELECTRIC

September 27, 2005

Mr. Al Linero P.E.,
Florida Department of Environmental Protection
Division of Air Resource Management
111 South Magnolia, Suite 4
Tallahassee, FL 32301

Via FedEx

Airbill No. 790167058304

RECEIVED

SEP 27 2005

BUREAU OF AIR REGULATION

**Re: Tampa Electric Company
Big Bend Station
Air Construction Permit Project No.: 0570039-023-AC
Fly Ash Carbon Burnout (CBO™) Technology**

Dear Mr. Linero:

Tampa Electric Company (TEC) has received your letter dated September 2, 2005 requesting additional information with regard to the air construction permit application requesting authorization to install the fly ash carbon burnout (CBO™) technology at Big Bend Station. This correspondence is intended to provide a response to each specific issue raised by the Department of Environmental Protection (Department). For your convenience, TEC has restated each point and provided a response below each specific issue.

TEC Responses to Department Comments

Department Comment 1:

Your application states that this project is not subject to New Source Review based on interpretation of specific language contained in the FDEP Consent Final Judgment and the EPA Consent Decree. We understand that EPA Region 4 is reviewing this issue. Please provide the latest status of your deliberations with EPA.

TEC Comment 1:

TEC is in agreement with the Department's discussion of options to potentially permit the CBO™ at Big Bend Station and is in discussions with the Environmental Protection Agency (EPA) regarding Prevention of Significant Deterioration (PSD) applicability. TEC will continue to keep the Department apprised of the latest developments.

Department Comment 2:

Based on the requested treatment of the CBO™ project as a separate emission unit, it appears that the Rule for the Prevention of Significant Deterioration (PSD) applies to the project. This is based on the potential emission increase of at least nitrogen oxides and carbon monoxide emissions (Rule 62-212.400, F.A.C.).

TEC Comment 2:

To clarify, TEC did not intend to request that the CBO™ project be treated as a new or separate emissions unit, as that term is used in Rule 62-212.400. For the purposes of calculating increases in actual emissions, TEC proposes that the CBO™ project be treated as a modification to Units 3 and 4 under the

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FDEP Consent Final Judgment and EPA Consent Decree. TEC apologizes for any ambiguity in the permit application.

Department Comment 3:

We have contacted EPA regarding the availability of emissions reductions generated by "over compliance" (i.e., NO_x limit < 0.15lb/mmBtu on Units 1, 2, and 3) for "netting". They are reviewing the matter and we recommend you include this in your discussions with them. This would provide one avenue for possible netting such that PSD will not be triggered.

TEC Comment 3:

As previously stated, TEC is in discussions with the Environmental Protection Agency (EPA) regarding PSD applicability. TEC appreciates the Department's assistance with potential permitting avenues for the CBO™ at Big Bend Station and will continue to keep the Department apprised of the latest developments.

Department Comment 4:

On September 1, 2005, we received test results of mercury emissions testing from a CBO™ installation and potential-to-emit calculations for the proposed TEC CBO™ project. We acknowledge receipt but have not studied the submittal yet. Please review the information just submitted, and confirm whether or not it includes estimates of pounds per year (lb/yr) of mercury that will enter the CBO™ process in the fly ash and the lb/yr that will exit via exhaust and the beneficiated fly ash. Otherwise, provide this information.

TEC Comment 4:

The September 1, 2005 submission applied only to the mercury potential-to-emit (PTE) from the Big Bend Station CBO™ facility. This was not a mass balance calculation. Mercury mass balance (control volume "ins" and "outs") information is available from an existing commercial CBO™ facility. TEC renews its offer to provide this information from its vendor, PMI, with regard to the mercury testing, which was previously performed. As the Department has requested, TEC through PMI is also providing samples of the Feed and Product ash from this commercial testing, which would allow the Department to perform its own testing. TEC recognizes that hold times have expired, but TEC has re-performed the analyses and confirmed that the prior analyses are still accurate. Attachment A contains the revised mercury information.

Department Comment 5:

Please provide the NO_x emissions test results from other power plant sources where CBO™ and SCR are currently employed (e.g., the two South Carolina plants referenced during our discussions with TECO representatives).

TEC Comment 5:

TEC is only aware of one commercial CBO™ facility operating in conjunction with an SCR-equipped power plant and the emissions from the CBO™ unit are not controlled by the SCR system. (The CBO™ exhaust is commingled with the electric utility steam generating unit exhaust downstream of the SCR system). Attachment B contains the NO_x data from the most recent quarterly EPA electronic data reports (EDR) for this plant. These data represent the NO_x emissions from the electric utility steam-generating unit, including the commingled NO_x emissions from the CBO™ unit. The plant does not separately monitor the emissions from the CBO™ facility, nor does the permit establish any separate limits for the CBO™ facility.

Department Comment 6:

Please also provide test samples of fly ash (at both the pre-processing and post-processing stages through the CBO™) from the plants selected for the above request and from the pilot test facility located in Tampa.

TEC Comment 6

TEC is unable to provide the Department with fly ash samples from the pilot test facility because there are presently no continuous-process, fluidized-bed CBO™ pilot test facilities in Tampa or elsewhere.

TEC understands that the Department's primary goal in testing fly ash is to determine potential mercury emissions from the CBO™. To assist the Department in independently verifying that the mercury emissions from the CBO™ facility will be well below the PSD applicability threshold of 0.1 ton per year, TEC will provide a recent fly ash sample for analytical purposes. Attachment C presents TEC's data from testing the fly ash to determine the amount of mercury on the feed ash. Applying the mass balance method suggested above to these analyses, TEC believes it confirms that the mercury emissions from the CBO™ facility are orders of magnitude below the PSD threshold. In addition, this data further supports the validity of the mercury emission estimates previously submitted to the Department, which were conservative.

Department Comment 7:

Please advise whether CBO™ system exhaust is routed to an SCR control system at any installations in the United States, and provide the locations of those installations.

TEC Comment 7:

There are no existing CBO™ system exhausts that are routed to an SCR control system. PMI indicates there are two CBO™ installations currently under construction in the Northeast and mid-Atlantic Region. At both of these locations, the CBO™ exhaust will be routed through the power plant's SCR system.

Department Comment 8:

The emissions calculations for the CBO™ Fluidized Bed Combustor (FBC) do not appear to account for emissions from the combustion of startup fuel. You did list it as a Segment, but we believe you did not account for the potential emissions from combusting up to 14,300 gallons of fuel oil. The potentials were based on 8760 hrs of FBC operation, so there may be an off-set to account for lost hours during start-up. Although there may be a minimal overall impact, we believe it should at least be referenced.

TEC Comment 8:

The Department was correct in noting that the CBO™ air construction permit application did not capture emissions from start up. The estimated annual quantity of distillate fuel used for CBO™ process startups is 14,300 gallons. Emissions associated with the combustion of this startup fuel, using AP-42 emission factors, are provided in Attachment D.

Department Comment 9:

All emission factors for FBC calculations were based off of "Vendor Data". Please provide supporting documentation validating these factors.

TEC Comment 9:

The FBC emission factors were derived as follows: PM/PM₁₀ is based on a design outlet grain loading of 0.010gr/dscf. This will be achieved by the CBO™ product recovery baghouse. Actual PM/PM₁₀ emissions will likely be even lower due to additional capture achieved in the Big Bend Units 3 and 4 flue gas desulfurization (FGD) system. Sulfur dioxide (SO₂) is based on an uncontrolled emission factor of

5.0 lb/MMBtu heat input and a control efficiency of 95%. The uncontrolled emission factor represents the typical maximum uncontrolled SO₂ for Big Bend Units 1 through 4. This is a conservative assumption because PMI's experience with CBO™ indicates that CBO™ SO₂ emissions (which are dependent upon the heat value and sulfur content of fly ash burned as fuel) tend to be less than the SO₂ emissions of the host coal-fired unit(s). The 95% SO₂ control efficiency is based upon the designed minimum efficiency of the Units 3 and 4 FGD system. The NO_x emission factor of 0.95 lb/MMBtu heat input is based on bench-scale research performed by PMI to characterize NO_x emissions from the highly ammoniated fly ash that will be generated at Big Bend Station as a result of the SCR projects. This emission factor is conservative because it incorporates several worst-case assumptions regarding fly ash ammonia levels. The CO emission factor is based on a conservatively assumed outlet concentration of 200 ppmvd. The VOC emission factor is based on the AP-42 emission factor for non-methane organic compounds from fluidized bed combustors burning bituminous and/or sub-bituminous coal. Details of the CO and VOC emission factor derivations are provided in Attachment E.

Department Comment 10:

In reference to the Product Fly Ash Handling (fugitives from truck traffic), you used a silt loading factor from Iron and Steel Production. We question whether a more appropriate factor should be used. As an alternative, you could use a factor from Sand and Gravel Processing, which was about the mid-range of the various categories offered in Table 13.2.1-4 of AP-42. With this approach, PM emissions rise from 0.78 ton/yr to 2.8 ton/yr and PM₁₀ increases from 0.15 tons/yr to 0.55 tons/yr.

TEC Comment 10:

Revised estimates of fugitive PM emissions due to truck traffic on paved roadways using the silt loading factor for sand and gravel processing facilities as suggested by the Department are provided in Attachment F. The fugitive PM emissions were also revised due to a change in the weight of a fully loaded CBO™ product fly ash truck. However, use of the sand and gravel processing facility silt loading factor is considered to over-estimate fugitive PM emissions due to CBO™ product fly ash truck traffic on Big Bend Station paved roadways. The CBO™ product fly ash will be stored in enclosed domes, conveyed pneumatically to a truck loadout silo, and transferred to enclosed trucks. Additionally, baghouses will be used to control PM emissions at each transfer point. In contrast, sand and gravel processing facilities typically include storage of materials in open stockpiles and loading of open top trucks. The potential for material spillage on plant roadways is considered to be much higher for sand and gravel processing facilities than for power generation facilities such as the Big Bend Station.

Department Comment 11:

We note that due to space limitations the fly ash storage and truck loadout areas are inserted on the far eastern portion of your plant site that borders a public road (Figure 2-3 in the Application). Based on the lightweight nature of fly ash and its inherent fugitive properties, we suggest detailed attention to the construction and operation of this part of the process be made to ensure that nuisance emissions are minimized.

TEC Comment 11:

TEC appreciates the Department's observation as to the lightweight nature of the fly ash and its inherent fugitive properties. TEC employs a comprehensive dust control plan to ensure that fugitive dust does not become a nuisance and is kept to a minimum.

TEC understands that with the submission of this additional information, the Department will continue to process the CBO™ air construction permit application for Big Bend Station in an expeditious manner. As per the Department's request, Attachment G contains the professional engineer's certification for the

Mr. Al Linero
September 27, 2005
Page 5 of 5

CBO™ project. If you have any further questions regarding this air construction permit application, please contact me or Shelly Castro at (813) 228-4408.

Sincerely,

A handwritten signature in black ink, appearing to read "Byron T. Burrows". The signature is fluid and cursive, with a large initial "B" and "T".

Byron T. Burrows, P.E.
Manager – Air Programs
Environmental, Health & Safety

EHS/rk/SSC228

Enclosures

c/enc David Lloyd, EPA Region 4
Jason Waters, FDEP SW
Alice Harmon, EPCHC

ATTACHMENT A

**TAMPA ELECTRIC COMPANY
BIG BEND STATION**

Revised Mercury Information

**Tampa Electric Company - Big Bend Station
 Fly Ash Carbon Burn-Out (CBO™) Project
 Potential Mercury (Hg) Emissions - Revised 9/20/05**

	Data ID	Value	Units	Comments
Data:				
Commercial CBO™ Inlet Fly Ash Hg Feed Rate	A	0.024676	lb/hr	
Commercial CBO™ Hg Stack Test Results	B	0.000082	lb/hr	Highest of three test runs
Big Bend Station CBO™ Inlet Fly Ash Hg Content	C	0.167	ppmw	Measured average value
Big Bend Station CBO™ Inlet Fly Ash Feed Rate	D	37.67	ton/hr	PMI design
Big Bend Station CBO™ Annual Operating Hours	E	8,760	hr/yr	Assumed
PSD Hg Significant Emission Rate (SER)	F	200	lb/yr	Chapter 62-212, Table 212.400-2, F.A.C.
Calculations:				
Commercial CBO™ Hg Stack Emission - % of Inlet Fly Ash Hg Feed Rate	G	0.3306	%	$(B / A) \times 100$
Big Bend Station CBO™ Inlet Fly Ash Hg Feed Rate	H	0.012607	lb/hr	$(D \times 2,000) \times (C / 1,000,000)$
	I	110.4	lb/yr	$H \times E$
Big Bend Station CBO™ Potential Hg Emissions	J	0.37	lb/yr	$I \times (G / 100)$
Big Bend Station CBO™ Potential Hg Emissions - Percent of PSD Hg SER	K	0.18	%	$(J / F) \times 100$

Sources: ECT, 2005.
 RTP Environmental Associates, 2005.

ATTACHMENT B

**TAMPA ELECTRIC COMPANY
BIG BEND STATION**

EDR NO_x Data from CBO™ Facility

CBO NO _x Data*	
January 1, 2005 through June 30, 2005	
Facility/Unit	NO _x (lb/MMBtu)
Wateree Station 1	0.340
Wateree Station 2	0.270
Winyah Station 1	0.080
Winyah Station 2	0.080
Winyah Station 3	0.370
Winyah Station 4	0.480

*Wateree Station recently installed an SCR on Units 1 and 2. However, the CBO exhaust for Wateree Station does not tie-in upstream of the SCR. In addition, Winyah Station Units 1 through 4 are equipped with SCRs. The CBO exhaust for Winyah Station is tied into Units 3 and 4 downstream of the SCR. Source: http://www.epa.gov/airmarkets/emissions/prelimarp/05q2/052_sc.txt

ATTACHMENT C

**TAMPA ELECTRIC COMPANY
BIG BEND STATION**

TEC's Fly Ash Mercury Analysis*

Fly Ash Silo	Hg (ppm)
1	0.170
2	0.086
3	0.246
Composite of Fly Ash from Silos 1, 2 & 3	0.172

*This analysis used reference method 7471. The data represents a composite sample of fly ash recently assembled to assist the Department.

ATTACHMENT D

**TAMPA ELECTRIC COMPANY
BIG BEND STATION**

CBO™ Start-up Fuel Emission Calculations

EMISSION INVENTORY WORKSHEET

Tampa Electric Company - Big Bend Station

CBO™

EMISSION SOURCE TYPE

DISTILLATE FUEL OIL FIRED EXTERNAL COMBUSTION SOURCES - CRITERIA POLLUTANTS

FACILITY AND SOURCE DESCRIPTION

Emission Source Description: CBO™ Circulating Fluidized Bed (CFB) Startup Fuel

Emission Control Method(s)/ID No.(s): Big Bend Station Unit 3 and 4 FGD

EMISSION ESTIMATION EQUATIONS

Emission (lb/hr) = Emission Factor (lb/10³ gal) x Fuel Consumption (10³ gal/hr)

Emission (ton/yr) = Emission Factor (lb/10³ gal) x Fuel Consumption (10³ gal/yr) x (1 ton / 2,000 lb)

Source: ECT, 2005.

INPUT DATA AND EMISSIONS CALCULATIONS

Data				
Fuel Consumption:	0.25	10 ³ gal/hr		
	14.3	10 ³ gal/yr		
Distillate Fuel Oil Sulfur Content:	0.5	wt % S		
Criteria Pollutant	AP-42 Emission Factor (lb/10 ³ gal)	Control Efficiency (%)	Potential Emission Rates	
			(lb/hr)	(tpy)
NO _x	20	0.0	5.0	0.14
CO	5	0.0	1.25	0.04
VOC	0.2	0.0	0.050	0.0014
SO ₂	71.0	95.0	0.89	0.025
Filterable PM	2.0	90.0	0.050	0.0014
Filterable PM ₁₀	2.0	90.0	0.050	0.0014
Pb	0.00126	0.0	0.00032	0.0000090

SOURCES OF INPUT DATA

Parameter	Data Source
Fuel Consumption	PMI, 2005
Distillate Fuel Oil Sulfur Content	TEC, 2005.
Emission Factors (NO _x , CO, SO ₂ , PM/PM ₁₀)	AP-42, Table 1.3-1., EPA, September 1998.
Emission Factor (VOC)	AP-42, Table 1.3-3., EPA, September 1998.
Emission Factor (Pb)	AP-42, Table 1.3-10., EPA, September 1998.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	T.Davis	Date:	9/05
Data Entered by:	T.Davis	Date:	9/05
Reviewed by:	T.Davis	Date:	9/05

ATTACHMENT E

**TAMPA ELECTRIC COMPANY
BIG BEND STATION**

CBO™ CO and VOC Emission Factor Calculations

**Tampa Electric Company - Big Bend Station
 Fly Ash Carbon Burn-Out (CBO™) Project
 Carbon Monoxide (CO) Emission Factor Derivation**

	Data ID	Value	Units	Comments
<u>Data:</u>				
CBO™ Return Flow Rate	A	26,700	dscfm	Project design
CBO™ Return CO Concentration	B	200	ppmvd	Project design
CBO™ Heat Input	C	95.61	10 ⁶ Btu/hr	Project design
Molecular Weight of CO	D	28.00	lb/mole	
Volume of One Mole of CO	E	385.30	ft ³ /mole	Ideal Gas Law at 68°F.
<u>Calculations:</u>				
CBO™ Return CO Emission Rate	F	23.3	lb/hr	$(B / 1,000,000) \times A \times 60 \times (1 / E) \times D$
CBO™ CO Emission Factor	G	0.244	lb/10 ⁶ Btu	F / C

Sources: ECT, 2005.
 PMI, 2005.

**Tampa Electric Company - Big Bend Station
 Fly Ash Carbon Burn-Out (CBO™) Project
 Volatile Organic Compound (VOC) Emission Factor Derivation**

	Data ID	Value	Units	Comments
<u>Data:</u>				
AP-42 VOC Emission Factor	A	0.05	lb/ton	Table 1.1-19 TNMOC factor for bituminous/subbituminous coal combustion in FBC units
CBO™ Feed Fly Ash Rate	B	34.63	ton/hr	Project design
CBO™ Heat Input	C	95.61	10 ⁶ Btu/hr	Project design
<u>Calculations:</u>				
CBO™ Feed Fly Ash Heat Content	D	2.76	10 ⁶ Btu/ton	C / B
CBO™ VOC Emission Factor	E	0.018	lb/10 ⁶ Btu	A/ D

TNMOC - total non-methane organic compounds.

Sources: ECT, 2005.
 PMI, 2005.

ATTACHMENT F

**TAMPA ELECTRIC COMPANY
BIG BEND STATION**

CBO™ PM Emission Calculations

ATTACHMENT G

**TAMPA ELECTRIC COMPANY
BIG BEND STATION**

Professional Engineer Certification



Jeb Bush
Governor

Department of Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Colleen M. Castille
Secretary

September 2, 2005

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Ms. Karen Sheffield, General Manager
Big Bend Station
Tampa Electric Company
Post Office Box 111
Tampa, Florida 33601-0111

Re: Big Bend Station
DEP File No. 0570039-023-AC
Fly Ash Carbon Burn-out (CBO) Technology

Dear Ms. Sheffield:

We have begun the review of your air construction permit application received on August 8, 2005, for the subject project. However, we must deem your application *incomplete*, because we need further information relative to the following items:

- Your application states that this project is not subject to New Source Review based on interpretation of specific language contained in the FDEP Consent Final Judgment and the EPA Consent Decree. We understand that EPA Region 4 is reviewing this issue. Please provide the latest status of your deliberations with EPA.
- Based on the requested treatment of the CBO project as a separate emission unit, it appears that the Rule for the Prevention of Significant Deterioration (PSD) applies to the project. This is based on the potential emission increase of at least nitrogen oxides and carbon monoxide emissions (Rule 62-212.400, F.A.C.).
- We have contacted EPA regarding the availability of emissions reductions generated by "over compliance" (i.e., NO_x limit < 0.15 lb/mmBtu on Units 1, 2, and 3) for "netting". They are reviewing the matter and we recommend you include this in your discussions with them. This would provide one avenue for possible netting such that PSD will not be triggered.
- On September 1, 2005, we received test results of mercury emissions testing from a CBO installation and potential-to-emit calculations for the proposed TECO CBO project. We acknowledge receipt but have not studied the submittal yet. Please review the information just submitted, and confirm whether or not it includes estimates of pounds per year (lb/yr) of mercury that will enter the CBO process in the fly ash and the lb/yr that will exit via exhaust and the beneficiated fly ash. Otherwise, provide this information.
- Please provide the NO_x emissions test results from other power plant sources where CBO and SCR are currently employed (e.g., the two South Carolina plants referenced during our discussions with TECO representatives).

"More Protection, Less Process"

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- Please also provide test samples of fly ash (at both the pre-processing and post-processing stages through the CBO) from the plants selected for the above request and from the pilot test facility located in Tampa.
- Please advise whether CBO system exhaust is routed to an SCR control system at any installations in the United States, and provide the locations of those installations.
- The emissions calculations for the CBO Fluidized Bed Combustor (FBC) do not appear to account for emissions from the combustion of startup fuel. You did list it as a Segment, but we believe you did not account for the potential emissions from combusting up to 14,300 gallons of fuel oil. The potentials were based on 8760 hrs of FBC operation, so there may be an off-set to account for lost hours during start-up. Although there may be a minimal overall impact, we believe it should at least be referenced.
- All emission factors for FBC calculations were based off of "Vendor Data". Please provide supporting documentation validating these factors.
- In reference to the Product Fly Ash Handling (fugitives from truck traffic), you used a silt loading factor from *Iron and Steel Production*. We question whether a more appropriate factor should be used. As an alternative, you could use a factor from *Sand and Gravel Processing*, which was about the mid-range of the various categories offered in Table 13.2.1-4 of AP-42. With this approach, PM emissions rise from 0.78 ton/yr to 2.8 ton/yr and PM₁₀ increases from 0.15 tons/yr to 0.55 tons/yr.
- We note that due to space limitations the fly ash storage and truck loadout areas are inserted on the far eastern portion of your plant site that borders a public road (Figure 2-3 in the Application). Based on the lightweight nature of fly ash and its inherent fugitive properties, we suggest detailed attention to the construction and operation of this part of the process be made to ensure that nuisance emissions are minimized.

When we receive this information, we will continue processing your application. If you have any questions, please contact Tom Cascio at 850-921-9526.

Rule 62-4.050(3), F.A.C., requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature. Permit applicants are advised that Rule 62-4.055(1), F.A.C., requires applicants to respond to requests for information within 90 days, unless the applicant has requested in writing, and has been granted, additional time within 90 days.

Ms. Karen Sheffield, General Manager
Big Bend Station
Page 3 of 3

Sincerely,

Handwritten signature of A. A. Linero and the date 9/2/2005.

A. A. Linero, P.E.
Program Administrator
Permitting South Section

Cc: Thomas Davis, P.E.
Shelly Castro, TEC
Alice Harman, EPCHC
Jason Waters, FDEP-SWD
David Lloyd, EPA Region 4

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:
 Ms. Karen Sheffield
 General Manager
 Tampa Electric Company / Big Bend Station
 P. O. Box 111
 Tampa, FL 33601-0111

2. Article Number
 (Transfer from service label) 7000 2870 0000 7028 4236

PS Form 3811, August 2001

Domestic Return Receipt

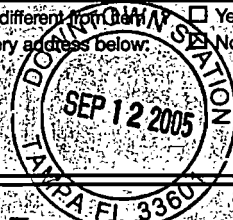
102595-02-M-1540

COMPLETE THIS SECTION ON DELIVERY

A. Signature Agent
 Addressee

B. Received by (Printed Name) C. Date of Delivery

D. Is delivery address different from that on label? Yes
 No
 If YES, enter delivery address below



3. Service Type
 Certified Mail Express Mail
 Registered Return Receipt for Merchandise
 Insured Mail C.O.D.

4. Restricted Delivery? (Extra Fee) Yes

7000 2870 0000 7028 4236

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 (Domestic Mail Only; No Insurance Coverage Provided)**

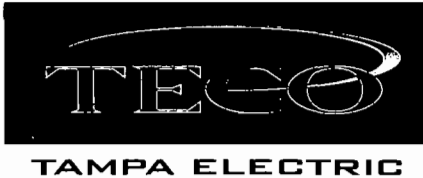
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Total Postage & Fees	\$

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 Street, Apt. No.; or PO Box No. PO Box 111
 City, State, ZIP+4 Tampa, FL 33601-0111

PS Form 3800, May 2000 See Reverse for Instructions



RECEIVED

AUG 08 2005

August 5, 2005

BUREAU OF AIR REGULATION

Mr. Al Linero
Florida Department of
Environmental Protection
111 South Magnolia Drive, Suite 4
Tallahassee, FL 32301

Via FedEx
Airbill No. 7929 9381 2681

**Re: Tampa Electric Company
Big Bend Station
Air Construction Permit Application for
Fly Ash Carbon Burn-Out (CBO™) Project**

Dear Mr. Linero,

Tampa Electric Company (TEC) requests an air construction permit to install a fly ash carbon burn-out (CBO™) technology at its Big Bend Station. CBO™ technology has the capability to mitigate significant impacts to the quality of fly ash resulting from the installation of nitrogen oxides (NO_x) pollution control and other associated systems planned for Big Bend Station.

TEC entered into agreements with the Environmental Protection Agency (EPA) and the Florida Department of Environmental Protection (FDEP) concerning the installation of additional air pollution control systems at Big Bend Station. These agreements (EPA Consent Decree and FDEP Consent Final Judgment) included requirements to install additional air pollution control systems for NO_x control on Units 1 through 4. In response to these requirements, TEC determined that the installation of combustion modification and selective catalytic reduction (SCR) systems are the technologies to be utilized to reduce the NO_x emissions on Big Bend Units 1 through 4.

TEC has investigated the impacts of the SCR operation relative to its potential to increase the amount of sulfur trioxide (SO₃) generated and determined that a SO₃ control system is necessary. The proposed SO₃ control technology uses ammonia wherein the vast majority of the unreacted ammonia will be captured by the fly ash. This will result in concentrations of ammonia in the fly ash which make the ash unsuitable for the cement industry. Therefore, to avoid creating a significant solid waste issue as a result of installing air emission reduction control technology; TEC has opted to install beneficiation equipment to ensure that it can continue to market the fly ash for beneficial use. This will avoid having to otherwise potentially dispose of approximately 280,000 tons of fly ash annually. Based upon data from prior installations and testing conducted by the vendors for the CBO™ technology, the ammonia is decomposed in the CBO™ process

TAMPA ELECTRIC COMPANY
P. O. BOX 111 TAMPA, FL 33601-0111

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Mr. Al Linero
August 5, 2005
Page 2 of 2

thus allowing the fly ash to continue to be marketed for beneficial use. As previously mentioned to FDEP, TEC reviewed the effects of installing the future NO_x control and SO₃ control systems and determined that there is a potential for increase in particulate matter (PM) and opacity as a result. For that reason, a request for higher permit limits may be submitted in the future.

An air construction permit application for Big Bend Station's CBO™ technology is enclosed for your review. This application addresses the issues raised during the May 31, 2005 pre-application meeting with the Department.

TEC appreciates the cooperation of the Department in this matter. If you have any questions or comments, please contact Shelly Castro or me at (813) 228-4408.

Sincerely,



Byron T. Burrows
Manager - Air Programs
Environmental, Health & Safety

EHS/rlk/SSC225

Enclosure

c/enc: Ms. Alice Harman, EPCHC
Mr. Jason Waters, FDEP SW
Mr. David Lloyd, EPA Region IV
Mr. Scott Sheplak, FDEP
Ms. Trina Vielhauer, FDEP
Mr. Sterlin Woodard, EPCHC