Cascio, Tom

From: David Lukcic [dmlukcic@tecoenergy.com]
Sent: Thursday, April 06, 2006 8:39 AM
To: www.tom.cascio@deo.state.fl.us
Subject: CBO Permit Additinal Information

Tom,

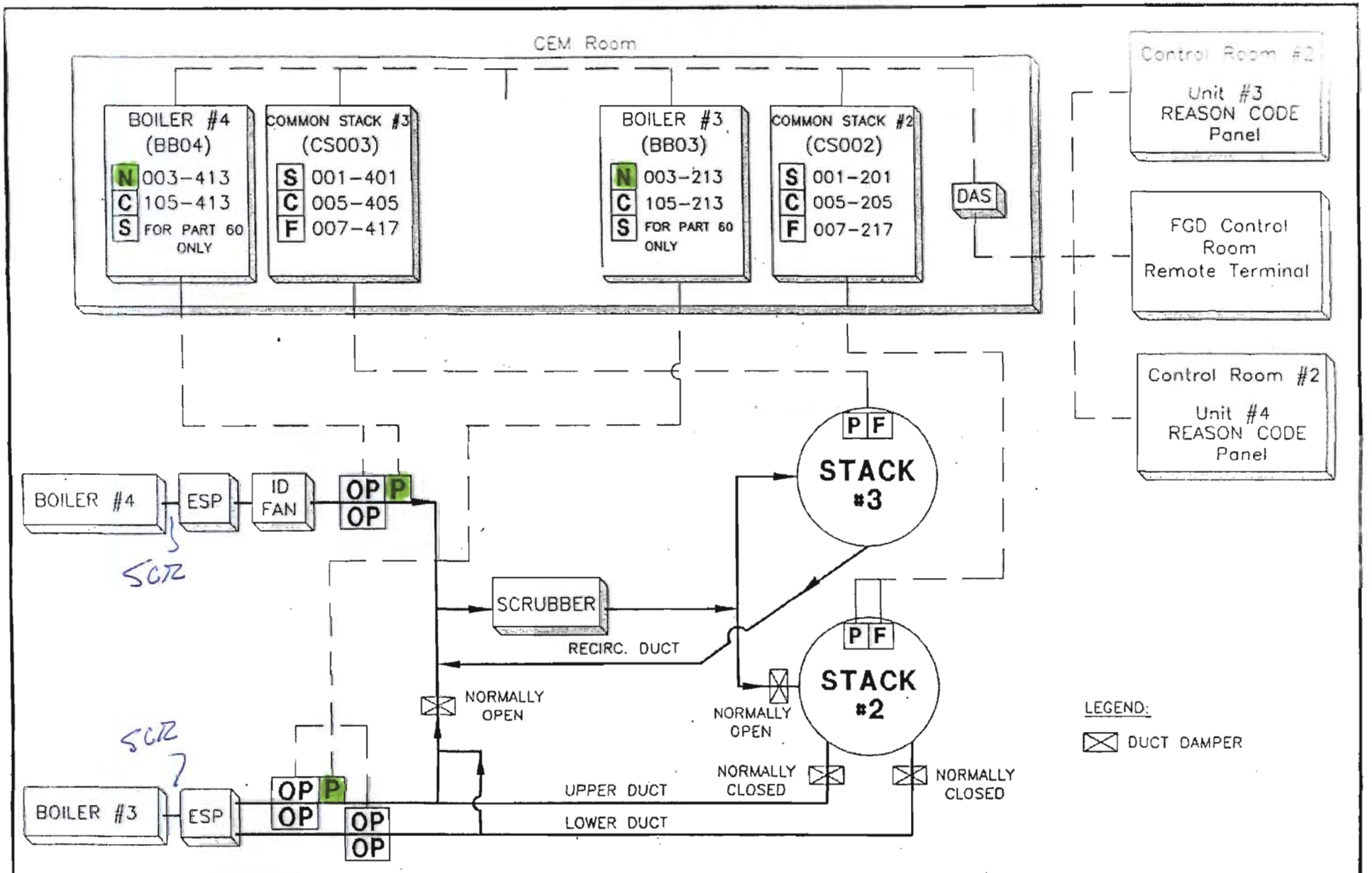
I wanted to clairify wehre we were currently proposing to monitor .
This could change once discussions are finalized with the EPA.
CUrrently we would keep the existng CEMS monitor where it is to monitor the bioler emisssions. We would then intoruce the CBO stream after the ESP's and one f two opions.
1) An annual stack test for compliance of the CBOstream.or 2) place an additional CEMS after the streams combined and monitor the combines for a NOx limit of .15.

We would also like to keep the existing exclusions that are in the title V permit that address startup, shut down and abnormal events like we dis in unitls 1,2,3, & 4.

Thank you so much. If you have an addiitonal questions please call me.
I am out of town so call me on my cell. 813 293-6619 .

David

David M. Lukcic, P.E.
Tampa Electric Co.
Environmental, Health, & Safety
Manager, Environmental Projects
Ph. (813) 635-1523
Fax (813) 228-1308



TAMPA ELECTRIC
A TECO ENERGY COMPANY

CEM SYSTEM
BLOCK DIAGRAM
UNITS NO.3 AND NO.4-BIG BEND STATION

DESIGNED BY	CHECKED BY	APPROVED BY
CW/JFM	CW	DC
DATE 03/95	JOB NO. B42-77	
FILE NAME CEM-B41A		DWG. NO. SH.1

TAMPA ELECTRIC

RECEIVED

AUG 08 2005

BUREAU OF AIR REGULATION

August 5, 2005

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^{TM}) Project

Dear Mr. Linero,

Tampa Electric Company (TEC) requests an air construction permit to install a fly ash carbon burn-out (CBO^{TM}) technology at its Big Bend Station. CBO^{TM} 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 (SO_3) generated and determined that a SO_3 control system is necessary. The proposed SO_3 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^{TM} technology, the ammonia is decomposed in the CBO^{TM} process

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 SO_3 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

1.0 INTRODUCTION

Tampa Electric Company (Tampa Electric) requests an air construction permit to install fly ash carbon burn-out (CBO™) technology at its Big Bend Station. CBO™ technology is an integral component of the Big Bend Station nitrogen oxides (NO_x) pollution control projects required by the U.S. Environmental Protection Agency (EPA) Consent Decree and Florida Department of Environmental Protection (FDEP) Consent Final Judgment.

Tampa Electric entered into agreements with EPA and FDEP concerning the installation of additional air pollution control systems at the Big Bend Station. These agreements (EPA Consent Decree and FDEP Consent Final Judgment) included requirements to install additional systems for NO_x control on Units 1 through 4. In response to these requirements, Tampa Electric determined that the installation of combustion modifications and SCR systems are the technologies to be used to reduce NO_x emissions from Big Bend Station Units 1 through 4. However, installation of those systems to effect NO_x reductions will necessarily impact Tampa Electric's current beneficial reuse of its fly ash at the Big Bend Station.

An air construction permit application for the Unit 4 SCR control system was submitted to FDEP in February 2005. In response, on May 6, 2005, FDEP issued an air construction permit for the Unit 4 SCR control system project. In June 2005 an air construction permit application for the Unit 3 SCR control system was submitted to FDEP; this permit application is currently being reviewed by FDEP. Air construction permit applications for Units 1 and 2 SCR control systems will be submitted approximately 3 months prior to the commencement of construction activities.

Combustion by-product fly ash generated at Units 1 through 4 is presently transferred offsite and used as a raw material in the production of Portland cement or as a substitute for Portland cement in the production of concrete. The current and planned NO_x control systems for Units 1 through 4 will increase the fly ash carbon and ammonia concentrations to levels that will render the fly ash unusable as a Portland cement raw material or substitute. Big Bend Station generates approximately 280,000 tons of fly ash per year as a

result of its operations; 100 percent of that fly ash is currently transferred offsite for use in the production of either Portland cement or concrete. If the fly ash cannot be used for those purposes, this could potentially result in the landfill disposal of 280,000 tons of fly ash annually.

In addition to reducing NO_x to molecular nitrogen, the SCR control systems will unavoidably increase boiler flue gas sulfur trioxide (SO_3) concentrations due to the oxidation of sulfur dioxide (SO_2) to SO_3 by the SCR catalyst. SO_3 vapor will subsequently condense to form sulfuric acid mist aerosol as the flue gas temperature is reduced in the inlet to the wet flue gas desulfurization (FGD) control system. Sulfuric acid mist aerosol is not efficiently removed by wet FGD control systems. To avoid corrosion downstream of the ductwork and ESP internals, and avoid potential plume opacity problems, ammonia injection systems will be installed at the Big Bend Station to mitigate the environmental impacts of SO_3 formation by the SCR control systems. The ammonia injection systems will further increase the fly ash ammonia concentration to levels that are well above the maximum concentration (i.e., 50 parts per million) required for recycling the fly ash as a Portland cement raw material or substitute.

The SCR and the control measures to mitigate SO_3 formation will alter the quality of the fly ash so that it cannot be recycled in the current manner. Landfill disposal of large quantities of fly ash is not an acceptable alternative or environmentally sound. Therefore, CBO™ technology is a necessary component of the projects required by the FDEP Consent Final Judgment and EPA Consent Decree. CBO™ technology will be installed to produce a low-carbon, low-ammonia, fly ash material suitable for reuse in cement and concrete production (in lieu of landfilling the fly ash). CBO™ technology will also recover a significant portion of the energy contained in the high-carbon fly ash for beneficial use at the Big Bend Station. Heat recovered from the CBO™ process will displace the energy derived from solid fuels that would otherwise be burned in Units 3 and 4, resulting in a fuel savings and corresponding reduction in air emissions. Although the CBO™ process will cause collateral increases in air pollutant emissions, it is an important and necessary element of the significant emission reductions of the Big Bend Station NO_x Pollution Control Project.

The Big Bend Station fly ash CBO™ project is not subject to New Source Review (NSR) permitting requirements pursuant to Section V., Paragraph M of the FDEP Consent Final Judgment and Paragraph 44. of the EPA Consent Decree. The applicable provision of the FDEP Consent Final Judgment states as follows:

> M. TAMPA ELECTRIC COMPANY shall also be protected from triggering NSR requirements with respect to repairs, maintenance and physical or operation changes during the term of the Consent Final Judgment which term shall remain effective until the actions required hereunder have been implemented.
>
> FDEP Consent Final Judgment, Section V, at page 8.

Both the FDEP Consent Final Judgment and the EPA Consent Decree allow projects such as the CBO™ project that are made necessary by and undertaken during pendency of the Consent Final Judgment and Consent Decree to proceed without the need to obtain Prevention of Significant Deterioration (PSD) permits. As set forth above, installation of CBO™ technology at Big Bend Station is a crucial component of the NO_x pollution control projects required by the Consent Final Judgment and Consent Decree, without which approximately 280,000 tons of fly ash would be compromised. Accordingly, this permit application requests a non-PSD air construction permit for the Big Bend Station fly ash CBO™ project.

A pre-application meeting was held with the Bureau of Air Regulation staff in Tallahassee on May 31, 2005. One issue discussed at this meeting was the planned location of the CBO™ return stream at the common duct on Units 3 and 4 downstream of the SCR control systems and upstream of the common flue gas desulfurization (FGD) control system. As the Department was advised, routing the relatively low temperature CBO™ return stream immediately upstream of a SCR control system is problematical due to SCR temperature constraints. The temperature of the SCR inlet stream, with the inclusion of the CBO™ return, could be reduced below the minimum SCR effective operating temperature, particularly at low boiler loads, resulting in possible compliance issues. Tampa Electric also considered routing the CBO™ return to the boiler wind boxes of Unit 3 and 4. However, this option is not feasible due to the risk of boiler operational problems aris-

ance issues and/or a boiler trip causing a loss in generation. The planned location of the CBO™ return at the common duct on Units 3 and 4 was selected so as not to jeopardize the safe and effective operation of Units 3 and 4 and their SCR control systems.

Another issue raised during the pre-application meeting was that of potential mercury emissions associated with the CBO™ process. Extensive testing conducted by the CBO™ process vendor, Progress Materials, Inc. (PMI), has confirmed that essentially all of the mercury present in the feed fly ash to the CBO™ process will remain with the CBO™ process product fly ash; therefore, mercury emissions are not an issue with the CBO™ process.

Regarding emissions monitoring, Tampa Electric proposes to conduct initial and annual sampling for NO_x and CO of the CBO™ return prior to entering the common Units 3 and 4 FGD inlet duct in accordance with the requirements of Rule 62-297.310(7)(a)4.b., F.A.C. The existing SO_2 CEMS located downstream of Units 3 and 4 FGD will be used to monitor SO_2 emissions from Units 3 and 4 and the CBO™ return. Consistent with current testing requirements, initial and annual of sampling for particulate matter (PM) will also be conducted downstream of Units 3 and 4 FGD to measure PM from Units 3 and 4 and the CBO™ return.

The fly ash CBO™ project will process fly ash from each of the four Big Bend Station units following installation of SCR control systems on each unit. Accordingly, construction of the CBO™ project should commence no later than October 1, 2005 in order to be operational prior to completion of the first Big Bend Station SCR installation on Unit 4.

Following this introduction, a description of the CBO™ process and discussion of project emissions are provided in Sections 2.0 and 3.0, respectively. Attachment B provides FDEP's Application for Air Permit—Long Form. Attachment B provides detailed CBO™ technology emission rate calculations.

2.0 PROCESS DESCRIPTION

CBO™ technology is a proprietary, patented, environmentally beneficial technology whose primary function is the production of low-carbon, low-ammonia fly ash material suitable for commercial use as a Portland cement raw material or substitute. Major components of the CBO™ process planned for the Big Bend Station include a feed fly ash silo, feed and product fly ash storage domes, fluidized bed combustor (FBC), hot cyclones for fly ash recycle to the FBC, heat recovery heat exchanger, cold cyclone and fabric filter baghouse for product fly ash recovery, and product fly ash truck loading. A flow diagram of the CBO™ process proposed for the Big Bend Station is provided in Figure 2-1. A process flow diagram for Units 1 through 4, including all air emission control equipment, is shown in Figure 2-2. A plan view of the Big Bend Station showing the locations of the CBO™ process emission points is provided in Figure 2-3.

Fly ash from Units 1 through 4 electrostatic precipitators (ESPs) will be conveyed pneumatically to the CBO™ feed fly ash silo or feed fly ash storage dome. The ESPs are located downstream of the SCR and SO_3 air emission control systems and therefore will collect high-carbon, ammoniated fly ash from Units 1 through 4 combustion gas streams. The feed fly ash silo will vent through a baghouse prior to discharging to the atmosphere (Emission Point ID CBO-001). The feed fly ash storage dome will also vent through a baghouse prior to discharging to the atmosphere (Emission Point ID CBO-002).

Fly ash from the feed silo will then be fed to the FBC for oxidation of carbon contained in the fly ash to carbon dioxide. The high temperature FBC process will also reduce fly ash ammonia compounds to molecular nitrogen (N_2) and water. The CBO™ technology does not require any auxiliary fuel to operate, with the limited exception of a minimal amount of start up fuel to initiate the combustion process. As with any fossil fuel combustion process, the FBC combustion gases will also contain combustion by-products including NO_x, carbon monoxide (CO), SO_2, particulate matter less than or equal to 10 micrometers (PM_{10}), and volatile organic compounds (VOCs). The CBO™ process

includes a forced draft fan to provide fluidization and combustion air to the FBC. An induced draft fan maintains the FBC freeboard pressure slightly below atmospheric pressure.

The FBC exhaust stream will be routed through hot cyclones to capture fly ash entrained in the FBC exhaust stream. Fly ash captured by the hot cyclones is returned to the FBC. The hot cyclones exhaust and FBC low carbon product ash streams are combined and sent to the gas/product cooler heat exchanger for heat recovery. Thermal energy recovered from the CBO™ process will be used to heat condensate from the Units 3 and/or 4 low-pressure feedwater systems. Unit 3 will be the primary recipient of the recovered CBO™ process energy; Unit 4 will be used during periods when Unit 3 is not available. Reuse of the CBO™ process recovered energy saves fuel that would otherwise need to be burned in Units 3 and 4. This will result in less coal being consumed per Unit of electric output, with corresponding reductions in air pollutant emissions. The improvement in Unit 3 and Unit 4 heat rate, due to the use of recovered energy from the CBO™ process, represents recovery of a portion of the efficiency lost when combustion controls were installed on Units 3 and 4 for NO_x reduction purposes. Lower combustion efficiency is a consequence of the lower flame temperatures and lower oxygen available in the combustion zone which is necessary to reduce NO_x emissions. This is the reason for the increase in fly ash carbon content.

Following heat recovery, the cooled FBC combustion gases, containing entrained product fly ash, will be routed through a cold cyclone and fabric filter baghouse for product fly ash separation. The exhaust from the fabric filter baghouse (i.e., the CBO™ return) will be routed to the inlet of Units 3 and 4 flue gas desulfurization (FGD) emission control system and subsequently discharged to the atmosphere through the existing Units 3 and 4 stacks (Emission Point IDs CS-002 and CS-003).

Product fly ash separated by the cold cyclone and fabric filter baghouse will be sent to a surge bin. A portion of the cooled, low-carbon product will be recycled to the FBC for temperature control. The remaining product ash is then conveyed pneumatically to the product fly ash storage dome or directly to a truck loadout silo. The product fly ash stor-

age dome will vent through a baghouse prior to discharging to the atmosphere (Emission Point ID CBO-003). The feed and product fly ash storage domes will be used to provide flexibility in product fly ash marketing. Product fly ash will be conveyed to the truck loadout silo for subsequent transfer to trucks for shipment to offsite customers. The PM_{10} emissions captured during the truck loading process will be routed to the truck loadout silo which will vent through a baghouse prior to discharging to the atmosphere (Emission Point ID CBO-004).

The product fly ash trucks will travel on paved roads within Big Bend Station and then exit the plant for delivery to offsite customers. Fugitive particulate matter (PM)/PM_{10} emissions associated with product fly ash truck traffic on Big Bend Station paved roads (Emission Point CBO-005) will be controlled by periodic watering on an as-needed basis.

3.0 PROJECT EMISSION RATES

Emissions associated with the CBO™ pollution control project include PM_{10} due to fly ash handling and storage and combustion by-products (NO_x, CO, SO_2, PM_{10}, and VOC) due to combustion of feed fly ash in the CBO™ FBC. A plan view of the Big Bend Station showing the locations of the CBO™ process emission points was previously provided in Figure 2-3. Detailed emission rate calculations are provided in Attachment B. Each of these CBO™ emission areas is discussed in the following sections.

Material Handling and Storage PM_{10} Emissions

The CBO™ process will include five PM_{10} emission points associated with material handling and storage activities. These PM_{10} emission points include: (1) feed fly ash silo (Emission Point CBO-001), (2) feed fly ash storage dome (Emission Point CBO-002), (3) product fly ash storage dome (Emission Point CBO-003), (4) product fly ash truck loadout storage silo and truck loading operation (Emission Point CBO-004), and (5) fugitive emissions associated with product fly ash truck traffic on paved Big Bend Station roads (Emission Point CBO-005).

The feed fly ash silo, feed and product fly ash storage domes, and product fly ash truck loadout silo will each be equipped with fabric filter baghouses designed to achieve an outlet PM_{10} concentration of no more than 0.020 grains per dry standard cubic foot (gr/dscf). These baghouses will employ Nomex™/Teflon™ filter bags and pulse jet cleaning. Design pressure drop for each baghouse is 6 inches of water. Baghouse air-to-cloth ratios are 3:1 (feed fly ash silo) and 4:1 (feed and product fly ash storage domes and product fly ash truck loadout silo). The truck loading operation will include a telescoping chute with local ventilation designed to capture the fugitive PM_{10} emissions that would otherwise occur in the absence of this collection equipment. The PM_{10} emissions captured during the truck loading process will be routed to the truck loadout silo. Fugitive PM_{10} emissions associated with product fly ash truck traffic on paved Big Bend Station roads will be minor due to relatively short travel distances. Potential PM_{10} emissions, based on the conservative premise of continuous operation, total 16.4 tons per year (tpy) for these CBO™ emission sources.

The existing Big Bend Station fly ash handling and storage systems will remain in use. However, the existing fly ash truck loading equipment will not be used while the CBO™ process is operational.

CBO™ Combustion By-Product Emissions

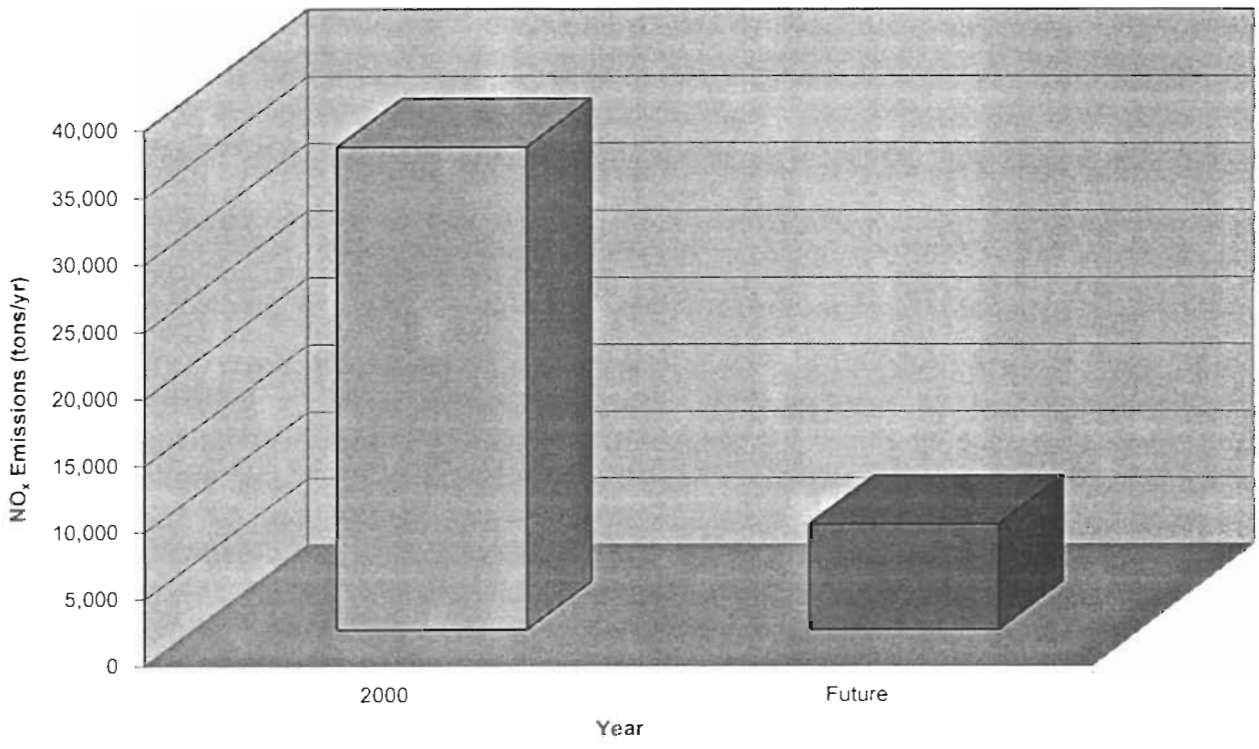
The CBO™ FBC combustion gases will contain combustion by-products including NO_x, CO, SO_2, PM_{10}, and VOCs. The CBO™ FBC will utilize good combustion practices to minimize emissions of CO. Following product fly ash separation by the cold cyclone and fabric filter baghouse, this exhaust stream will be routed to the inlet of Units 3 and 4 FGD control system prior to discharging to the atmosphere through existing Units 3 and 4 stacks. Emission estimates for these combustion by-products, provided in Attachment B, were developed based on data provided by the CBO™ vendor, Progress Materials, Inc. (PMI).

Including the CBO™ return stream, the Units 3 and 4 FGD control system will continue to achieve the SO_2 removal rates required by the EPA Consent Decree and FDEP Consent Final Judgment. Units 3 and 4 will also continue to comply with the PM emission limits required by the EPA Consent Decree and FDEP Consent Final Judgment.

As noted in Section 2.0, reuse of the CBO™ process recovered energy will save fuel that would otherwise need to be consumed in Units 3 and 4. The emission rate increases associated with the Big Bend Station CBO™ process range from 362 tpy (for NO_x) to 22.9 tpy (for PM_{10}). NO_x emissions from the Big Bend Station CBO™ process are expected to be greater than some other CBO™ process installations due to the high ammonia levels in the Big Bend fly ash. The increased NO_x emissions are a direct consequence of the SO_3 mitigation system and constitute a small collateral impact.

The Big Bend Station NO_x pollution control projects, including the integral CBO™ process, are environmentally beneficial due to the substantial reductions in actual NO_x emissions that will occur following completion of these projects. Actual Big Bend Station NO_x emissions in 2000 totaled 36,073 tons. Future Big Bend Station actual NO_x emissions, following completion of the NO_x pollution control projects, are estimated to total

approximately 7,900 tpy resulting in an actual NO_x emissions reduction of over 28,000 tpy. This substantial decrease in actual NO_x emissions is illustrated below.



ATTACHMENT B

CBO™ EMISSION RATE CALCULATIONS

Table B-1. Tampa Electric Company Big Bend Generating Station
CBO™ Project - Potential Emission Estimates
Fly Ash Handling and Storage Particulate Matter Emissions

Emission Source	Control Device	Operating Hours (hrs/yr)	Exhaust Temperature (°F)	Exhaust Flow Rates (acfm)	Exhaust Flow Rates (scfm)	PM_{10} Emission Rates (gr/dscf)	PM_{10} Emission Rates (lb/hr)	PM_{10} Emission Rates (tpy)
Feed Fly Ash Silo	Baghouse	8,760	Ambient	2,400	2,400	0.02	0.4	1.8
Feed Fly Ash Storage Dome	Baghouse	8,760	200	8,000	6,400	0.02	1.1	4.8
Product Fly Ash Storage Dome	Baghouse	8,760	200	8,000	6,400	0.02	1.1	4.8
Product Fly Ash Loadout Silo and Truck Loading	Baghouse	8,760	200	8,000	6,400	0.02	1.1	4.8
Fly Ash Truck Traffic	Paved Roads Watering	8,760	N/A	N/A	N/A	N/A	0.10	0.15
Totals							**3.8**	**16.4**

Sources: ECT, 2005.
PMI, 2005.

Table B-2. Tampa Electric Company Big Bend Generating Station
CBO™ Project - Potential Emission Estimates
Fluidized Bed Combustor By-Products and CBO™ Heat Recovery

A. NO_x, SO_2, CO, VOC, and PM_{10} - CBO™ Return to Units 3 and 4 FGD

Emission Source:	CBO™ Return to Units 3 and 4	
Control System:	FGD (Units 3 and 4)	
Operating Hours:	8,760	hr/yr
CBO™ Heat Input:	95.61	10^6 Btu/hr

Pollutant	Control System Efficiency (%)	Emission Rates (lb/10^6 Btu)[1]	Emission Rates (lb/hr)	Emission Rates (tpy)
NO_x	0.0	0.949	90.7	397.3
CO	0.0	0.244	23.3	102.2
SO_2	95.0	5.0	23.9	104.7
VOC	0.0	0.018	1.7	7.6
PM_{10}	50.0	0.048	2.3	10.1

[1] CBO™ return prior to Units 3 and 4 FGD.

B. NO_x, SO_2, CO, VOC, and PM_{10} - Units 3 and 4 Decreases (CBO™ Heat Recovery)

Emission Source:	CBO™ Heat Recovery - Units 3 & 4	
Operating Hours:	8,760	hr/yr
CBO™ Heat Recovery:	705,882	10^6 Btu/yr (100% capacity factor)
CBO™ Heat Recovery:	80.6	10^6 Btu/hr

Pollutant	Historical Units 3 & 4 (lb/10^6 Btu)[2]	Emission Rates (lb/hr)	Emission Rates (tpy)
NO_x	0.10	(8.06)	(35.29)
CO	0.022	(1.81)	(7.91)
SO_2	0.25	(20.15)	(88.24)
VOC	0.0027	(0.22)	(0.95)
PM_{10}	0.01	(0.81)	(3.53)

[2] Per EPA Consent Decree for NO_x, SO_2, and PM_{10}. AP-42 factors for CO and VOC.

C. NO_x, SO_2, CO, VOC, and PM_{10} - Change in Emissions

Pollutant	Emission Rates[3] CBO™ Return to Units 3 & 4 (tpy)	CBO™ Units 3 & 4 Heat Recovery (tpy)	Change (tpy)
NO_x	397.3	(35.3)	362.0
CO	102.2	(7.9)	94.3
SO_2	104.7	(88.2)	16.5
VOC	7.6	(0.9)	6.6
PM_{10}	10.1	(3.5)	6.5

[3] Downstream of all emission control systems.

Sources: ECT, 2005.
PMI, 2005.

EMISSION INVENTORY WORKSHEET

Tampa Electric Company - Big Bend Station

Truck Traffic (Paved Roads)

EMISSION SOURCE TYPE

FUGITIVE PM - TRUCK TRAFFIC ON PAVED ROADS

FACILITY AND SOURCE DESCRIPTION

Emission Source Description:	Fugitive PM - CBO™ Product Fly Ash Truck Traffic on Paved Roads
Emission Control Method(s)/ID No.(s):	Watering, As Necessary
Emission Point ID:	CBO-005

EMISSION ESTIMATION EQUATIONS

PM Emission (lb/hr) = ((0.082 x [(Silt Loading Factor/2)$^{0.65}$] x [(Truck Weight/3)$^{1.5}$)) - 0.00047) x (1 - ("Wet" Days/1,460)) x Vehicle Miles Traveled (VMT)/hr x (1 - (Control Eff. / 100))

PM Emission (ton/yr) = ((0.082 x [(Silt Loading Factor/2)$^{0.65}$] x [(Truck Weight/3)$^{1.5}$)) - 0.00047) x (1-("Wet" Days/1,460)) x Vehicle Miles Traveled (VMT)/yr x (1 ton/2,000 lb) x (1 - (Control Eff. / 100))

Source: Section 13.2.1, AP-42, December 2003.

INPUT DATA AND EMISSIONS CALCULATIONS

Uncontrolled Silt Loading Factor:	9.7	g/m^2	Mean Annual Number of "Wet" Days:	100	
Operating Hours:	8	hr/dy	7 dy/wk	52	wk/yr
CBO™ Fly Ash Shipped by Truck:	300,000	ton/yr	Truck Travel Distance (one way):	483	ft
Hourly Truck Count:	8	trucks/hr	Annual Truck Count:	23,077	trucks/yr

Truck Traffic Type	Source ID	Vehicle Miles Traveled (VMT/hr)	Vehicle Miles Traveled (VMT/yr)	Vehicle Weight (ton)	Control Efficiency (%)	Potential PM Emission Rates (lb/hr)	Potential PM Emission Rates (ton/yr)
CBO™ Fly Ash Trucks (Empty)	CBO-005a	0.725	2,112	13.0	90.0	0.139	0.203
CBO™ Fly Ash Trucks (Full)	CBO-005b	0.725	2,112	26.0	90.0	0.395	0.574
					Totals	**0.53**	**0.777**

SOURCES OF INPUT DATA

Parameter	Data Source
Uncontrolled Silt Loading Factor	Based on factor for iron and steel production, ECT, 2005.
Mean Annual Number of "Wet" Days	Figure 13.2.1-2, Section 13.2.1, AP-42, November 2003.
Vehicle Miles Traveled, VMT	TEC, 2005.
Truck Weights, ton	TEC, 2005.
Control Efficiency	Estimated, ECT 2005.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	S. Castro	**Date:**	8/05
Evaluated by:	T. Davis	**Date:**	8/05
Data Entered by:	T. Davis	**Date:**	8/05

EMISSION INVENTORY WORKSHEET

Tampa Electric Company - Big Bend Station

Truck Traffic (Paved Roads)

EMISSION SOURCE TYPE

FUGITIVE PM_{10} - TRUCK TRAFFIC ON PAVED ROADS

FACILITY AND SOURCE DESCRIPTION

Emission Source Description:	Fugitive PM_{10} - CBO™ Product Fly Ash Truck Traffic on Paved Roads
Emission Control Method(s)/ID No.(s):	Watering, As Necessary
Emission Point ID:	CBO-005

EMISSION ESTIMATION EQUATIONS

PM_{10} Emission (lb/hr) = ((0.016 x [(Silt Loading Factor/2)$^{0.65}$] x [(Truck Weight/3)$^{1.5}$] - 0.00047) x (1 - ("Wet" Days/1,460)) x Vehicle Miles Traveled (VMT)/hr x (1 - (Control Eff. / 100))

PM_{10} Emission (ton/yr) = ((0.016 x [(Silt Loading Factor/2)$^{0.65}$] x [(Truck Weight/3)$^{1.5}$] - 0.00047) x (1-("Wet" Days/1,460)) x Vehicle Miles Traveled (VMT)/yr x (1 ton/2,000 lb) x (1 - (Control Eff. / 100))

Source: Section 13.2.1, AP-42, December 2003.

INPUT DATA AND EMISSIONS CALCULATIONS

Uncontrolled Silt Loading Factor:	9.7	g/m^2	Mean Annual Number of "Wet" Days:	100	
Operating Hours:	8	hr/dy	7 dy/wk	52	wk/yr
CBO™ Fly Ash Shipped by Truck:	300,000	ton/yr	Truck Travel Distance (one way):	483	ft
Hourly Truck Count:	8	trucks/hr	Annual Truck Count:	23,077	trucks/yr

Truck Traffic Type	Source ID	Vehicle Miles Traveled (VMT/hr)	Vehicle Miles Traveled (VMT/yr)	Vehicle Weight (ton)	Control Efficiency (%)	Potential PM_{10} Emission Rates (lb/hr)	Potential PM_{10} Emission Rates (ton/yr)
CBO™ Fly Ash Trucks (Empty)	CBO-005a	0.725	2,112	13.0	90.0	0.027	0.040
CBO™ Fly Ash Trucks (Full)	CBO-005b	0.725	2,112	26.0	90.0	0.077	0.112
					Totals	**0.10**	**0.152**

SOURCES OF INPUT DATA

Parameter	Data Source
Uncontrolled Silt Loading Factor	Based on factor for iron and steel production, ECT, 2005.
Mean Annual Number of "Wet" Days	Figure 13.2.1-2, Section 13.2.1, AP-42, November 2003.
Vehicle Miles Traveled, VMT	TEC, 2005.
Truck Weights, ton	TEC, 2005.
Control Efficiency	Estimated, ECT 2005.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	S. Castro	**Date:**	8/05
Evaluated by:	T. Davis	**Date:**	8/05
Data Entered by:	T. Davis	**Date:**	8/05

Cascio, Tom

From: Vielhauer, Trina
Sent: Wednesday, August 17, 2005 2:23 PM
To: Morgan, Larry
Cc: Cascio, Tom; Linero, Alvaro
Subject: TECO follow-up

Larry,

As a follow-up to our conversation re. the TECO CFJ:

TECO is installing SCR to comply with the CFJ NOx emission limits. The company has discovered that the installation of SCR renders their flyash unsellable [because of higher carbon and ammonia content]. Therefore, they also want to install equipment called Carbon Burnout. TECO wants the Carbon Burnout equipment to be "exempt" from PSD/NSR under the language in the CFJ because the Carbon Burnout equipment will increase NOx emissions and CO emissions in amounts that will trigger PSD/NSR permitting.

An interesting note [and probably more than you want to know]: TECO originally had these two projects as one application with the "exhaust" from the Carbon Burnout process tying back into the SCR system [thus, the Carbon Burnout exhaust was routed through the control equipment for NOx]. However, the temperatures in the Carbon Burnout exhaust are too cold for routing to the SCR. This means that these additional NOx emissions will NOT go through control equipment and will, truly, be increases in emissions.

They will need a PSD/NSR permit for the Carbon Burnout.

Cascio, Tom

From: DeAngelo, Gregory
Sent: Monday, August 22, 2005 4:38 PM
To: Vielhauer, Trina
Cc: Linero, Alvaro; Cascio, Tom; DeAngelo, Gregory
Subject: RE: TECO Consent Order

1) David has looked at the consent decree (CD) and thinks that the CBO project does NOT meet the criteria for PSD/NSR exclusion under paragraph 44. Under 44, to be exempt from PSD, a project must either meet A ("expressly directed" by the CD) or all of the requirements under B (5 or 6 listed). David doesn't think CBO will meet 44.B.4 because B.4 says the project can't cause in increase in hourly emissions of NOx, SO2, or PM.

David will be calling TECO with this interpretation. Note that TECO sent David a copy of their permit application, so David will be responding to that permit application, not "at the urging of DEP" or anything similar.

2) David said TECO has approached EPA regarding CAIR and allowance trading. He indicated that EPA is amenable to allowing TECO to trade credits generated from "supercompliance," i.e., if TECO is beating the NOx requirements of the CD, then those portions of their allowances could be traded. EPA will likely amend the CD to reflect this idea and clarify the existing language.

3) The above-mentioned amendment will also address the 30-d averaging period for NOx; this will likely "open up" the paragraph about the definition of "emission rate," which contains the language that interprets our excess emissions rule to mean data exclusion during periods of startup, shutdown, or malfunction. I mentioned to David that we would be interested in working with EPA on either removing the reference to our rule or helping them understand some of the intricacies of state vs federal SSM...

~ Greg D.

Greg DeAngelo, Administrator
Compliance & Enforcement Section
DARM/Bureau of Air Regulation

Gregory.DeAngelo@dep.state.fl.us
(850)921-9506 (SUNCOM 291-9506)
(850)921-9533 (FAX)

-----Original Message-----
From: Vielhauer, Trina
Sent: Thursday, August 18, 2005 8:48 AM
To: DeAngelo, Gregory; Cascio, Tom
Cc: Linero, Alvaro; George, Larry
Subject: TECO Consent Order

Greg and Tom,

Have either of you spoken to EPA about EPA's consent decree and TECO's claims about:

1. the carbon burnout process shouldn't require a PSD permit [I don't read our CFJ language that way but was wondering if EPA weighed-in on their Consent Decree language]
2. trading of NOx and SO2 under CAIR?

If we haven't touched base with them, we need to do that. Greg- if you and Tom could put in a call to David Lloyd [right? Or is it Jason Dressler?] and pose those questions, it would be helpful.

THANKS!

Trina

Cascio, Tom

From: Little.James@epamail.epa.gov
Sent: Friday, August 26, 2005 2:17 PM
To: Cascio, Tom
Cc: Lloyd.David@epamail.epa.gov
Subject: Re: TECO CBO APPLICATION

Tom -

I have reviewed the CBOTM permit application and will discuss it with David Lloyd next week for consistency with the consent decree. The obvious question is whether the emissions of NOx and CO from the CBOTM system pose any PSD concerns. SO2 should not be a concern so long as the CBOTM return gases are not allowed to be bypassed around the FGD. I would also disallow processing of any imported flyash (that is, fly ash not generated at the Big Bend Station). Finally, if you plan to credit the supposed decrease in boiler emissions resulting from CBOTM heat recovery, please discuss this with me first.

Jim Little - EPA Region 4
(404) 562-9118

"Cascio, Tom" <Tom.Cascio@dep.state.fl.us>
08/24/2005 02:49 PM

To: James Little/R4/USEPA/US@EPA
cc:
Subject: TECO CBO APPLICATION

Hi Jim. We recently received the attached application from TECO that has possible BACT and PSD implications. David Lloyd also has a copy.
We will call you after you have had a chance to review this. Many thanks.

Tom Cascio, D.B.A., CPM
Engineering Specialist IV
Permitting South Section
Florida Department of Environmental Protection
850-921-9526
[attachment "Tampa Electric CBO Air Construction Permit Application.pdf" deleted by James Little/R4/USEPA/US]

Cascio, Tom

From: Byron Burrows [btburrows@tecoenergy.com]
Sent: Wednesday, August 31, 2005 4:20 PM
To: Linero, Alvaro; Cascio, Tom
Cc: tdavis@ectinc.com; lisa.cooper@pgnmail.com; David Lukcic; Patrick Shell; Shelly Castro
Subject: TEC Mercury PTE for CBO
Attachments: TEC Big Bend CBO Potential Hg Emissions_1.pdf

Al & Tom:

Attached is the calculation showing the PTE for mercury from the CBO process is 1.13 lb/year, well below the 200 lb/year PSD significance level for Hg.

As I indicated in my voice message to Tom, PMI has proposed numerous dates to the host facility for the CBO tour but has not heard back from them yet. We will keep you posted. Also, the Hg white paper from the Hg expert will be ready shortly. We met with EPC last week to update them using the same presentation on the CBO and SCR that we reviewed with you. It went very well. We will schedule a followup meeting with them once the draft Unit 3 permit is issued to ensure all of their questions are answered.

I'll call Tom tomorrow to discuss the time frame for issuing the Unit 3 AC permit. Please give us a call if you have any questions on any of this.

Thanks,

Byron

Byron T. Burrows, P.E.
Manager-Air Programs
Environmental, Health, and Safety
Tampa Electric Co.
Phone: 813.228.1282
Mobile: 813.230.3445
Fax: 813.228.1308
btburrows@tecoenergy.com

Tampa Electric Company - Big Bend Station
Fly Ash Carbon Burn-Out (CBO™) Project
Potential Mercury (Hg) Emissions

	Data ID	Value	Units	Comments
Data:				
SCE&G Wateree Station CBO™ Hg Stack Test Results	A	0.000082	lb/hr	Highest of three test runs
Big Bend Station CBO™/SCE&G Wateree Station CBO™ Size Ratio	B	1.58	-	Based on CBO™ fly ash feed rates
Big Bend Station CBO™ Annual Operating Hours	C	8,760	hr/yr	Assumed
PSD Hg Significant Emission Rate (SER)	D	200	lb/yr	Chapter 62-212, Table 212.400-2, F.A.C.
Calculations:				
Big Bend Station CBO™ Potential Mercury Emissions	E	0.000129	lb/hr	A x B
	F	1.13	lb/yr	C x E
Big Bend Station CBO™ Potential Mercury Emissions - Percent of PSD Hg SER	G	0.56	%	(F / D) x 100

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

Cascio, Tom

From: Linero, Alvaro
Sent: Thursday, September 01, 2005 10:38 AM
To: Cascio, Tom
Subject: FW: TECO CBO application
Attachments: TECO Calcs-From applic. 8-25-04.xls

Tom:

Can you call Ron and tell him I'm sorry I didn't get back to him earlier.

Let him know you are handling this one and see if he has any further issues he wants to discuss with you.

Thanks.

Al.

From: Dennis, Ron [mailto:DennisR@epchc.org]
Sent: Thursday, September 01, 2005 11:37 AM
To: Linero, Alvaro
Cc: Harman, Alice; Sims, Jeff; Lee, Diana
Subject: FW: TECO CBO application

Al,

Our comments on the TECO CBO air construction application (0570039-023-AC) are given below.

If you have any questions about or problems with any of these comments, please call either Jeff (Ext. 1285) or myself (Ext. 1269) at 813-627-2600.

Ron Dennis
Professional Engineer I
Hillsborough County EPC
Air Management Division

From: Sims, Jeff
Sent: Thursday, August 25, 2005 10:16 AM
To: Dennis, Ron
Cc: Harman, Alice
Subject: TECO CBO application

Ron,

I've looked over the application and only have a few comments. Overall, the project appears pretty well presented and summarized.

1. The emissions calculations for the CBO Fluidized Bed Combustor (FBC) did not appear to account for emissions from the combustion of startup fuel. They did list it as a Segment, but didn't account for the potential emissions from combusting up to 14,300 gallons of fuel oil. The potentials were based off of 8760 hrs of FBC operation, so there could be an off-set to account for lost hours during start-up. I don't think there would be much of an overall impact, but it should at least be referenced.

2. All emission factors for FBC calculations were based off of "Vendor Data". Should we request some supporting documentation validating these factors?
3. In reference to the Product Fly Ash Handling (fugitives from truck traffic), I have a similar comment to one raised during the Coal Transloading project submitted last year. TECO used a silt loading factor from *Iron and Steel Production*. I question whether a more appropriate factor should be used. I used 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. PM emissions rose from 0.78 ton/yr to 2.8 ton/yr and PM-10 increased from 0.15 tons/yr to 0.55 tons/yr. These aren't large increases, but I thought it should be noted. A copy of the calculations is attached.

One other observation from the application ... due to space limitations, the fly ash storage and truck loadout are to be inserted on the very east portion of their site that borders a public road. Based on the lightweight nature of fly ash and its inherent fugitive properties, I would suggest detailed attention to the construction and operation of this part of the process to ensure that nuisance emissions are minimized from entering the public roadway.

Jeff Sims
Environmental Protection Commission of Hillsborough County
simsj@epchc.org
(813)627-2600 ext. 1285
(813) 627-2660 (FAX)

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

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

Sincerely,

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

Tampa Electric Company - Big Bend Station
Fly Ash Carbon Burn-Out (CBO™) Project
Potential Mercury (Hg) Emissions

	Data ID	Value	Units	Comments
Data:				
Commercial CBO™ Hg Stack Test Results	A	0.000082	lb/hr	Highest of three test runs
Big Bend Station CBO™/Commercial CBO™ Size Ratio	B	1.58	-	Based on CBO™ fly ash feed rates
Big Bend Station CBO™ Annual Operating Hours	C	8,760	hr/yr	Assumed
PSD Hg Significant Emission Rate (SER)	D	200	lb/yr	Chapter 62-212, Table 212.400-2, F.A.C.
Calculations:				
Big Bend Station CBO™ Potential Mercury Emissions	E	0.000129	lb/hr	A x B
	F	1.13	lb/yr	C x E
Big Bend Station CBO™ Potential Mercury Emissions - Percent of PSD Hg SER	G	0.56	%	(F / D) x 100

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

Department of Environmental Protection

Jeb Bush
Governor

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).

- 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 PM_{10} 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.

Sincerely,

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

9/2/2005

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

TAMPA ELECTRIC

RECEIVED
AUG 10 2005
BUREAU OF AIR REGULATION

August 5, 2005

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^{TM}) Project

Dear Mr. Linero,

Tampa Electric Company (TEC) requests an air construction permit to install a fly ash carbon burn-out (CBO^{TM}) technology at its Big Bend Station. CBO^{TM} 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 (SO_3) generated and determined that a SO_3 control system is necessary. The proposed SO_3 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^{TM} technology, the ammonia is decomposed in the CBO^{TM} process

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 SO_3 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

TAMPA ELECTRIC

January 13, 2006

Mr. David Lloyd,
Environmental Scientist
Air Enforcement Section
U.S. Environmental Protection Agency, Region IV
61 Forsyth Street, S.E.
Atlanta, Georgia 30303

Via FedEx
Airbill No. 7907 7768 9454

Re: Tampa Electric Company
Big Bend Station
Consent Decree
Civil Action No. 99-2524 CIV-T-23F
Electrostatic Precipitators (ESP)
Revised Particulate Matter (PM) Best Operational Practices (BOP) Report

Dear Mr. Lloyd:

This is a follow-up letter to our discussion that was held on December 8, 2005 in which the Environmental Protection Agency (EPA) requested additional information concerning the revised Best Operating Practices (BOP) for Particulate Matter (PM). Specifically, the EPA is requesting a firm date for all physical modifications to the particulate matter control equipment described in Section 3.3 of the revised PM BOP to be completed.

Section 3.0 of the EPA approved PM BOP discusses the performance of the precipitators as they were found at the beginning of the PM optimization study, the actions recommended to improve their operating potential and the theoretical performance for each unit after these improvements are completed. Although the ESP's currently operating at the Big Bend Station are fully compliant with the required emissions limits, the recommendations made in the PM BOP and the revised PM BOP documents provide a means to maintain PM emissions below the established regulatory limits. As such, enclosed is a copy of the page to insert into the revised PM BOP. This page includes a firm date by which the physical equipment modifications will be completed.

As previously stated in the letter submitted on October 7, 2005, it was not TEC's intent to implement those changes on a strict schedule, but rather as the condition of the equipment dictates and as opportunity allows. The estimated schedule in Section 3.3 is based upon current ESP inspections, SCR construction schedules, and future outage schedules. The estimated schedule can be revised and the work may be performed earlier or later depending on such factors as ESP performance, equipment condition, outage duration, safety issues, specific unit operating parameters, and system demand.

TEC understands that with the submission of this additional information, the EPA will authorize the revised PM BOP for Big Bend Station. If you have any further questions regarding this matter, please contact me or Shelly Castro at (813) 228-4408.

Sincerely,

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

EHS/rlk/SSC243

Enclosure

c/enc: Jerry Campbell, EPCHC
Greg DeAngelo, FDEP
Bruce Gelber, USDOJ
Adam Kushner, USEPA
Al Linero, FDEP
James I. Palmer Jr., USEPA
Whitney Schmidt, US Attorney
Jason Waters, FDEP SW
Sterlin Woodard, EPCHC

Flyash level controls	C	N/A	N/A	N/A
Relocate slag vent lines	C	C	C	N/A
Redesign SO_3 conditioning systems	N/A	N/A	N/A	N/A
Rapper optimization	C	C	C	C
Ash hopper high level electrical cutouts	C	C	C	N/A
Enhanced O&M procedures	C	C	C	C

Where C = complete and N/A is not applicable.

All of these modifications are expected to be completed no later than December 31, 2015.

3.4 Factors Effecting ESP Optimization

3.4.1 Fuels

The characteristics of the fuel burned coupled with the furnace design and operation are determining factors for the operation of an ESP. The primary factors of concern are: ash content, particle size distribution and ash electrical resistivity. The ESP systems with the present fuel supply for the station produces emission levels, with a significant margin of safety with regard to meeting the allowable particle emission limits. The fuel and boiler conditions for Big Bend Units 1 through 3 are very similar. These units burn a medium high-sulfur, medium ash content coal, which is sometimes blended with a small portion of petroleum coke. The resultant fly ash exhibits a resistivity in the 10^{10} Ω-cm range with a particle size distribution as measured in September of 2000 having an mmd of about 15.4 μm. The fuel supply for Unit 4 is essentially the same as for the other units, but the furnace is a tangentially fired Combustion Engineering, (now Alstom) pulverized coal boiler.

3.4.2 Ash Content

The collection efficiency of an ESP is somewhat dependent on the inlet ash loading. If all other factors are equal, an increase in the inlet mass loading will generally result in a corresponding increase in the outlet emissions. Therefore, the emissions from an ESP are directly related to the ash content of the coal. Switching to a higher or lower ash coal should cause a corresponding change in the emissions, if ash content is the only change (which it usually is not).

3.4.3 Particle Size Distribution

The collection efficiency of an ESP changes drastically for different particle sizes. Very large particles, 20 micrometer (μm) and above, are collected with a much greater efficiency than particles in the 0.2 to 3.0 μm range, and finally, particles much smaller than 0.05 μm are again collected with a higher efficiency. The large particles (primarily charged by what is termed field charging) attain a greater electrical charge than the smaller ones, providing a greater electrical force to remove them from the gas stream. The larger surface area of the particles provides for retaining a greater amount of electrical charge. The collecting efficiency drops steadily as the size of the fly ash particle (and surface area) decrease, until another charging mechanism begins to dominate - diffusion

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

4APT-APB

MEMORANDUM

To: Interested Parties

From: Jim Little - Air Permits Section, Region 4 (404-562-9118)

Subj: Tampa Electric Company, Big Bend Carbon Burnout Project

Date: January 20, 2006

This memo addresses the question of new source review (NSR) applicability for the proposed carbon burnout project at the Tampa Electric Company (Tampa Electric) Big Bend station. This memo represents the views of the U.S. Environmental Protection Agency (EPA), Region 4, Air Permits Section.

A. Conclusions

1. The opinion of the Region 4 Air Permits Section is that the fluidized bed combustor within the carbon burnout project can be viewed as a physical change of the existing Big Bend Units 3 and 4 subject to the additional considerations below. Units 3 and 4 meet the regulatory definition of an electric utility steam generating unit (EUSGU).

2. New source review (NSR) applicability for that part of the carbon burnout project representing a physical change of Units 3 and 4 can be assessed using current Florida rules that incorporate federal WEPCO rule provisions. To assess NSR applicability for physical changes of EUSGUs, Florida rules allow comparison of actual annual emissions prior to the change with representative actual annual emissions after the change. (The definition of representative actual annual emissions is incorporated by reference to federal rules in 40 CFR 52.21 that were in effect at the time Florida's current rules were adopted. The term no longer exists in current federal rules that have not yet been implemented by Florida.)

3. Actual emissions from Units 3 and 4 prior to development of the carbon burnout project can be based on total actual emissions from Units 3 and 4 within a recent two-year period

without any adjustments that take into account the Consent Decree between the federal government and Tampa Electric Company.

B. Basis for Concluding that Fluidized Bed Combustor is a Physical Change of Units 3 and 4

1. Boiler feedwater from Units 3 and 4 will be heated by heat from the fluidized bed combustor component of the carbon burnout system. Furthermore, exhaust gases from the fluidized bed combustor will be vented through the flue gas desulfurization (FGD) system that serves to control sulfur dioxide emissions from Units 3 and 4. These gases and will then enter the atmosphere through the Units 3 and 4 stacks.

2. Consideration of the fluidized bed combustor as a modification of Units 3 and 4 would be voided if the combustor were operated when both units were not in operation. (Operation of just one unit would be acceptable.) Another way of saying this is that operation of the fluidized bed combustor in stand-alone mode would void consideration of the combustor as a physical change of Units 3 and 4. In addition, consideration of the combustor as a physical change of Units 3 and 4 would be voided if the exhaust gases from the combustor were to bypass the FGD system that serves Units 3 and 4.

3. Components of the carbon burnout system other than the fluidized bed combustor (for example, the high carbon fly ash silo and product ash storage area) should be considered as new emissions units and not as part of Units 3 and 4.

C. Calculation of Emissions Changes for NSR Applicability Purposes

1. By virtue of viewing the fluidized bed combustor as a physical change of Units 3 and 4, all regulated NSR pollutants emitted by Units 3 and 4 must be assessed for NSR applicability. In other words, the applicability assessment should not be restricted just to those regulated NSR pollutants such as nitrogen oxides (NO_x) emitted from the fluidized bed combustor in greatest quantities.

2. Consistent with current Florida regulations for electric utility steam generating units, the emissions increases (or decreases) for Units 3 and 4 can be calculated by comparing actual emissions prior to the change with representative actual annual emissions after the change. (Florida has not yet adopted federal NSR rule revisions that incorporate the term "projected actual emissions" in place of "representative actual annual emissions." The terms are equivalent for purposes of this project, however.)

3. The key to NSR applicability for this project is the method for calculating past actual emissions for Units 3 and 4. Unless other considerations warrant a different approach, past actual emissions under current Florida rules for EUSGU's are the actual annualized emissions that occurred during any consecutive 24 months during the five years preceding a change.

(a) A consideration that would warrant an adjustment to actual emissions calculated on the basis just described is a finding that past actual emissions were in violation of an air regulatory requirement. Related to this consideration, the Region 4 Air Permits Section reviewed the Consent Decree between the federal government and Tampa Electric and also reviewed the complaint and the notice of violation associated with the Consent Decree. We did not find a specific allegation that Units 3 and 4 were in violation of an air regulatory requirement.

(b) We also took into account Condition No. 7 in Amendment 1 of the Consent Decree related to "Netting." This condition holds that netting credits are not produced by emissions reductions at the Big Bend Station unless reductions are achieved that are better than certain threshold levels specified in the condition. In our opinion, calculation of emissions increases or decreases for a changed EUSGU using the actual-to-actual approach is not a netting calculation. Therefore, Condition No. 7 is not applicable to an assessment of NSR applicability for the carbon burnout project unless the emissions change calculation procedure outlined above indicates that netting is needed as an additional step to avoid NSR.

(c) As a further check, we reviewed the discussion on estimating EUSGU past actual emissions (also referred to as baseline emissions) that appears in the preamble to the federal WEPCO rule (57 FR 32323, July 21, 1992). In footnote 18 included with this discussion, EPA states the following: "The level of baseline emissions selected must be consistent with current assumptions regarding the source's emissions that are used under the SIP [state implementation plan] for planning or permitting purposes. Thus, the source may not select a level of baseline emissions higher than that used by the permitting authority in issuing a PSD [prevention of significant deterioration] or other construction permit to a source in the area, if such higher level would result in a NAAQS [national ambient air quality standards] or increment violation, or violate a visibility limitation." So far as we know, use of unadjusted past actual emissions from Units 3 and 4 would be consistent with this consideration. Verification by the Florida Department of Environmental Protection on this point is advisable.

4. Separate actual-to-actual emissions calculations should be made for Unit 3 and for Unit 4 unless the current title V permit for the units establishes combined emissions limits. The separate calculations would then be summed to arrive at total emissions increases or decreases from the two units. Making separate calculations may cause some difficulty in allocating the contribution from the fluidized bed combustor to each unit. Allocation on the basis of the quantity of feedwater going to each unit is a possible approach.

5. The NSR applicability assessment must include potential emissions from all components of the carbon burnout project other than the fluidized bed combustor. Therefore, the overall increase or decrease in emissions from the carbon burnout project consists of the actual-to-actual emissions change for Units 3 and 4 plus the potential emissions from the non-combustor components of the carbon burnout project.

D. Project Sequence Consideration

To take credit for any reductions in emissions from Unit 3 or Unit 4 when assessing NSR applicability for the carbon burnout project, these reductions must occur before emissions from the carbon burnout project begin. We understand that reductions from Unit 4 will occur before the carbon burnout project begins operation.

E. Use of Unit 3 and Unit 4 Selective Catalytic Reduction Systems

Tampa Electric has expressed concern about the feasibility of routing exhaust gases from the carbon burnout fluidized bed combustor through the Unit 3 and Unit 4 selective catalytic reduction (SCR) systems. Such routing would allow NO_x emissions from the combustor to be at least partially controlled. We recommend that further consideration be given to the feasibility of controlling combustor NO_x emissions continuously by SCR. As an alternative, further consideration should be given to the feasibility of selectively routing combustor exhaust gases through the SCR systems when doing so will not interfere with Units 3 and 4 boiler or SCR operation.

PMI

A Progress Fuels Company

January 24, 2006

BY FEDERAL EXPRESS

Al Linero
Division of Air Resource Management
111 South Magnolia
Suite 4
Tallahassee, FL 32301

Dear Al:

Enclosed are samples of feed and product ash from a commercial CBO plant. These samples were taken in 2004.

Should you have any questions, as always, please feel free to call me or Frank Kirkconnell. Thanks for your patience and understanding on this matter.

Very Truly Yours,

Lisa Cooper

Lisa Cooper

cc: Frank Kirkconnell

Progress Materials, Inc.
P.O. Box 1551
Raleigh, NC 27602
www.progressmaterials.com

2.0 CBO PROCESS

CBO™ technology will be installed to produce a low-carbon, low-ammonia, fly ash material suitable as a partial replacement for Portland cement (in lieu of landfilling the ash). The CBO™ project will combust the carbon in the fly ash from each of the two existing SGS Units. The CBO™ will also have the potential capacity to process fly ash from the proposed electric utility steam generating Unit No. 3. Accordingly, construction of the CBO™ project should commence no later than June 2007 in order to be operational prior to completion of the first SGS SCR installation in December 2008.

CBO™ technology will also recover a significant portion of the energy contained in the high-carbon fly ash for beneficial use at the SGS. More specifically, the heat from the CBO system will replace steam currently being extracted from the Units 1 and 2 LP turbines to heat water in the condensate cycle. Although the CBO™ process will cause small collateral increases in PM, VOC and CO emissions, it is an important element of the significant emission reductions of the SGS environmental improvement project.

2.1 CBO Process Description

CBO™ technology is a proprietary, patented, environmentally beneficial technology whose primary function is the production of low-carbon, low-ammonia fly ash material suitable for commercial use as a partial replacement for Portland cement. Major components of the CBO™ process planned for the SGS include a feed fly ash silo, product fly ash storage dome, fluidized bed combustor (FBC), hot cyclones for fly ash recycle to the FBC, heat recovery heat exchanger, cold cyclone and fabric filter bag house for product fly ash recovery, and product fly ash truck loading. A flow diagram of the CBO™ process proposed for the SGS is provided in Appendix B (Attachment B-2C). A plan view of the SGS showing the locations of the CBO™ process emission points is provided in Figure B-1.

Fly ash from Units 1 and 2 will be conveyed pneumatically to the CBO™ feed fly ash silo. The CBO feed fly ash silo will vent through a bag house prior to discharging to the atmosphere (Attachment B-1, Item 21; Emission Unit (EU) ID CBO-001).

Fly ash from the feed silo will then be fed to the FBC. The CBO™ technology does not require any auxiliary fuel to operate, with the limited exception of a minimal amount of start up fuel to initiate the combustion process. As with any fossil fuel combustion process, the FBC combustion gases will also

contain combustion by-products including NO_X, carbon monoxide (CO), SO_2, particulate matter less than or equal to 10 micrometers (PM_{10}), and volatile organic compounds (VOCs). The CBO™ process includes a forced draft fan to provide fluidization and combustion air to the FBC. An induced draft fan maintains the FBC freeboard pressure slightly below atmospheric pressure.

The FBC exhaust stream will be routed through hot cyclones to capture fly ash entrained in the FBC exhaust stream. Fly ash captured by the hot cyclones is returned to the FBC. The hot cyclones' exhaust and FBC low carbon product ash streams are combined and sent to the gas/product cooler heat exchanger for heat recovery. Thermal energy recovered from the CBO™ process will be used to heat condensate from the Units 1 and 2 low-pressure feed water systems. The improvements in Units 1 and 2 heat rates due to the use of recovered energy from the CBO™ process will compensate in part, for the energy penalties associated with the operation of the low NO_X burners and SCR systems. The low-NO_X burners also lower the combustion efficiency as a consequence of the lower flame temperatures and lower oxygen available in the combustion zone. This is the reason for the increase in fly ash carbon content.

Following heat recovery, the cooled FBC combustion gases, containing entrained product fly ash, will be routed through a cold cyclone and fabric filter bag house for product fly ash separation. The exhaust from the fabric filter bag house (i.e., the CBO™ return) will be routed back to Units 1 and 2, upstream of the SCR, FGD, ESP and alkali injection systems, and subsequently discharged to the atmosphere through the existing Units 1 and 2 stacks.

Product fly ash separated by the cold cyclone and fabric filter bag house will be sent to a surge bin. A portion of the cooled, low-carbon product will be recycled to the FBC for temperature control. The remaining product ash is then conveyed pneumatically to the product fly ash storage dome or directly to a truck loadout silo. The product fly ash storage dome will vent through a bag house prior to discharging to the atmosphere (Attachment B-1, Item 23, EU ID CBO-002). The product fly ash storage dome will be used to provide flexibility in product fly ash marketing. Product fly ash will be conveyed to the truck loadout silo for subsequent transfer to trucks for shipment to offsite customers. The PM_{10} emissions captured during the truck loading process will be routed to the truck loadout silo which will vent through a bag house prior to discharging to the atmosphere (Attachment B-1; Item 24; EU ID CBO-003).

Cascio, Tom

From: Byron Burrows [btburrows@tecoenergy.com]
Sent: Friday, February 24, 2006 5:26 PM
To: Cascio, Tom
Cc: Linero, Alvaro; David Lukcic; Shelly Castro; Tom Davis
Subject: Big Bend CBO PSD Applicability Table

Tom:

As requested, the following is a table summarizing the emissions changes for Big Bend Units 3 & 4 and the CBO project.

Combined Emissions - Big Bend CBO, Unit 3, & Unit 4

Parameter	Baseline Actual Emissions[1] (tons)	Calculated Future Actuals[2] (tons)	Emissions Increase or (Reduction)[3] (tons)	PSD Significance Level (tons)
NOx	9,168	3,254	(5,914)	40
SO2	6,020	5,885	(135)	40
CO	2690	2736	46	100
VOC	60	66	6	40
PM_{10}	244	251	6	15

Notes:
1. Actual 2004-2005 emissions for Unit 3 and Unit 4 are selected as the baseline actual emissions.
2. The CBO impacts are based on the CBO application except CO tons were revised to reflect a higher heat recovery emissions offset value because of revised future CO emissions from Units 3 & 4.
3. For Unit 4, baseline and future CO emissions are based on the current 0.029 lb/MMBtu permit limit. TEC will request a higher CO limit based on effect of Consent Decree Early NOx Reduction Projects. This table reflects the applicable increases that are due to the CBO project.

This table is based upon the 1/20/06 EPA guidance memo for this project and it shows that the CBO project does not trigger PSD. Please let me know if you need additional information on this.

Thanks,

Byron

Byron T. Burrows, P.E.
Manager-Air Programs
Environmental, Health, and Safety
Tampa Electric Co.
Phone: 813.228.1282
Mobile: 813.230.3445
Fax: 813.228.1308
btburrows@tecoenergy.com

Cascio, Tom

From: Shelly Castro [sscastro@tecoenergy.com]
Sent: Wednesday, March 08, 2006 4:40 PM
To: Cascio, Tom
Cc: linero@dep.state.fl.us; campbell@rtpenv.com; Byron Burrows; David Lukcic; Shelly Castro
Subject: TEC's Proposed Draft CBO AC Permit
Attachments: TEC CBO draft ac permit.doc

Hi Tom,
I know you requested some information regarding the CBO construction dates late last week. Colin and I took the liberty of creating a draft CBO AC permit, which includes the dates you requested. Please review TEC's proposed draft CBO AC permit and we will call you to set up a meeting so we can further discuss our proposed CBO AC permit requirements.

Please let me know if you need any additional information.

Have a Great Wednesday!
Shelly

Sincerely,
Shelly Castro
Environmental Engineer,
Environmental, Health & Safety
Tampa Electric Company
ph# 813-228-4408
fax# 813-228-1308
email: sscastro@tecoenergy.com

Judy Pareya -
There are hundreds of languages in the world but a smile speaks them all.

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/10^3 gal) x Fuel Consumption (10^3 gal/hr)

Emission (ton/yr) = Emission Factor (lb/10^3 gal) x Fuel Consumption (10^3 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)	Potential Emission Rates (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

EMISSION INVENTORY WORKSHEET

Tampa Electric Company - Big Bend Station

Truck Traffic (Paved Roads)

EMISSION SOURCE TYPE

FUGITIVE PM - TRUCK TRAFFIC ON PAVED ROADS

FACILITY AND SOURCE DESCRIPTION

Emission Source Description:	Fugitive PM - CBO™ Product Fly Ash Truck Traffic on Paved Roads
Emission Control Method(s)/ID No.(s):	Watering, As Necessary
Emission Point ID:	CBO-005

EMISSION ESTIMATION EQUATIONS

PM Emission (lb/hr) = ((0.082 x [(Silt Loading Factor/2)$^{0.65}$] x [(Truck Weight/3)$^{1.5}$] - 0.00047) x (1 - ("Wet" Days/1,460)) x Vehicle Miles Traveled (VMT)/hr x (1 - (Control Eff. / 100))

PM Emission (ton/yr) = ((0.082 x [(Silt Loading Factor/2)$^{0.65}$] x [(Truck Weight/3)$^{1.5}$]) - 0.00047) x (1-("Wet" Days/1,460)) x Vehicle Miles Traveled (VMT)/yr x (1 ton/2,000 lb) x (1 - (Control Eff. / 100))

Source: Section 13.2.1, AP-42, December 2003.

INPUT DATA AND EMISSIONS CALCULATIONS

Uncontrolled Silt Loading Factor:	70.0 g/m^2	Mean Annual Number of "Wet" Days:	100		
Operating Hours:	8 hr/dy	7 dy/wk	52 wk/yr		
CBO™ Fly Ash Shipped by Truck:	300,000 ton/yr	Truck Travel Distance (one way):	483 ft		
Hourly Truck Count:	4 trucks/hr	Annual Truck Count:	11,111 trucks/yr		

Truck Traffic Type	Source ID	Vehicle Miles Traveled (VMT/hr)	Vehicle Miles Traveled (VMT/yr)	Vehicle Weight (ton)	Control Efficiency (%)	Potential PM Emission Rates (lb/hr)	Potential PM Emission Rates (ton/yr)
CBO™ Fly Ash Trucks (Empty)	CBO-005a	0.349	1,017	13.0	90.0	0.243	0.353
CBO™ Fly Ash Trucks (Full)	CBO-005b	0.349	1,017	40.0	90.0	1.310	1.907
					Totals	**1.55**	**2.260**

SOURCES OF INPUT DATA

Parameter	Data Source
Uncontrolled Silt Loading Factor	Based on factor for sand and gravel processing, Suggested by FDEP, 2005.
Mean Annual Number of "Wet" Days	Figure 13.2.1-2, Section 13.2.1, AP-42, November 2003.
Vehicle Miles Traveled, VMT	TEC, 2005.
Truck Weights, ton	PMI, 2005.
Control Efficiency	Estimated, ECT 2005.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	S. Castro	**Date:**	9/05
Evaluated by:	T. Davis	**Date:**	9/05
Data Entered by:	T. Davis	**Date:**	9/05

EMISSION INVENTORY WORKSHEET

Tampa Electric Company - Big Bend Station

Truck Traffic (Paved Roads)

EMISSION SOURCE TYPE

FUGITIVE PM_{10} - TRUCK TRAFFIC ON PAVED ROADS

FACILITY AND SOURCE DESCRIPTION

Emission Source Description:	Fugitive PM_{10} - CBO™ Product Fly Ash Truck Traffic on Paved Roads
Emission Control Method(s)/ID No.(s):	Watering, As Necessary
Emission Point ID:	CBO-005

EMISSION ESTIMATION EQUATIONS

PM_{10} Emission (lb/hr) = ((0.016 x [(Silt Loading Factor/2)$^{0.65}$] x [(Truck Weight/3)$^{1.5}$] - 0.00047) x (1 - ("Wet" Days/1,460)) x Vehicle Miles Traveled (VMT)/hr x (1 - (Control Eff. / 100))

PM_{10} Emission (ton/yr) = ((0.016 x [(Silt Loading Factor/2)$^{0.65}$] x [(Truck Weight/3)$^{1.5}$] - 0.00047) x (1-("Wet" Days/1,460)) x Vehicle Miles Traveled (VMT)/yr x (1 ton/2,000 lb) x (1 - (Control Eff. / 100))

Source: Section 13.2.1, AP-42, December 2003.

INPUT DATA AND EMISSIONS CALCULATIONS

Uncontrolled Silt Loading Factor:	70.0 g/m^2	Mean Annual Number of "Wet" Days:	100		
Operating Hours:	8 hr/dy	7 dy/wk	52 wk/yr		
CBO™ Fly Ash Shipped by Truck:	300,000 ton/yr	Truck Travel Distance (one way):	483 ft		
Hourly Truck Count:	4 trucks/hr	Annual Truck Count:	11,111 trucks/yr		

Truck Traffic Type	Source ID	Vehicle Miles Traveled (VMT/hr)	Vehicle Miles Traveled (VMT/yr)	Vehicle Weight (ton)	Control Efficiency (%)	Potential PM_{10} Emission Rates (lb/hr)	Potential PM_{10} Emission Rates (ton/yr)
CBO™ Fly Ash Trucks (Empty)	CBO-005a	0.349	1,017	13.0	90.0	0.047	0.069
CBO™ Fly Ash Trucks (Full)	CBO-005b	0.349	1,017	40.0	90.0	0.256	0.372
					Totals	**0.30**	**0.441**

SOURCES OF INPUT DATA

Parameter	Data Source
Uncontrolled Silt Loading Factor	Based on factor for sand and gravel processing, Suggested by FDEP, 2005.
Mean Annual Number of "Wet" Days	Figure 13.2.1-2, Section 13.2.1, AP-42, November 2003.
Vehicle Miles Traveled, VMT	TEC, 2005.
Truck Weights, ton	PMI, 2005.
Control Efficiency	Estimated, ECT 2005.

NOTES AND OBSERVATIONS

DATA CONTROL

Data Collected by:	S. Castro	**Date:**	9/05
Evaluated by:	T. Davis	**Date:**	9/05
Data Entered by:	T. Davis	**Date:**	9/05

Cascio, Tom

From: Lloyd.David@epamail.epa.gov
Sent: Thursday, March 30, 2006 9:06 AM
To: Cascio, Tom
Subject: Re: BIG BEND UNIT 3

Attachments: TECO NOx limits CD amendment David Lloyd.txt

TECO NOx limits
CD amendment ...

Tom,

The amendment has not yet been finalized. There have been ongoing discussions and meetings including on the issue of if/how the CD addresses emissions from the CBO project. Also, TECO has raised some additional issues that we are looking at. We are trying to get a meeting with TECO set up for next week in D.C. to resolve most or all of these issues.

David

"Cascio, Tom" <Tom.Cascio@dep.state.fl.us> 03/30/2006 08:23 AM

To: David Lloyd/R4/USEPA/US@EPA
cc:
Subject: BIG BEND UNIT 3

Hi David. Please see the attached. Has the CD amendment been finalized?

Tom Cascio, D.B.A., CPM
Engineering Specialist IV
Permitting South Section
Florida Department of Environmental Protection
850-921-9526
(See attached file: TECO NOx limits CD amendment David Lloyd.txt)

From: Lloyd.David@epamail.epa.gov
Sent: Thursday, September 15, 2005 1:43 PM
To: Cascio, Tom
Cc: sscastro@tecoenergy.com; Burke.Shaun@epamail.epa.gov; Little.James@epamail.epa.gov; DeAngelo, Gregory; Dubose.Dick@epamail.epa.gov
Subject: TECO NOx limits / CD amendment

Tom,

As we discussed over the phone, here is a status update concerning NOx limits at Big Bend. EPA/DOJ and TECO have reached a verbal agreement to amend the Consent Decree in the following manner:

1. Assign a NOx "emissions rate" for Big Bend Units 1, 2 and 3 of 0.12 lbs/mmBtu 2. Modify the definition of "emissions rate" so that an equation is used that divides total pounds by total heat in each 30-day period to reach a 30-day rolling average.
3. Add provisions for startup/shutdown/malfunction consistent with other utility consent decrees signed by EPA 4. Add provisions concerning credits for "super compliance" with the Consent Decree

In EPA's consideration of the modified NOx emissions rate for Units 1-3, we understood that the future SCR devices would not be in operation during certain low load periods and that in general, NOx emissions during these periods would be reflected in the 30-day rolling average.

EPA has prepared a internal draft Consent Decree amendment which will be forwarded to TECO for review shortly. Once the amendment language is agreed upon and any other procedural requirements are met, it will go to the U.S. district court (Middle District of Florida) for signature.

David

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

4APT-APB

MEMORANDUM

To: Interested Parties

From: Jim Little - Air Permits Section, Region 4 (404-562-9118)

Subj: Tampa Electric Company, Big Bend Carbon Burnout Project

Date: January 20, 2006

This memo addresses the question of new source review (NSR) applicability for the proposed carbon burnout project at the Tampa Electric Company (Tampa Electric) Big Bend station. This memo represents the views of the U.S. Environmental Protection Agency (EPA), Region 4, Air Permits Section.

A. Conclusions

1. The opinion of the Region 4 Air Permits Section is that the fluidized bed combustor within the carbon burnout project can be viewed as a physical change of the existing Big Bend Units 3 and 4 subject to the additional considerations below. Units 3 and 4 meet the regulatory definition of an electric utility steam generating unit (EUSGU).

2. New source review (NSR) applicability for that part of the carbon burnout project representing a physical change of Units 3 and 4 can be assessed using current Florida rules that incorporate federal WEPCO rule provisions. To assess NSR applicability for physical changes of EUSGUs, Florida rules allow comparison of actual annual emissions prior to the change with representative actual annual emissions after the change. (The definition of representative actual annual emissions is incorporated by reference to federal rules in 40 CFR 52.21 that were in effect at the time Florida's current rules were adopted. The term no longer exists in current federal rules that have not yet been implemented by Florida.)

3. Actual emissions from Units 3 and 4 prior to development of the carbon burnout project can be based on total actual emissions from Units 3 and 4 within a recent two-year period

without any adjustments that take into account the Consent Decree between the federal government and Tampa Electric Company.

B. Basis for Concluding that Fluidized Bed Combustor is a Physical Change of Units 3 and 4

1. Boiler feedwater from Units 3 and 4 will be heated by heat from the fluidized bed combustor component of the carbon burnout system. Furthermore, exhaust gases from the fluidized bed combustor will be vented through the flue gas desulfurization (FGD) system that serves to control sulfur dioxide emissions from Units 3 and 4. These gases and will then enter the atmosphere through the Units 3 and 4 stacks.

2. Consideration of the fluidized bed combustor as a modification of Units 3 and 4 would be voided if the combustor were operated when both units were not in operation. (Operation of just one unit would be acceptable.) Another way of saying this is that operation of the fluidized bed combustor in stand-alone mode would void consideration of the combustor as a physical change of Units 3 and 4. In addition, consideration of the combustor as a physical change of Units 3 and 4 would be voided if the exhaust gases from the combustor were to bypass the FGD system that serves Units 3 and 4.

3. Components of the carbon burnout system other than the fluidized bed combustor (for example, the high carbon fly ash silo and product ash storage area) should be considered as new emissions units and not as part of Units 3 and 4.

C. Calculation of Emissions Changes for NSR Applicability Purposes

1. By virtue of viewing the fluidized bed combustor as a physical change of Units 3 and 4, all regulated NSR pollutants emitted by Units 3 and 4 must be assessed for NSR applicability. In other words, the applicability assessment should not be restricted just to those regulated NSR pollutants such as nitrogen oxides (NO_x) emitted from the fluidized bed combustor in greatest quantities.

2. Consistent with current Florida regulations for electric utility steam generating units, the emissions increases (or decreases) for Units 3 and 4 can be calculated by comparing actual emissions prior to the change with representative actual annual emissions after the change. (Florida has not yet adopted federal NSR rule revisions that incorporate the term "projected actual emissions" in place of "representative actual annual emissions." The terms are equivalent for purposes of this project, however.)

3. The key to NSR applicability for this project is the method for calculating past actual emissions for Units 3 and 4. Unless other considerations warrant a different approach, past actual emissions under current Florida rules for EUSGU's are the actual annualized emissions that occurred during any consecutive 24 months during the five years preceding a change.

(a) A consideration that would warrant an adjustment to actual emissions calculated on the basis just described is a finding that past actual emissions were in violation of an air regulatory requirement. Related to this consideration, the Region 4 Air Permits Section reviewed the Consent Decree between the federal government and Tampa Electric and also reviewed the complaint and the notice of violation associated with the Consent Decree. We did not find a specific allegation that Units 3 and 4 were in violation of an air regulatory requirement.

(b) We also took into account Condition No. 7 in Amendment 1 of the Consent Decree related to "Netting." This condition holds that netting credits are not produced by emissions reductions at the Big Bend Station unless reductions are achieved that are better than certain threshold levels specified in the condition. In our opinion, calculation of emissions increases or decreases for a changed EUSGU using the actual-to-actual approach is not a netting calculation. Therefore, Condition No. 7 is not applicable to an assessment of NSR applicability for the carbon burnout project unless the emissions change calculation procedure outlined above indicates that netting is needed as an additional step to avoid NSR.

(c) As a further check, we reviewed the discussion on estimating EUSGU past actual emissions (also referred to as baseline emissions) that appears in the preamble to the federal WEPCO rule (57 FR 32323, July 21, 1992). In footnote 18 included with this discussion, EPA states the following: "The level of baseline emissions selected must be consistent with current assumptions regarding the source's emissions that are used under the SIP [state implementation plan] for planning or permitting purposes. Thus, the source may not select a level of baseline emissions higher than that used by the permitting authority in issuing a PSD [prevention of significant deterioration] or other construction permit to a source in the area, if such higher level would result in a NAAQS [national ambient air quality standards] or increment violation, or violate a visibility limitation." So far as we know, use of unadjusted past actual emissions from Units 3 and 4 would be consistent with this consideration. Verification by the Florida Department of Environmental Protection on this point is advisable.

4. Separate actual-to-actual emissions calculations should be made for Unit 3 and for Unit 4 unless the current title V permit for the units establishes combined emissions limits. The separate calculations would then be summed to arrive at total emissions increases or decreases from the two units. Making separate calculations may cause some difficulty in allocating the contribution from the fluidized bed combustor to each unit. Allocation on the basis of the quantity of feedwater going to each unit is a possible approach.

5. The NSR applicability assessment must include potential emissions from all components of the carbon burnout project other than the fluidized bed combustor. Therefore, the overall increase or decrease in emissions from the carbon burnout project consists of the actual-to-actual emissions change for Units 3 and 4 plus the potential emissions from the non-combustor components of the carbon burnout project.

D. Project Sequence Consideration

To take credit for any reductions in emissions from Unit 3 or Unit 4 when assessing NSR applicability for the carbon burnout project, these reductions must occur before emissions from the carbon burnout project begin. We understand that reductions from Unit 4 will occur before the carbon burnout project begins operation.

E. Use of Unit 3 and Unit 4 Selective Catalytic Reduction Systems

Tampa Electric has expressed concern about the feasibility of routing exhaust gases from the carbon burnout fluidized bed combustor through the Unit 3 and Unit 4 selective catalytic reduction (SCR) systems. Such routing would allow NO_x emissions from the combustor to be at least partially controlled. We recommend that further consideration be given to the feasibility of controlling combustor NO_x emissions continuously by SCR. As an alternative, further consideration should be given to the feasibility of selectively routing combustor exhaust gases through the SCR systems when doing so will not interfere with Units 3 and 4 boiler or SCR operation.

Cascio, Tom

From: Fitzpatrick, Timothy
Sent: Wednesday, December 28, 2005 9:29 AM
To: Cascio, Tom; 'lisa.cooper@pgnmail.com'; Atkeson, Thomas
Cc: Chandrasekhar, Thekkekalathil; Morgan, Christopher; Brackett, Kathryn
Subject: RE: Fate of Mercury from CBO Fly Ash Process

Tom - I've been on the road quite a bit lately and apologize for taking so long to respond. I presume the goal of this study is to determine the amount of Hg lost in the process (presumable to the atmosphere) of burning out the residual carbon in fly ash. I don't think one can do a proper mass balance determination without knowing a) the mass of mass of residual produced per unit mass of fly ash (mass in vs. mass out) and b) the variability inherent in each type of process and material. To get at the variability issue, we'd prefer to have replicate samples - at least three samples representing different batches of starting material (fly ash) and residual for each process type. If necessary, we can provide the sampling jars. A 250 ml jar is much more than sufficient to measure total mercury. Is there interest in other potential contaminants or shall we just focus on Hg at this point?

Timothy W. Fitzpatrick
Administrator, Chemistry Section
Florida Dept. of Environmental Protection
(850) 245-8083
-----Original Message-----
From: Cascio, Tom
Sent: Friday, December 16, 2005 11:54 AM
To: 'lisa.cooper@pgnmail.com'; Atkeson, Thomas; Fitzpatrick, Timothy
Subject: FW: Fate of Mercury from CBO Fly Ash Process

Lisa, Tom, and Tim:

Please see the following message from Al Linero. You comments and suggestions on proper protocol would be appreciated.

Tom

-----Original Message-----
From: Linero, Alvaro
Sent: Thursday, December 15, 2005 11:09 AM
To: Cascio, Tom
Cc: Vielhauer, Trina
Subject: FW: Fate of Mercury from CBO Fly Ash Process

Tom:

Call Lisa or e-mail her. I would think homogenized daily cumulative sample for one day will do the job. Maybe a couple of one liter plastic bottles (one for each type in/out).

You can consult with Tim Fitzpatrick or Tom Atkeson if you prefer to institute chain of custody procedures and let the lab receive, store, test, and possibly ship elsewhere for specialized testing if warranted.

Al

I know we promised you feed ash and product ash. Rather than waiting until TEC responds to the RAI later in January(dependent on EPA discussions), we can ship you the ash. How much do you want and where should we ship it?

If I don't get to talk with you in person, best of the season to you and your family.

Lisa

Cascio, Tom

From: Shelly Castro [sscastro@tecoenergy.com]
Sent: Tuesday, January 10, 2006 3:27 PM
To: Cascio, Tom
Cc: Byron Burrows; David Lukcic; Shelly Castro
Subject: BB1 & 2 SCR AC Permits

Hi Tom,
Yes, both of those permits are the same except for the in-service dates Unit 2 is 2009 and Unit 1 is 2010 (unless something changes between now and then).

Please let me know if you have any further questions.

Have a Great Tuesday!
Shelly

Sincerely,
Shelly Castro
Environmental Engineer,
Environmental, Health & Safety
Tampa Electric Company
ph# 813-228-4408
fax# 813-228-1308
email: sscastro@tecoenergy.com

Judy Pareya -
There are hundreds of languages in the world but a smile speaks them all.

Cascio, Tom

From: Fitzpatrick, Timothy
Sent: Tuesday, January 10, 2006 3:19 PM
To: Linero, Alvaro
Cc: Chandrasekhar, Thekkekalathil; Atkeson, Thomas; Cascio, Tom; Brackett, Kathryn
Subject: RE: Fate of Mercury from CBO Fly Ash Process

Al, we have no objections to analyzing the samples archived earlier but I don't think, by themselves, they'll provide much useful information - to determine statistical significance we need replication and for mass balance, other information is needed. My recollection is that there was only one fly ash sample and one product sample and that they both contained approximately the same amount of mercury on a dry mass basis. Without knowing the mass of fly ash burned to produce a unit mass of product, I don't see how the sample analysis is of any use in determining whether mercury is lost in the combustion process.

I suppose their arguments were that the amount of mass lost in combustion (as carbon consumed) was insignificant or at least less than 10. I don't recall any real data, though, that could be used in a mercury mass balance determination.

Timothy W. Fitzpatrick
Administrator, Chemistry Section
Florida Dept. of Environmental Protection
(850) 245-8083
-----Original Message-----
From: Linero, Alvaro
Sent: Tuesday, January 10, 2006 2:26 PM
To: 'Cooper, Lisa'; Cascio, Tom
Cc: Fitzpatrick, Timothy
Subject: RE: Fate of Mercury from CBO Fly Ash Process

Thanks Lisa:

We'll review and get back to you.

Al Linero.

-----Original Message-----
From: Cooper, Lisa [mailto:lisa.cooper@pgnmail.com]
Sent: Tuesday, January 10, 2006 2:14 PM
To: Cascio, Tom
Cc: Linero, Alvaro; Fitzpatrick, Timothy
Subject: FW: Fate of Mercury from CBO Fly Ash Process

Dear Tim, Tom and Al,

Currently all CBO ash is processed by others under a license granted by PMI. PMI does not have direct access to provide the ash samples outlined in Tim's 1/5/06 e-mail. We would love to get you the samples you've requested but we have no contractual basis for forcing our licensees to provide them. Our delay in responding has been due to our attempts to get our licensees to provide these samples. In light of your request, we asked our licensee, SEFA, if they would provide ash samples of feed and product ash. We have received no answer to date.
We have no problem with your approach to the protocol or the handling of the chain of custody.

As an interim step, we would propose sharing ash samples which were taken during earlier Mercury mass balance testing at a commercial CBO facility i.e. Feed ash in, product ash out and gas out was sampled and analyzed. From that test we have archived feed and product ash.
Although this ash isn't exactly what is desired from a quantity and timing standpoint in Tim's request, it can give you reasonable independent assurance documenting the data on

mercury we have provided to the Agency is accurate. We can send splits of those samples overnight to whomever you specify.

We further propose entering into a Memorandum of Understanding(MOU)now among the three parties(DEP,TEC and PMI) which would lay out a sampling plan and allow for Tim to complete the sampling and analysis requested.
Once construction of the TEC CBO facility is complete and the plant is in operation, we can generate and provide such samples for you according to the MOU we enter into now among the three parties: DEP, PMI and TEC.
We have spoken to TEC about this issue and they too are willing to enter into a MOU which would allow these objectives to be met. Until we get the permit and construct the CBO at TEC and/or obtain access to the samples at another plant, PMI has no other option to get you the ash samples requested. We will get such samples to you once we can obtain them.
We suggest outlining a MOU which would set forth the protocol that all three parties can use to voluntarily further study into this important topic.

Please advise of your thoughts and thanks for your help and patience on this issue.

Lisa

RECEIVED
JAN 25 2006
BUREAU OF AIR REGULATION

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

Via FedEx
Airbill No. 7913 4909 5209

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 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

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 CBO™ 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 CBO™ project includes, in addition to the CBO™ 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 CBO™ 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 CBO™ 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 CBO™) 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 CBO™ 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 CBO™ 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 CBO™ 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 CBO™ product ash. The mass balance demonstrates that the CBO™ 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 CBO™ 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 CBO™ 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).

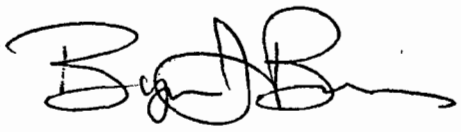
Therefore, while TEC re-asserts PMI's willingness to provide the Department the ash from PMI's licensee should such ash be provided, TEC does not believe that PMI's inability to provide new samples should delay the Department's processing of TEC's application.

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/rlk/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

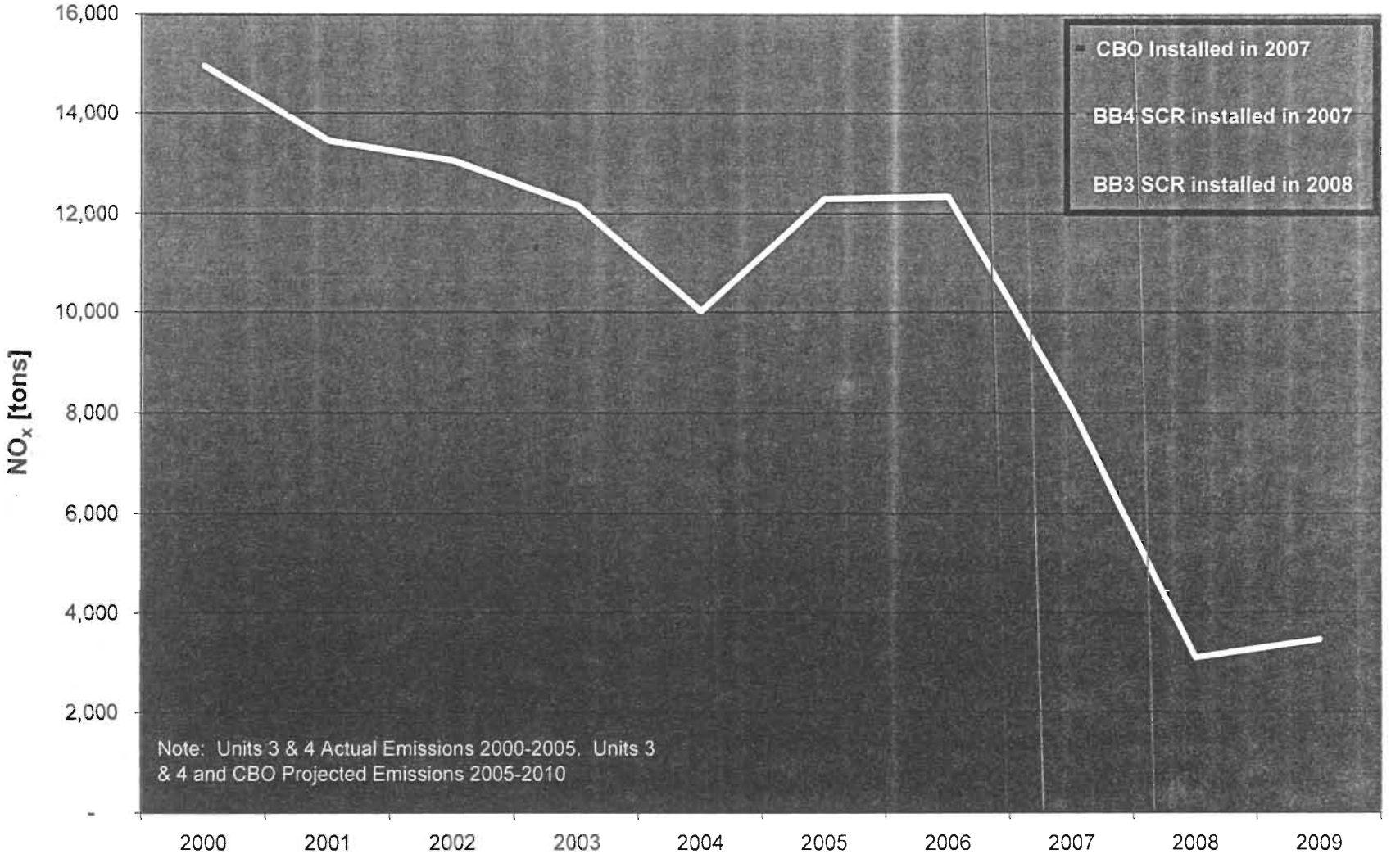
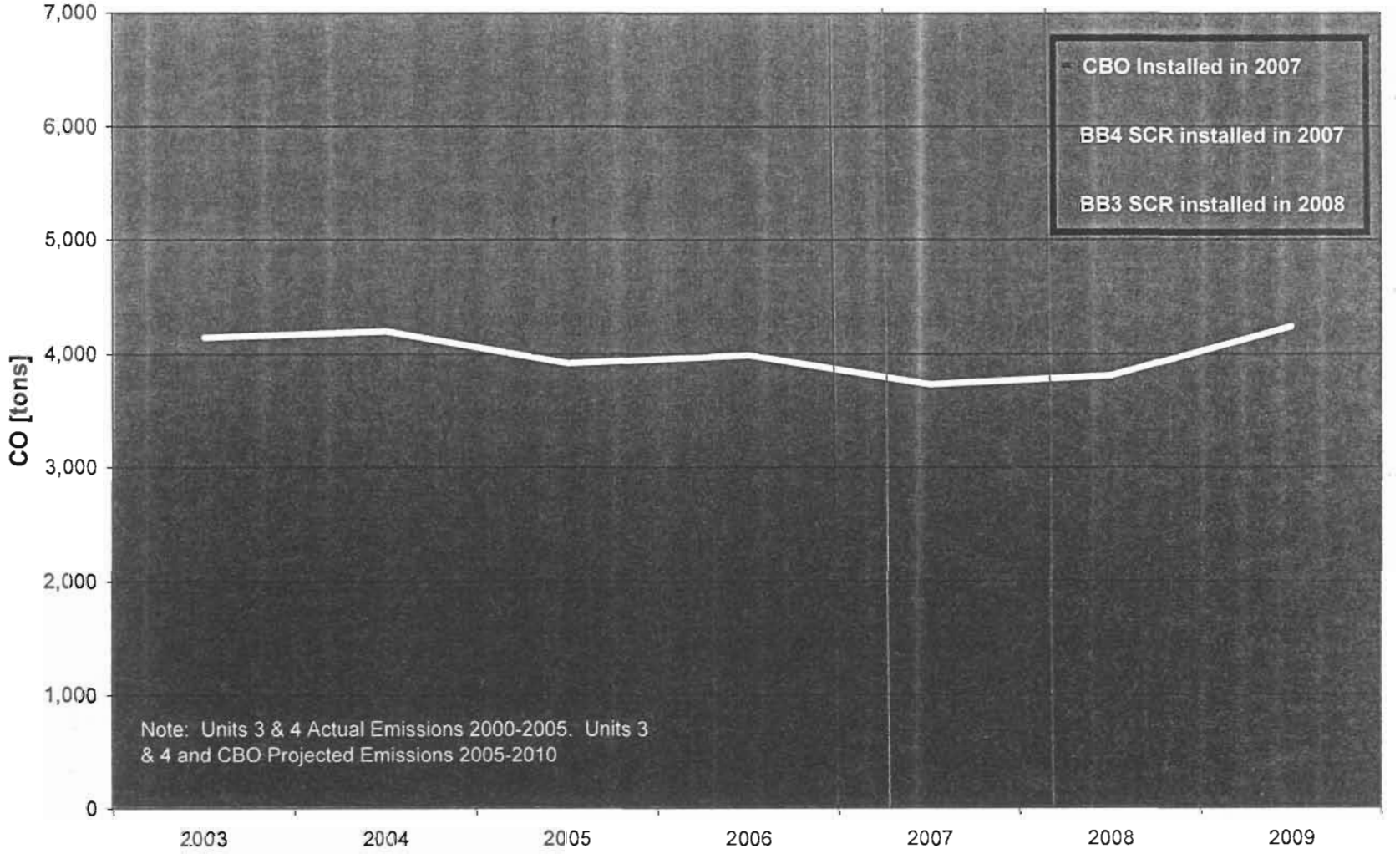


Figure 2. Big Bend 3 & 4 Carbon Monoxide (CO) Emissions



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

Cascio, Tom

From: Little.James@epamail.epa.gov
Sent: Monday, April 03, 2006 1:18 PM
To: Cascio, Tom
Subject: Re: CBO PROJECT

Tom -

I focused my comment on malfunctions, but in fact we don't like exemptions for startups and shutdowns either. In this case my concern is with the words "This limit applies ... excluding periods of startup, shutdown, and malfunction." EPA's official view is that limits apply during these periods, but that enforcement discretion can be applied when deciding what to do if the limits are exceeded during such periods.
Another approach is to have a separate set of limits for startups and shutdowns or to have work practice requirements in lieu of emission limits for startup and shutdown. I'll call to explain.

Jim

"Cascio, Tom" <Tom.Cascio@dep.state.fl.us> 04/03/2006 02:07 PM

To: James Little/R4/USEPA/US@EPA
cc:
Subject: CBO PROJECT

Hi Jim. Thanks for talking with us this morning. In discussing the proposed conditions in the TECO letter (see below), I believe you said that malfunctions should not be excluded when applying the NOx limit.
Is this accurate?

- NOx emissions from Unit 4 shall not exceed 0.10 lb/MMBtu, 30-day heat input weighted average basis. This limit applies during all periods including periods when the CBOTM exhaust is routed to the Unit 4 boiler exhaust, but excluding periods of startup, shutdown, and malfunction..

- NOx emissions from Unit 3 shall not exceed 0.12 lb/MMBtu, 30-day heat input weighted average basis. This limit applies during all periods, excluding periods of startup, shutdown, malfunction, and periods when the CBOTM exhaust is routed to the Unit 3 boiler exhaust. During periods when the CBO TM exhaust is routed to the Unit 3 boiler exhaust, the NOx limit affecting Unit 3 is 0.15 lb/MMBtu, 30-day heat input weighted average basis.

Tom Cascio, D.B.A., CPM

Engineering Specialist IV
Permitting South Section
Florida Department of Environmental Protection
850-921-9526