

Walker, Elizabeth (AIR)

From: Livingston, Sylvia
Sent: Tuesday, November 04, 2008 7:44 AM
To: Arif, Syed; Holladay, Cleve
Cc: Walker, Elizabeth (AIR); Gibson, Victoria
Subject: FW: TEC Big Bend Station - Response to Request regarding Mercury & CAIR

FYI

Sylvia Livingston
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From: Burrows, Byron T. [mailto:BTBurrows@tecoenergy.com]
Sent: Monday, November 03, 2008 9:42 PM
To: Livingston, Sylvia; Kahn, Joseph
Cc: Nguyen, Andrew T.; Ward, Julie M.
Subject: TEC Big Bend Station - Response to Request regarding Mercury & CAIR

November, 3 2008

Mr. Joseph Kahn, Director	Via Email:
Division of Air Resource Management	<u>Sylvia.Livingston@dep.state.fl.us</u>
Florida Department of Environmental Protection 2600 Blair Stone Road Tallahassee, Florida 32399-2400	

RE: Big Bend Power Station
Facility ID No. 0570039
EU ID No. 1 - 4
Subject: Department Letter Dated September 2, 2008
Request for Information Regarding Mercury and CAIR Control Plans

Dear Mr. Kahn:

The purpose of this letter is to provide the information requested by the Department regarding the subject request. Tampa Electric Company (TEC) is committed to partnering with the Department in rule development activities. The information provided has been carefully evaluated to ensure accuracy to the extent practical. However, please be advised that some of the information provided is based on future projections of the TEC business plan and regulatory requirements. Therefore, TEC reserves the right to modify its positions as necessary.

Per your request, below are TEC's responses to each question listed in the September 2, 2008 letter:

1. Does your facility have mercury test results?

(a) For example, can you provide the results from fuel sampling fly ash, stack tests, etc.?

Response 1(a):

TEC has results from engineering studies for mercury concentration in coal, fly ash, and stack emissions at Big Bend Station. Table 1 below provides a summary.

TABLE 1-Summary of Big Bend Station Mercury Data

Parameter	Method (Year) [# samples]	Average Result	
Hg in Coal	Grab Sample (2008) [1]	180 ppb	
Hg in Flyash- pre-beneficiation	Grab Samples (2008) [daily]	314 ppb	6.1 lb/month
Hg in Flyash- Beneficiated-low carbon	Grab Samples (2008) [daily]	129 ppb	1.4 lb/month
Hg in Flyash- Beneficiated-high carbon	Grab Samples (2008) [daily]	571 ppb	4.3 lb/month
Hg in Unit 3 FGD Inlet	Ontario-Hydro Method (1999)	0.021 lb/hr	183 lb/yr
Hg in Unit 3 Stack	Ontario-Hydro Method (1999)	0.0071 lb/hr	62 lb/yr
Hg in Units 1 & 2 Common Stack	EPA Method 29/OHM (2006) [7]	0.013 lb/hr	113 lb/yr
Hg in Units 1 & 2 Common Stack	EPA Method 30B (2007) [1]	0.018 lb/hr	131 lb/yr
Hg in Units 3 & 4 Common Stacks	EPA Method 30B (2007) [2 each]	0.0085 lb/hr	74 lb/yr
Notes: 1. Lb/yr values based on operation 8760 hours per year			
2. BBS Units 1-4 equipped with ESP & FGD; Only Unit 4 equipped with SCR during 2007 tests			

(b) Has your facility ever conducted any type of mass balance with regard to mercury within the facility?

Response 1(b):

TEC's Toxic Release Inventory (TRI) reports provide an estimate of the facility wide mass balances of applicable pollutants which includes mercury. The TRI reports are submitted to the Department of Community Affairs and to the U.S. Environmental Department Protection on an annual basis. In addition, there are on-going initiatives to collect air, byproduct, and water data that will lead to the compilation of a mercury mass balance. Currently, Big Bend Station is half way through its \$330 million SCR project, with SCR's already constructed on Units 3 and 4. Since SCR's are known to enhance the removal efficiency of mercury, the facility mercury balance is expected to continue changing until the final SCR is installed in 2010. We will keep the Department informed as new information becomes available.

(c) In addition, does the facility have test data or information about the speciation of mercury emissions from the facility?

Response 1(c):

TEC has information on the speciation of mercury emissions from Unit 3. However, the test was performed in 1999 when Unit 3 emission controls were limited to an ESP and a FGD system. Recently, an SCR system was added to Unit 3 (resulting in an anticipated change in mercury speciation) and TEC does not have any up-to-date data on speciation of mercury emissions. It is expected that much of the oxidized mercury is removed in the ESP or FGD systems.

2. Can you confirm your estimated mercury emissions?

Response 2:

Table 1 in Response 1(a) describes the most accurate estimate of mercury emissions we have at this time. The previously submitted data for required reports such as the Toxics Release Inventory (TRI) and Annual Operating Report (AOR) list the specific emission factors used in each calculation (i.e., WebFire, stack test, AP-42, coal sampling) and the Department already has this information (submitted in the respective reports). The varying estimates are the result of different emission factors used for the various reports and the best removal efficiency data available at the time of the report preparation. TEC has been using the LARK-TRIPP software to calculate the TRI releases. LARK-TRIPP incorporates emission factors from EPRI's "Emission Factors Handbook (2002)", as well as the data on fuel and coal ash composition from EPRI's PISCES Database. The LARK-TRIPP built-in emission factor for mercury compound is 1.75 lb/ 10¹² BTU input for coal-firing. The AOR emission factor for mercury compounds from AP-42 is 8.3 x 10⁻⁵ lb/ton coal burned. The variation between the results of the different calculation methods is not surprising given the extremely small emission rate compared to the very large input rates.

Example:

- Assuming a heating value for coal of 12,000 Btu/lb or 24 MMBtu/ton of coal.
- LARK-TRIPP EF for Hg compounds: 1.75 lb/10¹²Btu
- AP-42 EF for Hg compounds: 8.3 x 10⁻⁵ lb/ton coal burned

Given a coal-fired unit burned 1,000,000 tons of coal in a year, the calculated values of Hg emissions using the LARK-TRIPP vs. the AP-42 Emission Factors are:

LARK-TRIPP Hg emissions: 42 lb/yr

AP-42 Hg emissions: 83 lb/yr

TEC follows the recommended reporting guidelines described by the instructions for the various reports. The variability in the results is an indication of the difficulty in accurately measuring an extremely small concentration, the evolving level of emission data available to us, and the changing emissions profile at Big Bend Station due to our emission reduction initiatives. We will update and refine our reporting procedures as statistically significant new data become available.

3. Do you have mercury related specifications in your fuel contracts?

Response 3:

TEC's current coal contracts do not have mercury related specifications or treatment requirements.

4. What is your current coal use and plan for coal in the future?

Response 4:

Big Bend Station units are baseload units currently operating on eastern bituminous coal and are sensitive to large variations in fuel type. Accordingly, these units do not burn high percentage of non-coal based fuels (e.g., petroleum coke). However, TEC reserves the right to supplement the coal with the permit allowed percentage of these additional fuel sources given market conditions and may apply to the Department for higher percentages. TEC has the authority to use certain types of coal as specified by the permit, and which may come from different regions. This flexibility is needed to accommodate varying market conditions and to allow for the optimum fuel diversity in the best interest of our customers. Because of this variability in origin and the affordability of mixing, TEC cannot determine future mercury content for its coal sources. The description of eastern bituminous coal analyses outlined in the RMB draft report is representative of TEC's current usage.

5. How does your facility handle treatment of coal combustion products (CCP)?

Response 5:

TEC Big Bend Station proudly recycles essentially all of its coal combustion products: fly ash, scrubber gypsum, and bottom ash. TEC has partnered with Separation Technologies, Inc. to provide flyash beneficiation and continue flyash recycling even after installation of SCR's, which cause ammonia entrainment that would otherwise prevent such recycling. Tampa Electric aggressively minimizes pollution and markets byproducts of its power plant operations. The recycling and reuse of coal combustion byproducts produced at the company's coal-burning power facilities has had a beneficial impact on the environment. Byproducts are used to support industries important to the area's economy. The beneficial use of these products reduces consumption of natural resources, as well as valuable landfill space. Over 98 percent of combustion byproducts generated in 2006-2007 were marketed to customers for beneficial use. At Big Bend, as part of the SO₂ removal system, coal combustion exhaust gases are sprayed with a slurry of water and limestone in the scrubbers. The chemical reaction of the slurry with the exhaust gases results in the formation of synthetic gypsum – a material which is ultimately used to manufacture wallboard – in the production of cement and as an agricultural soil supplement. Other coal combustion byproducts are recycled for local and regional use. Flyash is used in cement and concrete for construction, while slag is used in roofing shingles or as grit blasting material. Income streams from Tampa

Electric's byproducts aid in controlling electricity prices to customers. As described above, SCR's are known to enhance the removal efficiency of mercury and the facility mercury balance is expected to continue changing until the final SCR is installed in 2010. We will keep the Department informed as new information becomes available.

6. How does your facility handle monitoring of mercury emissions?

Response 6:

TEC currently periodically monitors mercury emissions for planning purposes. TEC is currently equipped to conduct monitoring using sorbent trap technology based on EPA Method 30B. TEC is also developing the capability to do portable instrumental monitoring using a trailer equipped with a Thermo Fisher Mercury Freedom system according to EPA Method 30A. TEC plans to continue periodic monitoring as needed to provide information supporting ongoing rulemaking efforts. We believe that periodic monitoring is appropriate at this time given the evolving nature of TEC's environmental initiatives.

7. Does your facility plan to proceed with CAIR controls plans?

Response 7:

Yes, TEC committed to install controls that comply with CAIR in 1999 (as part of an agreement with EPA and FDEP) and will continue to install these controls. At this time, Unit 3 and Unit 4 have SCR and FGD systems that surpass CAIR controls requirements. Units 1 & 2 currently have FGD systems and will complete installation of SCR Controls in 2010. There are no vendor guarantees for mercury control but TEC will evaluate the devices mercury control efficiency.

Please feel free to contact me should you have any questions. I can be reached at (813) 228-1282 or by email at btburrows@tecoenergy.com.

Sincerely,

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