



August 2, 2006

Mr. Robert Bull
Florida Department of Environmental Protection
Division of Air Resource Management
111 South Magnolia Drive, Suite 4
Tallahassee, Florida 32301

Via Email Notification
robertbull@dep.state.fl.us

**Re: Tampa Electric Company
Polk Power Station Unit 1
100% Petcoke Test Burn Request
Permit No. 1050233-016-AV
AIRS #1050233, EU ID #001**

Dear Mr. Bull:

The purpose of this letter is to provide detailed information related to the 100% Petcoke Test Burn flux questions raised on the August 1, 2006 conversation. The test burn would be conducted to test the feasibility of firing syngas produced from the gasification of up to 100% petcoke fuel (with a flux) at a maximum sulfur content of 6 percent by weight. This correspondence is intended to inform the Florida Department of Environmental Protection of the reasons flux is needed for the test burns.

Petcoke contains very little mineral matter (typically <.5%), but that mineral matter has such a high melting point that it does not completely melt at the gasifier's operating conditions. In order for Polk's gasifier to operate properly, all mineral must "flow" out of the gasifier. This is where the flux comes in. A flux is chosen that does melt at gasifier operating conditions. Inside the gasifier, the liquefied flux surrounds the petcoke mineral matter and at least partially dissolves some of it and entrains the rest. Regardless of the exact mechanism, as the flux flows out of the gasifier, it takes the petcoke mineral matter with it so normal operation can be sustained.

Polk Unit 1 normally operates on a blend of up to 60% petcoke with the remainder being coal. In this case, the coal's mineral matter serves as the flux. There is sufficient mineral matter in the current coal we are using to accommodate a blend of up to around 80% petcoke. Beyond 80% or 85% pet coke, we will probably have to begin adding supplemental flux. The amount of flux required must be determined by test. It depends on a number of factors such as the amount of mineral matter in the petcoke, the amount of petcoke in the blend, the ash content and composition in the blend coal (if any), and the composition of the added flux. It is to everyone's advantage to minimize the amount of flux since buying and adding flux increases the cost of electricity to our consumers.

2300 tons/day of petcoke containing 0.5% ash would yield 11.5 tons/day of petcoke mineral matter. Experience has shown that a 10/1 ratio of flux to petcoke mineral matter is generally sufficient. This would indicate that up to 115 tons/day of flux would be needed (10 x 11.5 tons/day = 115 tons/day). A flux/petcoke mineral matter ratio as low as 5/1 has sometimes been sufficient, and petcoke often contains only 0.3% ash. In this case the flux requirement for 2300 tons/day of petcoke would be only 35 tons/day. If the fuel is a blend of coal and petcoke, the mineral matter in the coal directly reduces the amount of "pure" flux which must be added. The amount of "pure" flux which must be added would depend on the blend coal and the petcoke we are using at the time of the test. The amount of flux required for each of

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the various test scenarios cannot be determined now since we don't know the coal and petcoke properties until we perform the test burns.

Several materials have been used successfully as flux for petcoke. The key criteria are that it be relatively consistent and have a melting point near the gasifiers operating temperature. A common choice is coal ash from conventional boilers. Dolomite, miscellaneous quarried rock (e.g., simple dirt), and waste concrete and asphalt roadbed material have also been used with varying degrees of success. If the test is approved, we would probably use coal ash as the flux and would add it at high ratios (near 10/1 flux to petcoke mineral matter) in the beginning to be sure we have enough flux to cause the petcoke mineral matter to leave the gasifier. Longer term, we would optimize the flux addition rate by gradually reducing it to the extent possible.

TEC appreciates the Departments timely review and processing of the air construction permit application for this test burn and the opportunity to provide this information. . If you have any further questions or need additional clarification, please do not hesitate to call Raiza Calderon or me at (813) 228-4369.

Sincerely,

(No Electronic Signature Available)

Raiza Calderon for
Byron Burrows, P.E. BCEE
Manager - Air Programs
Environmental, Health, and Safety

EHS/rik/RC222

Enclosure

c/enc: Mr. Jerry Kissel, FDEP SW District