TAMPA ELECTRIC

December 28, 2001

Mr. Scott Sheplak, P.E.
Florida Department of
Environmental Protection
111 South Magnolia Drive, Suite 4
Tallahassee, FL 32301

Via FedEx
Airbill No.7902 5966 5980

Re: Tampa Electric Company
Biomass Test Burn
Polk Power Station Unit 1
Facility ID No. 1050233

Dear Mr. Proses:

Per Condition 1 of the Polk Power Station Unit 1 Biomass Test Burn Authorization, which was issued by the Florida Department of Environmental Protection (DEP) on December 21, 2001, Tampa Electric Company (TEC) is required to notify the DEP Southwest District and the Bureau of Air Regulation one day prior to gasifying biomass. Through this correspondence TEC is providing notification that biomass is expected to arrive on- site on December 28, 2001 and that TEC will be attempting to gasify the biomass as it becomes available on- site.

If you have any questions please call Dru Latchman or me at (813) 641-5034.

Sincerely,

Laura R. Crouch
Manager- Air Programs
Environmental Affairs

EA/bmr/DNL105

cc: Mr. William A. Proses, P.E.

-file-

TAMPA ELECTRIC

RECEIVED
DEC 24 2001
BUREAU OF AIR REGULATION

December 21, 2001

Mr. Scott Sheplak, P.E.
Administrator- Title V Section
Florida Department of Environmental Protection
111 South Magnolia Drive, Suite 4
Tallahassee, FL 32301

Via FedEx
Airbill No. 7917 3941 6735

Re: Tampa Electric Company
Polk Power Station Unit 1
Biomass Test Burn

Dear Mr. Sheplak:

Tampa Electric Company (TEC) has received the Florida Department of Environmental Protection's (the Department) second letter of incompleteness dated December 14, 2001 addressing TEC's request for permission to conduct a biomass test burn at Polk Power Station Unit 1 (Polk Unit 1). The intent of the test burn is to answer questions concerning any emissions impact that the biomass will have on Polk Unit 1. In addition, the proposed test burn will allow TEC to evaluate any additional fuel handling and operational impacts associated with gasifying biomass in Polk Unit 1.

This correspondence is intended to provide a response to each specific issue raised by the Department. For your convenience, TEC has restated each point and provided a response below each specific issue.

FDEP Issue 1
It remains unclear to the Department how the existing handling and feed systems will be utilized with the biomass fuel. For example, will the fuel be transported from the trucks to a storage pile? Where will the pile be located? Will the pile be covered or open to atmospheric conditions? How will the fuel be ground, and how will it be moved to the grinding equipment? Will it be batch-fed or will an effort be made to maintain a continuous coal/biomass ratio (please be specific)? Will it be slurried directly with the coal? These questions are representative of level of description, which the Departments seeks, regarding storage, handling and feed systems.

TEC Response
For the purposes of the proposed test burn, the fuel is expected to be ground by the supplier or at F.J. Gannon Station and trucked to Polk. Tampa Electric is already permitted to burn wood derived fuel at F.J. Gannon Station and the associated wood grinding operations were included in the Title V permit modification. To the extent possible, TEC will use existing fuel

handling and feed systems that are in place at the plant. As such, it is expected that the biomass material will be unloaded from the delivery trucks to the conveyors that feed the fuel silos. The material will then be batch-fed to the system, but will ultimately be mixed with coal in the silos in an effort to maintain a continuous biomass/coal ratio. The biomass material will be directly slurried with the coal.

FDEP Issue 2
Biomass fuels typically have higher water contents than coal. Please explain how moisture removal and disposal will be accommodated, or will the additional water end up in the syngas?

TEC Response
The fuel being gasified at Polk is introduced in a slurry state, i.e., a mix of crushed fuel and water. Therefore, Tampa Electric does not expect the moisture content in the biomass to be an issue of concern.

FDEP Issue 3
In the December response, TEC indicated that it is not aware of any other IGCC facility that has attempted to gasify a blend of 5% biomass and coal. Inasmuch as this appears to be the first attempt at such a venture, the Department's opinion is that this request is not identical to other requests it has received to combust biomass. Therefore, the Department maintains that it wishes written confirmation by the manufacturer of the gasifier, that it is currently capable of accommodating the proposed fuel mix of coal (and/or petcoke) and biomass.

TEC Response
The gasifier at Polk was designed to accommodate a variety of fuels and Tampa Electric does not expect that the introduction of the biomass fuel will cause detrimental effects to the gasifier. However, through the performance of a test burn, TEC will observe the behavior of the gasifier in response to the proposed introduction of a blend of 5% biomass and coal. It is from the results of the test burn that TEC will determine if the gasifier will be truly capable of accommodating the proposed fuel mix. Obtaining written confirmation from the manufacturer that the gasifier is currently capable of accommodating the proposed fuel mix will be a lengthy process. In the interest of moving the test burn forward, TEC requests that the Department allow TEC to move forward and consider the operational results of the test burn to be confirmation that the gasifier is capable, or not capable, of accommodating the proposed fuel mix

FDEP Issue 4
As previously indicated, the Department is aware that one of the largest impediments to the widespread use of biomass is its tendency to form unmanageable ash deposits. In the event that TEC intends to ultimately combust the (beneficiated) slag, the Department will require TEC to segregate the "co-fired" gasifier slag and provide a protocol for analysis of the quantity and quality. Based upon these results, TEC may propose a method for disposal after the test burn.

TEC Response

Though the firing of biomass in traditional coal-fired boilers may lead to increased ash deposits due to the nature of the materials combusted, TEC does not expect the gasification process at Polk to be affected by these concerns. Gasification is a separate and unique process in comparison to traditional coal-fired boilers. Due to the unique nature of the gasification process and the small amount of biomass proposed for gasification, TEC does not expect the gasification of biomass to impact the quantity or quality of the residual fuel from gasification. Because of this, TEC requests that the Department consider postponing the decision to segregate the residual fuel produced from the gasification of the 5% biomass and coal blend from the residual fuel currently produced at the facility until the results of the test burn are complete. Should issues arise indicating a need for additional requirements related to the residual fuel, the Department and TEC can develop a protocol for the analysis of the quantity and quality at that time.

FDEP Issue 5

The Department needs TEC to provide a protocol for syngas fuel analysis for each blend of biomass and coal/petcoke tested.

TEC Response

Due to the physical nature of biomass and coal, it is difficult to perform laboratory analyses that are representative of the exact percentages of blended materials. Therefore, TEC proposes to perform individual fuel analyses on the biomass and coal separately, then develop blend analyses by combining the individual fuel analyses using the percent by weight of the materials in the various blends incorporated during the test burn. These values, as they vary throughout the test burn, will be reported in the final test burn report.

FDEP Issue 6

In order to have reasonable assurance that a PSD review and associated public notices are not triggered for the proposed co-firing, the Department requires a summary of the *estimated* emission increases/decreases. This should be done at TEC's proposed maximum blend for each biomass and coal/petcoke fuel to be combusted. All assumptions should be clearly stated.

TEC Response

Due to the small amount of biomass that TEC is proposing to burn during the test burn, it is extremely unlikely that PSD review and the associated public notices will be triggered by the performance of the test burn. In addition, the unique nature of the Polk IGCC facility leads to a limited availability of emission factors for any fuel from an IGCC gasifier. The performance of the test burn will allow TEC to obtain actual data from the CEM system to evaluate emissions impact for PSD applicability. Should the results of the test burn suggest that the permanent inclusion of a 5% biomass/fuel blend in the unit's operation would trigger PSD review, then TEC would perform the necessary modeling and analysis required.

Provided in Attachment 1 of this document is the Responsible Official Certification. TEC appreciates the cooperation and consideration of the Department in this matter. If further questions or concerns arise pertaining to the additional information TEC has provided please contact me (813) 641-5376.

Sincerely,

Laura R. Crouch
Manager- Air Programs
Environmental Affairs

EA/bmr/DNL104

Enclosure

c/enc: Mr. Jerry Kissel - FDEP SW
Mr. Al Linero, FDEP

Attachment 1

Responsible Official Certification

I have reviewed the testing results in this report, and hereby certify that this test report is authentic and accurate to the best of my knowledge.

Date 12-21-01

Signature. Mark Hornick

General Manager

Polk Power Station

Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

December 21, 2001

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Ms. Laura Crouch
Manager, Air Programs – Environmental Affairs
Tampa Electric Company
Post Office Box 111
Tampa, Florida 33601

Re: Biomass Test Burn
Polk Power Station Unit 1
Facility ID No. 1050233

Dear Ms. Crouch:

The Department has reviewed the request from Tampa Electric Company received on October 25, 2001, and the supplementary information dated December 4 and December 21, 2001 concerning the gasification of a blend of coal/petcoke and biomass (eucalyptus, cottonwood and switch grass) in your IGCC unit located at the Polk Power Station, Polk County, Florida.

You are hereby authorized to conduct performance tests on these emissions units while gasifying and combusting a blend of up to 5 percent biomass by weight (eucalyptus, cottonwood and switch grass) for pollutants described herein, for a period not to exceed 28 days, and within 45 days from the first day biomass is gasified. Test results must include a material balance (fuels, emissions, gasifier slag, and boiler deposits) for each unique blend of fuels. All conditions of existing permits related to air pollution emission limits and control equipment remain in force during the test burn. This temporary permit shall expire on or before April 30, 2002.

The performance tests shall be conducted in order to gather data regarding air pollutant emissions, any operation limitations on gasifying a blend of up to 5 percent by weight biomass, to measure syngas characteristics and to determine the slag content from the gasifier and HRSG deposits. Unless otherwise specified, all test results shall be sent to the Department's Bureau of Air Regulation within 30 days of completion of the tests. Upon any requested change to allow permanent combustion of fuels not currently permitted for these emission units, the Department will evaluate the establishment of new or additional permit conditions resulting from either increases or improvements in emission quality or quantity.

The performance tests shall be subject to the following conditions:

1. The permittee shall notify the DEP Southwest District, and the Bureau of Air Regulation upon receipt of any biomass, 1 day prior to gasifying biomass and 7 days prior to commencement of any stack performance testing. Because of the end of the year tax credit, the permittee may give 1 day testing notification. A written final report shall be submitted to these offices within 45 days of completion of the last day that biomass is gasified.

2. While gasifying biomass, it shall be continuously fed so as to maintain a homogenous stream of syngas for combustion. The maximum biomass content shall not exceed 5 percent by weight of fuels gasified, as measured during each calendar day. A log shall be maintained at the facility demonstrating compliance with this condition, documenting the unique type of biomass being gasified (eucalyptus, cottonwood or switch grass) along with the unique blend of coal or petcoke. This log shall be available for inspection and submitted with the final test report. Performance testing (mass balance, syngas testing and stack testing) shall be conducted for each unique blend of biomass gasified with each unique blend of coal or petcoke.

3. Emissions due to biomass gasification shall not exceed any current limits in existing permits for all impacted emission units.

4. Representative samples of "as-burned" coal, petcoke and biomass shall be taken and analyzed for each unique blend of biomass gasified with each unique blend of coal or petcoke. All sample results shall be submitted with the final report.

5. As-burned (syngas) fuel samples shall be collected and analyzed as "refinery gas" (as has been done with past compliance tests) upon initial gasification of each unique blend of biomass gasified with each unique blend of coal or petcoke. Additionally, metals contents (fluorides, chromium, arsenic, cadmium, mercury, lead, and beryllium) phosphorous, amines and organic silicon compounds shall be measured for each unique blend of biomass gasified with each unique blend of coal or petcoke. Sample results shall be provided to the DEP Southwest District and the Bureau of Air Regulation within 14 days of sample collection.

6. To provide reasonable assurance that the ash generated from any fuel blend can be disposed of in a method to be proposed by TEC, as well as to ensure compliance with the solid and hazardous waste regulations, representative samples of the gasifier slag generated as the result of gasifying coal and petcoke with biomass shall be segregated, sampled and analyzed in accordance with the requirements set forth in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846, Third Edition."

7. A material balance of all measured syngas constituents shall be performed for each unique blend of biomass and coal or petcoke, based on all test/analytical data. Such material balances shall be provided with the final test report.

8. Stack gas emissions shall be conducted for each unique blend of biomass gasified with each unique blend of coal or petcoke and results reported for all measured syngas constituents as well as all currently regulated pollutants.

9. Performance tests shall be conducted using EPA Reference Methods, as contained in 40 CFR 60 (Standards of Performance for New Stationary Sources), 40 CFR 61 (National Emission Standards for Hazardous Air Pollutants), and 40 CFR 266, Appendix IX (Multi-metals), unless otherwise approved by the Department, in

writing, in accordance with Chapter 62-297, F.A.C. All performance testing shall be submitted with the final report.

10. Upon completion of the test burn period and upon the first unit shutdown, representative HRSG deposits shall be obtained. The Department's Southwest District, and the Bureau of Air Regulation shall be notified immediately upon such shutdown, as to the expected duration. TEC shall provide photographic evidence of the magnitude and location of such deposits upon conclusion of the unit shutdown. HRSG deposits shall be analyzed in a scanning electron microscope (SEM) using energy dispersive X-ray spectroscopy (EDS) to identify the elements present. The Southwest District and the Bureau of Air Regulation shall be provided with a copy of any and all sample analyses or results obtained for HRSG deposits upon receipt of any analyses or results, regardless of the purpose of such sample collection, analyses or results.

11. This test-burn shall not result in the release of objectionable odors pursuant to Rule 62-296.320(2). F.A.C.

12. Performance testing shall cease as soon as possible if the test results in any emissions, which are not in accordance with the conditions in existing permits, or this authorization protocol. Performance testing shall not resume until appropriate measures to correct the problem(s) have been implemented. The Southwest District shall be notified immediately upon such cessation and resumption.

13. This Department action is only to authorize the biomass blend performance testing of biomass consisting of eucalyptus, cottonwood and switch grass.

14. The Department's Southwest District, and the Bureau of Air Regulation shall be notified within 5 days, in writing, upon completion of the biomass test burn.

15. All testing series shall include emissions testing for emissions units operating at permitted capacity. Permitted capacity is defined as 90-100 percent of the capacity allowed by existing permits.

This letter must be attached to permit No. PSD-FL-194 (current revision) and shall become a part of the permit.

Sincerely,

Howard L. Rhodes

Howard L. Rhodes, Director
Division of Air Resources
Management

HLR/sms

cc: Mr. Jerry Kissel, FDEP/SW
Mr. A.A. Linero, FDEP – BAR
Mr. Gregg Worley, EPA-Region IV

TAMPA ELECTRIC

December 21, 2001

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Administrator- Title V Section
Florida Department of Environmental Protection
111 South Magnolia Drive, Suite 4
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Airbill No. 7917 3941 6735

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Provided in Attachment 1 of this document is the Responsible Official Certification. TEC appreciates the cooperation and consideration of the Department in this matter. If further questions or concerns arise pertaining to the additional information TEC has provided please contact me (813) 641-5376.

Sincerely,

Laura R. Crouch
Manager- Air Programs
Environmental Affairs

EA/bmr/DNL104

Enclosure

c/enc: Mr. Jerry Kissel - FDEP SW
Mr. Al Linero, FDEP

Attachment 1

Responsible Official Certification

I have reviewed the testing results in this report, and hereby certify that this test report is authentic and accurate to the best of my knowledge.

Date _____ Signature Mark Hornick

General Manager

_____ Power Station

Sheplak, Scott

From: Sheplak, Scott
Sent: Monday, December 17, 2001 10:13 AM
To: Halpin, Mike
Cc: Rhodes, Howard
Subject: FW: TECO Polk Power Station Energy Crop Test Burn

fyi

-----Original Message-----
From: Steve Segrest [mailto:commonpurpose@serve.com]
Sent: Monday, December 17, 2001 7:11 AM
To: Sheplak, Scott
Cc: Alexander Mack; Edward Cobham
Subject: TECO Polk Power Station Energy Crop Test Burn

Dear Mr. Sheplak,

My name is Steve Segrest and I am a Director of the Common Purpose Institute (a non profit environmental organization). Common Purpose, in conjunction with the State of Florida Energy Office, the U.S. Department of Energy, the University of Florida, Tampa Electric, the Electric Power Research Institute (EPRI) and others has developed a ~140 acre dedicated Energy Crop Tree Farm in Polk County. A description of the project is at the website: http://www.treepower.org

My background is in electric utility engineering and finance (CPA). I am not an employee of Tampa Electric, nor can I speak for TECO.

Hopefully through Mr. Mack's correspondences, you are aware of the significance of conducting some type of test burn at the Polk Power Station by December 31st in order to "grandfather" the power plant for the Section 45 Income Tax Credit. In talking to the U.S. Department of Treasury (IRS), it is my understanding that the energy crop fuel must be co-fired at Polk for a duration between 24 and 72 hours in order to achieve "grandfather status". It is my understanding that the cofiring rate would be between 1 and 3 percent.

If TECO does not "grandfather" the Polk Power Station by December 31st, TECO will lose any FUTURE potential of claiming this tax credit (that Congress has provided to encourage the development of renewable energy resources) -- which will severely damage the financial feasibility of using energy crop fuel.

TECO has told me that they can not possibly provide the full Florida DEP's data request in order to perform the test burn by December 31st.

With this background information, I wish to make the following request:

It is requested that you contact Tampa Electric (perhaps Mr. Mark Hornick, the Polk Power Station Manager) to see if something can be worked out between TECO and the Florida DEP to conduct some type of limited test burn by December 31st (e.g., under IRS guidelines 24 to 72 hours).

All I am requesting is the ability to keep our options OPEN for future testing. Without attaining Section 45 "grandfather status", there may never be any future requests to perform renewable energy, energy crop cofiring test burns at the Polk Power Station.

Thank you,
Steve Segrest
813 987 9728

P.S.: If you email me or leave me a voice mail, I will be more than willing to travel to Tallahassee as soon as tomorrow (Tuesday) to

provide you and the Florida DEP additional information.

Planet Power
energy and the environment

Power Plant Engineering

Accomplishments: During the past 2 years, our collaborative engineering research efforts have resulted in EPA/State of Florida DEP permitting at two coal-fired power plants (pulverized coal and cyclone units) to co-fire wood fuel biomass. Our third endeavor, at TECO Energy's IGCC coal gasification unit, is scheduled to begin in the Fall of 2001.

Lakeland Electric's McIntosh Unit #3 (pulverized coal)
TECO Energy's Gannon Unit #3 (coal-fired cyclone)
TECO Energy's Polk Power Station (coal gasification).

Combined, these three Units have ~900 MWs of generation capacity. At a biomass co-firing rate of 3 percent (by heat input), this would be a Renewable Energy equivalent of installing 54,000 large solar panels.

Since all three of these power plants are high capacity factor, base-load units (i.e., plants that run 24 hours a day), our initial engineering focus has been on operational issues of integrating biomass co-firing without jeopardizing overall Unit availability. Primarily, these efforts have focused on wood fuel pre-processing (mesh size reduction through grinding), and air flows into the boiler.

Test-burn results have shown that wood fuel must be double ground (i.e., through a tub grinder or Montgomery type hog) to a fine mesh size [click here for a picture] for co-firing in pulverized coal and cyclone units. In using larger mesh size biomass (i.e., a single pass through the tub grinder or hog) the material did not burn well as it fell through a pulverized coal boiler's combustion zones (i.e., suspension firing) -- accumulating un-burned wood on the grate. For wet bottom boilers, inadequate suspension firing especially creates a totally un-acceptable operational problem.

For Pulverized Coal Units, controlling air flows with the pneumatic lifting of wood fuel to the boiler's fuel ports has also been shown to be exceedingly important. In initial test-burns at McIntosh Unit 3, even though wood fuel contains almost no sulfur, overall SO2 emissions significantly increased! In our opinion, we believe that this

Quick Facts
Economics & Research
Crop Yields
Energy Crop Fuel Analysis
Model Fuel Contract
Co-Firing Engineering
Education Outreach
Energy Crop Pictures
Biomass Co-Firing Pictures
Questions & Answers
Technical & White Papers

Habitat & Reforestation
Urban Heat Islands
Recycling & Water Quality

Common Purpose Institute
Shell Energy Projects
Tampa Electric
University of Florida
Florida Energy Office
Institute Phosphate Research
Southern States Energy Board

Visit Our Plantation!
Educational Reading
Rainfall & Soil Moisture

Biomass Discussion Group
Renewables In Your State

vividly illustrates why research needs to be conducted on large commercial scale units -- compared to small prototype boilers at research labs.

Future Focus: We strongly believe that as power plant management becomes more familiar with co-firing, that more advanced engineering methods will be tested, especially those directly addressing NOx formation (i.e., Reburn, Separated Overfire Air, etc.).

In addition to completed and current engineering work, within the next year, our goal is to conduct test burns and permit power plants for biomass co-firing at the following generating stations:

- Wheelabrator's Ridge Generation Station (stoker unit).
- TECO Energy's Big Bend Units (pulverized coal).
- Florida Power's Crystal River Units (pulverized coal).
- Orlando Utilities' Stanton Units (pulverized coal).
- Gulf Power's Crist Units (pulverized coal).

Our intermediate goal is to implement an external biomass gasification project at an existing coal or natural gas fired power plant in Florida -- such as the Battelle bio-gas technology being commercially developed by FURCO [pdf document]

Lakeland Electric's McIntosh #3 Unit

Lakeland Electric's McIntosh Unit #3 is a 365 MW Babcock and Wilcox boiler, rated at 2,900,000 pph steam, at 2250 psig. The biomass co-firing technique used at Unit #3 has involved the direct injection of shredded wood fiber material (e.g., closed-loop & open-loop biomass) into a pulverized coal fired furnace. Biomass was shredded to the consistency of fine mulch and blown into the furnace through existing fuel injection ports. Coal and wood handling processing were separate.

In one of several co-firing test burns at Unit #3, in late 1998, approximately 125 tons of shredded/chipped eucalyptus trees were co-fired over a single continuous 6 hour period (~21 tons per hour) -- representing a co-firing level at full load of ~5% (by heating value).

The pre-processed wood fuel was deposited in a live

bottom storage bin and then was pneumatically transported to the boiler and injected above the coal burners. Wood particles that did not burn in suspension, fell to a dump grate. Combustion air was introduced below the grate to complete the combustion of the larger fuel particles.

Pulverized coal was fired through existing coal burners. There are a total of four refuse/biomass injection ports, two each on opposing sidewalls above the coal burners. Two opposite wall injection ports were used during the co-firing test burn.

Boiler efficiency was lower with wood co-firing, due predominantly to fuel moisture of ~50% and increased excess air associated with the wood fuel injection. With wood co-firing, boiler efficiency was reduced from baseline condition (100% coal blend) by approximately 1.3 boiler efficiency points.

For the six hour test duration, accumulations of unburned wood were not noted in the air heater. Also, unusual slagging or fouling was not noted.

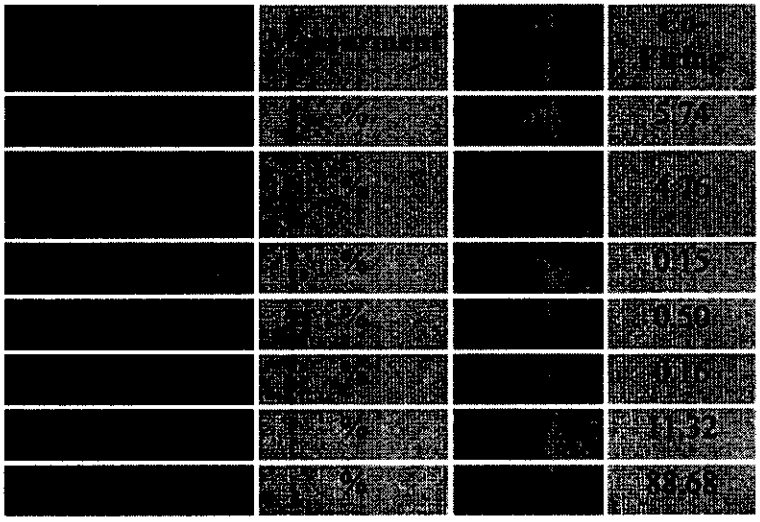
Fuel Ultimate Analyses:

	Measurement		Coal
	(%,w)		74.24
	(%,w)		4.57
	(%,w)		5.33
	(%,w)		1.43
	(%,w)		2.14
	(%,w)		7.45
	(%,w)		4.83
	(BTU/lb)		13,305

Stack Test Results:

			Co-Firing
			458.6
			0.451
			0.0047
			458.6

Effect On Boiler Efficiency:



TECO Energy's Gannon Power Generating Station:

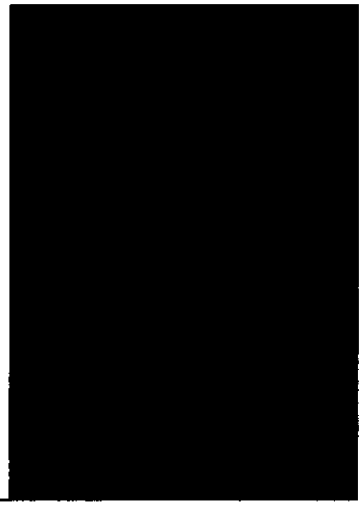
Tampa Electric's Gannon Power Generating Station is comprised of 7 Cyclone Units (~1,000 MWs) using 100% coal. During 2000 and 2001, a series of co-firing test burns were conducted at Unit #3 (wet bottom) with Yardwaste Biomass (~5,000 BTUs per pound) and Powder River Basin Coal (~9,000 BTUs per pound).

In 2000, a 72 hour continuous Test Burn was conducted with a biomass fuel blend of approximately 5% (i.e.,5% biomass wood fuel, and 95% coal, by volume). By Heat Input Value, biomass co-firing rate was approximately 2.75%.

Pre-processed biomass wood fuel was delivered "double ground" by initially grinding in a Tub Grinder (4"x 6" openings), screened (1/2" openings), and then re-ground through a Tub Grinder (1/2" grates). The biomass fuel was conveyed (a controlled variable speed conveyor) onto the main coal conveyor belt to be bunkered. Bunkering for Unit #3 (a base load unit) occurred twice per day.

During the Test Burn the focus was primarily on "Power Plant operational issues" associated with blending biomass fuels with the Powder River Basin Coal. While the Unit tripped numerous times during the Test Burn, none of the "trips" appeared to be directly the result of the biomass fuel. We experienced problems where the wood fuel conveyor continued to run, but the coal feed had been

tripped. For the Test Burn, we did not mechanically link the separate biomass conveyor to stop when the coal feed tripped. This resulted in the coal conveyor continuing to run (without any coal on the conveyor), and the biomass conveyor continuing to dump. When this has occurred, clumps of 100% wood fuel would occur in the bunker -- which eventually tripped the Unit (after bunkering) because sensors detected low Heat Input Value fuel (i.e., 5,000 BTUs per pound of biomass fuel, versus normal operations of 9,000 to 10,000 BTUs per pound of Powder River Basin coal).



Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

December 14, 2001

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Ms. Laura R. Crouch
Manager, Air Programs – Environmental Affairs
Tampa Electric Company
P.O. Box 111
Tampa, Florida 33601

Re: Proposed Biomass Test Burn
Polk Power Station Unit 1
Facility ID 1050233

Dear Ms. Crouch:

On October 25, 2001 the Department received your request to conduct a biomass test burn. On December 5, 2001 we received your responses to our November 20th request for additional information. Your request was for authorization to conduct a baseline test burn of 5% switch grass and/or eucalyptus/cottonwood to establish the representative emissions from Unit 1. Based upon those results, TEC might apply for a permit modification for the introduction of biomass into the gasifier on a more permanent basis. TEC has proposed to conduct a test burn for a period of 28 days to allow TEC to evaluate the impacts of the material on the fuel handling systems and other associated process equipment as well as evaluate the effects of firing syngas produced from a blend of biomass and other currently permitted fuels.

The Department finds that the request is yet incomplete. We understand that TEC wishes to pursue this test burn on a very fast track and we are endeavoring to provide a quick review. In order to continue processing your request, the Department will need the additional information below. Should your response to any of these items require new calculations, please submit the new calculations, assumptions, reference material and appropriate revised pages of the application. The Department needs satisfactory written responses to these issues by **Tuesday, December 18th** in order to allow for the possibility of a test burn authorization by the end of this calendar year.

1. It remains unclear to the Department how the existing handling and feed systems will be utilized with the biomass fuel. For example, will the fuel be transported from the trucks to a storage pile? Where will the pile be located? Will the pile be covered, or open to atmospheric conditions? How will the fuel be ground, and how will it be moved to the grinding equipment? Will it be batch-fed or will an effort be made to maintain a continuous coal/biomass ratio (please be specific)? Will it be slurried directly with the coal? These questions are representative of level of description, which the Departments seeks, regarding storage, handling and feed systems.

2. Biomass fuels typically have higher water contents than coal. Please explain how moisture removal and disposal will be accommodated, or will the additional water end up in the syngas?

3. In the December response, TEC indicated that it is not aware of any other IGCC facility that has attempted to gasify a blend of 5% biomass and coal. Inasmuch as this appears to be the first attempt at such a venture, the Department's opinion is that this request is not identical to other requests it has received to combust biomass. Therefore, the Department maintains that it wishes written confirmation by the manufacturer of the gasifier, that it is currently capable of accommodating the proposed fuel mix of coal (and/or petcoke) and biomass.

4. As previously indicated, the Department is aware that one of the largest impediments to the widespread use of biomass is its tendency to form unmanageable ash deposits. In the event that TEC intends to ultimately combust the (beneficiated) slag, the Department will require TEC to segregate the "co-fired" gasifier slag and provide a protocol for analysis of the quantity and quality. Based upon these results, TEC may propose a method for disposal after the test burn.

5. The Department needs TEC to provide a protocol for syngas fuel analyses for each blend of biomass and coal/petcoke tested.

6. In order to have reasonable assurance that a PSD review and associated public notices are not triggered for the proposed co-firing, the Department requires a summary of the *estimated* emission increases/decreases. This should be done at TEC's proposed maximum blend for each biomass and coal/petcoke fuel to be combusted. All assumptions should be clearly stated.

7. The Department previously inquired as to TEC's expectations regarding the performance of an SCR in light of the fuel proposed within the test burn request. TEC responded that it does not expect the application of an SCR to be successful on any IGCC Unit that fires a sulfur bearing fuel, and that the gasification of a 5% biomass blend will not significantly change the composition of the resulting syngas, nor affect TEC's position regarding the application of an SCR. DOAH will soon hear the case concerning the Department's recent BACT Determination for this unit, which had required SCR.

8. The Department still maintains its position on SCR for this facility.

We have included the EPA and the National Park Service within this review. Should we receive written comments, we will forward them to you when received and they will comprise part of this completeness review.

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.

If you should have any questions, please call me at 850/921-9532 or Al Linero at 850/921-9523.

Sincerely,

Scott M. Sheplak, P.E.
Administrator
Title V Section

cc: Mr. Jerry Kissel, FDEP/SW
Mr. A.A. Linero, FDEP – BAR
Mr. Gregg Worley, EPA-Region IV

TAMPA ELECTRIC

RECEIVED
DEC 05 2001
BUREAU OF AIR REGULATION

December 4, 2001

Mr. Scott Sheplak, P.E.
Administrator- Title V Section
Florida Department of Environmental Protection
111 South Magnolia Drive, Suite 4
Tallahassee, FL 32301

Via FedEx
Airbill No. 7902 3447 0167

Re: Tampa Electric Company
Polk Power Station Unit 1
Biomass Test Burn

Dear Mr. Sheplak:

Tampa Electric Company (TEC) has received the Florida Department of Environmental Protection's (the Department) letter of incompleteness dated November 20, 2001 addressing TEC's request for permission to conduct a biomass test burn at Polk Power Station Unit 1 (Polk Unit 1). The intent of the test burn is to answer questions concerning any emissions impact that the biomass will have on Polk Unit 1. In addition, the test burn will allow TEC to evaluate any additional fuel handling and operational impacts associated with gasifying biomass in Polk Unit 1.

This correspondence is intended to provide a response to each specific issue raised by the Department. For your convenience, TEC has restated each point and provided a response below each specific issue.

FDEP Issue 1
A generic description of each specific biomass fuel contemplated for gasification. Please indicate whether any of the material has been subjected to any treatment processes (e.g. pressure treated wood).

TEC Response
The potential biomass fuels that TEC has considered are switch grass and/or purpose-grown energy crops such as eucalyptus and cottonwood. TEC may include other sources of wood material, such as sawdust; to provide the initial quantities required for a test burn. Treated wood products will not be used.

FDEP Issue 2
The source(s) of the planned biomass fuel(s) including an ultimate analysis of each specific fuel contemplated for gasification. Please indicate heat value, moisture content and metals within these analyses. Provide the same data for the coal that is to be blended. Indicate how the fuel will be transported to Polk Power Station.

TEC Response
As mentioned above, the sources of the biomass fuel will include switch grass and/or eucalyptus/cottonwood. At this time, TEC does not have a complete analysis of the material to be

gasified at Polk Power Station. TEC expects that the biomass fuel will be consistent with that material that is currently fired at F.J. Gannon Station. A representative analysis of the material from F.J. Gannon Station is provided in Attachment A for your review. TEC will perform the requested analyses for each biomass fuel gasified during the test burn and will submit the results to the department as available. TEC will not change the fuel type used during this test burn The fuel that will be blended with the biomass for the purposes of this test burn will be consistent with the types of fuels that TEC is currently permitted to gasify. The fuel will be transported in enclosed trucks to Polk.

FDEP Issue 3
Wood materials at existing biomass cogeneration facilities have been found to contain measurable amounts of arsenic, cadmium, chromium, copper, fluorides, lead, and mercury. Does the current gasification system remove these types of contaminants? Please explain

TEC Response
It is unclear what types of wood materials the Department is referring to in the above referenced question. The biomass material proposed for gasification at Polk will not have been subject to painting, pressure treating or other industrial chemical treatments that other wood derived fuels can be subject to. It is not expected that the introduction of the biomass fuel will lead to an increase in the concentrations of any of these constituents. TEC is not currently required to evaluate the removal efficiency of the gasifier for these metals, as such data regarding the removal capability are not available.

FDEP Issue 4
The estimated annual quantity of each fuel available by supplier and estimated annual gasifier throughput at the proposed maximum blend rate of 5%.

TEC Response
At this point, TEC is not requesting to gasify biomass fuel on an annual basis. Based on the results of the test burn TEC may request permission to modify the facility's Title V permit to allow for the gasification of biomass fuel on an annual basis. The quantity of biomass proposed for test burn is 500 tons, which is reasonably available from our current suppliers.

FDEP Issue 5
A general description of how the existing handling and feed systems will be utilized with the biomass fuel. Please explain if changes in handling systems or methods are to be utilized (e.g. sizing, drying, pulverizing, etc.) and how moisture removal and disposal will be accommodated.

TEC Response
TEC expects the existing handling and feed systems to be able to accommodate the biomass fuel blend. TEC will any necessary changes to the existing fuel handling and feed systems discovered during the test burn in the report to be submitted to the Department after the test burn is completed. TEC will supply the Department with information about any necessary changes to the fuel handling and feed systems prior to making the change.

FDEP Issue 6
Written confirmation by the manufacturer of the gasifier, that it is currently capable of accommodating each specifically proposed fuel mix of biomass.

TEC Response
The gasifier was designed to accommodate a variety of fuels. It is not expected that the introduction of the biomass fuel would cause detrimental effects to the gasifier. TEC is not aware of any requirement that such written confirmation is obtained in order conduct a test burn, therefore it is not included.

FDEP Issue 7
Based upon Department information, one of the largest impediments to the widespread use of biomass is its tendency to form unmanageable ash deposits. Accordingly, provide the estimated impact on the quantity and quality (chemical make-up) of gasifier residuals (ash or slag) generated and how TEC intends to dispose of the newly composed "non-coal" ash or slag.

TEC Response
Though the firing of biomass in typical coal-fired boilers may lead to increased ash deposits due to the nature of the materials combusted, the gasification process at Polk is not expected to be affected by these concerns. Gasification is a separate and unique process as compared to coal- fired boilers. TEC does not expect the gasification of biomass to impact the quantity or quality of the residual fuel from gasification. TEC expects no changes to be necessary in the beneficiation of the residual fuel generated from Polk Unit 1, since a maximum of only 5% of the total fuel throughput to the gasifier will be biomass.

FDEP Issue 8
The estimated impact to the syngas composition, based upon mathematical analyses of actual syngas composition blend at the proposed ratio. Ensure halogen (e.g. chlorine) and alkali levels (e.g. potassium, sodium) are included.

TEC Response
A typical analysis of the syngas fired in Polk Unit 1 contains over 90% hydrogen, carbon monoxide and carbon dioxide. Halogen and alkali levels are minimal and the gasification of a blend of 5% biomass is not expected to affect these concentrations. Further, halogen and alkali compounds are not regulated under the PSD program and are not subject to evaluation for the purposes of this test burn.

FDEP Issue 9
Written confirmation by the manufacturer of the combustion turbine, that it is currently capable of accommodating each specifically proposed syngas fuel mix of biomass.

TEC Response
The syngas produced by the gasification of the 5% biomass fuel blend is not expected to be substantially different from the syngas currently produced. Therefore, TEC is confident that the combustion turbine will be able to fire the resulting syngas. TEC is not aware of any requirement that such written confirmation is obtained in order conduct a test burn, therefore it is not included.

FDEP Issue 10
Written confirmation by the manufacturer of the HRSG, that it is currently capable of accommodating each specifically proposed fuel mix of biomass.

TEC Response
Please see the response to Question 9.

FDEP Issue 11
The Department understands that TEC is currently experiencing deposit buildups in the HRSG. Please estimate the impacts to the quality and quantity of these deposits.

TEC Response
TEC does not expect the firing of syngas resulting from gasification of the 5% biomass blend to have a measurable impact on deposit build up. Therefore, the impacts to the quantity and quality of deposits on the HRSG will not be evaluated as part of this test burn.

FDEP Issue 12
A summary of the estimated emission changes for each criteria pollutant at TEC's proposed maximum blend of 5 % for each biomass fuel contemplated. All assumptions should be clearly stated.

TEC Response
Gasification of a 5% biomass fuel blend is not expected to change the composition of the syngas fired in Polk Unit 1 because the syngas is primarily composed hydrogen, carbon monoxide and carbon dioxide. TEC is proposing to gasify a relatively small quantity of biomass and does not anticipate any impact on the emission of criteria pollutants. To support this assertion, TEC will evaluate NOx and SO2 emissions during the test burn.

FDEP Issue 13
A modeling analysis to evaluate ambient impacts for any criteria pollutant where emissions are estimated to increase beyond the PSD thresholds.

TEC Response
TEC does not expect any emissions to increase beyond the PSD threshold and therefore a modeling analysis has not been completed. If the results of the test burn demonstrate that there is a significant increase in NOx or SO2 and TEC elects to apply for a permit requesting permission to permanently gasify the biomass material, the required modeling will then be performed as described in Chapter 62-212 F.A.C.

FDEP Issue 14
The past 2 year emissions of PSD pollutants.

TEC Response
If TEC elects to apply for a permit requesting permission to permanently gasify the biomass material, the required emissions analysis will then be performed as described in Chapter 62-212 F.A.C.

FDEP Issue 15
The Department has made a recent determination that Polk Unit 1 should be fitted with an SCR. In the event that this is ultimately required, pleases discuss TEC's expectations regarding the performance of the SCR in light of the proposed change in (gasified) fuel slate.

TEC Response
As explained to the Department previously, TEC does not expect the application of an SCR to be successful on any IGCC Unit that fires a sulfur bearing fuel. The gasification of a 5% biomass blend will not significantly change the composition of the resulting syngas, nor affect TEC's position regarding the application of an SCR.

FDEP Issue 16
Additional approvals for the test-burn should be sought from the appropriate regulating agencies on issues such as biomass storage, fuel pile, storm-water runoff, etc.

TEC Response
TEC will maintain compliance with all existing permits as identified in this question, should permits be necessary TEC will coordinate with the appropriate regulating agencies.

FDEP Issue 17
Indicate whether other IGCC facilities (with an entrained-flow gasifier) have combusted a blend of coal and biomass fuel. Provide the Department with any information available to TEC concerning that experience, particularly related to the Department's questions noted above.

TEC Response
TEC is not aware of any other IGCC facility that has attempted to gasify a blend of 5% biomass and coal.

FDEP Issue 18
Indicate whether models are available for conducting heat and material balances (e.g. EPRI, DOE, etc.) and if available, provide the Department with such analysis.

TEC Response
The purpose of conducting the test burn is to evaluate the emission impacts of firing syngas related to the gasification of a 5% biomass blend. Operational issues, such as heat and material balances, will be monitored and maintained by plant personnel as part of the test burn.

FDEP Issue 19
Please provide approval by the facility Designated Representative on the test burn request and response letter.

TEC Response
Approval of the facility Designated Representative will be provided in Attachment B.

TEC appreciates the cooperation and consideration of the Department in this matter. However, based the based on the Department's additional information requests it appears that clarification of the intent and purpose of the test burn is necessary. The intent of performing a test burn is to determine the emission impacts, if any, of a proposed alternative fuel. In addition, test burns are used to resolve operational and engineering challenges that arise as a result of attempting projects of this kind. In this instance, the test burn protocol proposed by TEC places a limit on the time frame and quantity of biomass that will be gasified. Because a test burn is an evaluative procedure, a modification of the facility's operating permit is not always pursued as result of a test burn.

In recent years, TEC has performed numerous test burns of alternative fuels at all of its generating facilities. The results of these test burns, both environmental and operational, have determined if the proposed alternative fuels are feasible for the facility and if modification of the existing operating permits will be pursued. The protocols of these past test burns, which have all been reviewed and approved by the Department, have become somewhat standard in nature. The biomass test burn protocol associated with TEC's request is not substantially different from past submittals. For this reason, TEC is concerned with the

extent and nature of the Department's request for additional information. The proposed gasification of biomass in Polk Unit 1 would utilize renewable fuel sources that may have a beneficial impact on emissions from the facility. In light of this, TEC has attempted to answer any questions the Department has asked and has provided available information as appropriate. If further questions or concerns arise pertaining to the additional information TEC has provided please contact me at (813) 641-5376.

Sincerely,

Laura R. Crouch

Laura R. Crouch
Manager- Air Programs
Environmental Affairs

EA/bmr/DNL103

Enclosure

c/enc: Mr. Jerry Kissel - FDEP SW
Mr. Al Linero, FDEP

Attachment A
Typical Wood Derived Fuel Analyses

GANNON STATION
TYPICAL WOOD DERIVED FUEL ANALYSES

Parameter	Yard Waste	Wood Chips	Units
Total Moisture	29	29.00	%
Ash, as Received	1.4	0.72	%
Ash, Dry Basis	1.97	0.82	%
Carbon, as Received	35.59	41.50	%
Carbon, Dry Basis	50.13	47.78	%
Fixed Carbon, as Received	10.92	15.54	%
Fixed Carbon, Dry Basis	15.38	17.89	%
Hydrogen, as Received	3.87	5.12	%
Hydrogen, Dry Basis	5.45	5.89	%
Nitrogen, as Received	0.39	0.22	%
Nitrogen, Dry Basis	0.549	0.25	%
Sulfur, as Received	0.04	0.13	%
Sulfur, Dry Basis	0.06	0.15	%
Pounds SO_2/Million BTU, Coal	0.145	0.37	lbs. SO_2/MMBTU
Volatiles, as Received	58.68	70.60	%
Volatiles, Dry Basis	82.65	81.29	%
BTU, as Received	5832	7199.00	BTU/lb
BTU, Dry Basis	8214	8286.35	BTU/lb
BTU, Moisture-Ash Free, Calc.	8379	8354.95	BTU/lb

Attachment B
Responsible Official Certification

Responsible Official Certification

I have reviewed the previous letter of request for authorization to conduct a biomass test burn at Polk Power Station and also the response to the Department's request for additional information. I hereby certify that these documents are authentic and accurate to the best of my knowledge.

Date: 12/3/01

Signature: Mark Hornick
General Manager
Polk Power Station

Scott Sheplak

Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

December 4, 2001

Mr. Gregg Worley, Chief
Air, Radiation Technology Branch
Preconstruction/HAP Section
U.S. EPA – Region IV
61 Forsyth Street
Atlanta, Georgia 30303

Re: Tampa Electric Company, Polk Power Station

Dear Mr. Worley:

We have provided a submittal from Tampa Electric Company (TEC) concerning their Polk Power Station. That facility incorporates an IGCC electrical generating unit, which combusts synthetic gas. You may recall that we issued a Draft BACT Determination earlier this year, concluding that the unit should be fitted with an SCR; and that the permittee has disputed the Determination, with the matter scheduled to be heard by an Administrative Law Judge.

The applicant recently submitted a request to conduct a test burn of a modified syngas, which is to be generated by a combination of coal and some form of biomass. As a result of our preliminary review, we had determined that the application was incomplete and forwarded a request for additional information to the applicant. We would appreciate your review and comments on TEC's responses, as well as any input that you may have regarding the proposed test burn. Of particular interest to the Department is whether EPA can offer guidance on the impact of biomass firing or coal/biomass co-firing on SCR design and operation.

Your comments can be forwarded to my attention at the letterhead address or faxed to me at (850) 922-6979. Please be aware that our review time of 30 days expires on January 3, and that TEC had hoped to be able to conduct the test burn by the end of this calendar year. If you have any questions, please contact me at 850/921-9532.

Sincerely,

Scott M. Sheplak, P.E.
Administrator
Title V Section

cc: Mr. Jerry Kissel, FDEP-SWD
Mr. A. A. Linero, FDEP – BAR
Mr. John Bunyak, NPS-Air Quality Division

w/ enclosures

Halpin, Mike

From: Oven, Hamilton
Sent: Wednesday, November 28, 2001 10:01 AM
To: Halpin, Mike
Subject: FW: Florida DEP Problems

Since Al is out, I am sending this to you.

-----Original Message-----
From: Oven, Hamilton
Sent: Wednesday, November 28, 2001 9:58 AM
To: 'Alexander Mack'; edward.cobham@dca.state.fl.us; commonpurpose@serve.com; Goorland, Scott
Cc: Brenda Menendez; Lena Price; Shirley Collins; raymond.costello@hq.doe.gov; bbuchan@psc.state.fl.us; btrapp@psc.state.fl.us; jdean@psc.state.fl.us; tballing@psc.state.fl.us
Subject: RE: Florida DEP Problems

This project is news to me. If approved, it would require a modification to the Conditions of Certification. There is a significant difference between the Gannon Plant which has pulverized coal units and the Polk Power Station which is an Integrated Coal Gasification Combined Cycle facility with natural gas fired combustion turbines. Are they trying to gasify biomass? Brightstar has a pyrolysis process that gasifies municipal solid waste. I am not sure how compatible the coal and biomass would be in a gasification process. That may explain the detailed info request.
I have passed your inquiry to the Bureau of Air Regulation.

-----Original Message-----
From: Alexander Mack [mailto:Alexander.Mack@dca.state.fl.us]
Sent: Wednesday, November 28, 2001 8:52 AM
To: edward.cobham@dca.state.fl.us; commonpurpose@serve.com
Cc: Alexander Mack; Brenda Menendez; Lena Price; Shirley Collins; Oven, Hamilton; raymond.costello@hq.doe.gov; bbuchan@psc.state.fl.us; btrapp@psc.state.fl.us; jdean@psc.state.fl.us; tballing@psc.state.fl.us
Subject: Re: Florida DEP Problems

<< File: TEXT.htm >>
Steve is this the same engineer that approved the Tampa Electric biomass co-firing at Gannon Power Plant? What is the difference between Gannon and Polk? DEP and the EPA previously approved the co-firing.

>>> Steve Segrest <commonpurpose@serve.com> 11/28/01 07:47AM >>>
Dear Alexander and Ed,
Tampa Electric submitted a permit request to the Florida DEP last summer to conduct a co-firing test burn using energy crop fuel (closed-loop biomass) at the Polk Power Station (a DOE sponsored, Clean Coal IGCC Coal Gasification Facility). Attached is a letter from the DEP (in pdf file format) responding to this request that TECO just received on Monday (November 26th).

According to Tampa Electric, the level of detail required by the Florida DEP on this request is far beyond any they have seen in previous requests to test burn alternative fuels. As a result of the DEP's tremendous "data requests", the test burn at Polk Power Station, scheduled to occur by December 31st is now in serious jeopardy.

The December 31st date is critical, as Tampa Electric must at least perform co-firing tests in order to grandfather the Polk Power Station for the Section 45 Income Tax Credit (Credit for wind and closed loop biomass energy) before December 31st. Without the Tax Credit, which Congress has provided to encourage the development of renewable energy, the economic viability of the Energy Crop Plantation which you, the DOE, and SERBEP have supported is placed in serious jeopardy.

The Florida DEP "data requests" make even the testing of this environmentally beneficial fuel source very difficult to achieve, and clearly is not possible to achieve by December 31st-which will deprive TECO the ability to ever qualify the power plant for the Section

45 Tax Credit

Again, TECO's request is for a test burn, not a request to permit the power plant for co-firing energy crop fuel.

I am wondering if you could discuss with the Florida DEP (Mr. Scott Sheplak or perhaps the Director of Title V Section at the Florida DEP) the importance of conducting a test burn of energy crop fuel at the Polk Power Station by December 31st. Maybe a joint response to the Florida DEP could be made by the Florida Energy Office and Ray Costello of the U.S. DOE.

I am certainly NOT asking for you to provide any letter of support for TECO, or to get into any engineering issues. My request is for you inform the DEP on how this test burn directly supports Federal and State of Florida efforts to develop renewable energy resources in Florida.

Unless some compromise can be achieved on the DEP "data requirements", allowing a test burn by December 31st, all of our hard work in developing energy crops is seriously jeopardized. What I fear is that this goes through a maze of administrative levels at the DEP, finally allowing TECO to perform the test burn in say March of 2002 -- where qualifying the power plant for the Section 45 Tax Credit is lost forever.

Perhaps I need to be clearer on the Section 45 Tax Credit. No grower of energy crop closed loop biomass benefits directly from the Tax Credit (the Tax Credit can only be taken by the Generator of electricity). The economics of what an electric utility could pay for fuel and modify their power plants to co-fire the fuel is significantly enhanced.

Thank you,
Steve Segrest
813 987 9728

Department of Environmental Protection

Jeb Bush
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

David B. Struhs
Secretary

November 20, 2001

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Ms. Dru Latchman
Associate Engineer – Environmental Affairs
Tampa Electric Company
P.O. Box 111
Tampa, Florida 33601

Re: Proposed Biomass Test Burn
Polk Power Station Unit 1
Facility ID No. 1050233

Dear Ms. Latchman:

The Department is in receipt of the your request for authorization to conduct a baseline test burn to establish the representative emissions from Unit 1 prior to the introduction of biomass into the gasifier on a more permanent basis.

TEC has proposed to conduct a test burn for a period of 28 days to allow TEC to evaluate the impacts of the material on the fuel handling systems and other associated process equipment as well as evaluate the effects of firing syngas produced from a blend of biomass and other currently permitted fuels. The Department finds that the request is incomplete. In order to continue processing your request, the Department will need the additional information below. Should your response to any of these items require new calculations, please submit the new calculations, assumptions, reference material and appropriate pages of the Department's permit application form.

1. A generic description of each specific biomass fuel contemplated for gasification. Please indicate whether any of the material has been subjected to any treatment processes (e.g. pressure treated wood).
2. The source(s) of the planned biomass fuel(s) including an ultimate analysis of each specific fuel contemplated for gasification. Please include heat value, moisture content and metals within these analyses. Provide the same data for the coal that is to be blended. Indicate how the fuel will be transported to Polk Power Station.
3. Wood materials at existing biomass cogeneration facilities have been found to contain measurable amounts of arsenic, cadmium, chromium, copper, fluorides, lead, and mercury. Does the current gasification system remove these types of contaminants? Please explain.
4. The estimated annual quantity of each fuel available by supplier and estimated annual gasifier throughput at the proposed maximum blend rate of 5%.
5. A general description of how the existing handling and feed systems will be utilized with the biomass fuel. Please explain if changes in handling systems or methods are to be utilized (e.g. sizing, drying, pulverizing, etc.) and how moisture removal and disposal will be accommodated.
6. Written confirmation by the manufacturer of the gasifier, that it is currently capable of accommodating each specifically proposed fuel mix of biomass.
7. Based upon Department information, one of the largest impediments to the widespread use of biomass is its tendency to form unmanageable ash deposits. Accordingly, provide the estimated impact on the quantity and quality (chemical make-up) of gasifier residuals (ash or slag) generated and how TEC intends to dispose of the newly composed "non-coal" ash or slag. Please indicate whether the coal/biomass ash or slag is to be segregated from that produced by coal only.
8. The estimated impact to the syngas composition, based upon mathematical analyses of actual syngas composition blended at the proposed ratio. Ensure that halogen (e.g. chlorine) and alkali levels (e.g. potassium, sodium) are included.

U.S. Postal Service
CERTIFIED MAIN RECEIPT
(Domestic Mail Only: No Insurance Coverage Provided)

7000 0520 0020 9371 1779

Ms. Dru Latchman

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Certified Fee	
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Ms. Dru Latchman
Street, Apt. No.; or PO Box No.
P.O. Box 111
City, State, ZIP+ 4
Tampa, Florida 33601

PS Form 3800, February 2000 See Reverse for Instructions

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- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
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- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:
Ms. Dru Latchman
Associate Engineer -
Environmental Affairs
Tampa Electric Company
P.O. Box 111
Tampa, Florida 33601

A. Received by *(Please Print Clearly)* B. Date of Delivery

C. Signature
X B. Latchman ☐ Agent ☐ Addressee

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

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PS Form 3811, July 1999 Domestic Return Receipt 102595-00-M-0952

9. Written confirmation by the manufacturer of the combustion turbine, that it is currently capable of accommodating each specifically proposed syngas fuel mix of biomass.
10. Written confirmation by the manufacturer of the HRSG, that it is currently capable of accommodating each specifically proposed fuel mix of biomass.
11. The Department understands that TEC is currently experiencing deposit buildups in the HRSG. Please estimate the impacts to the quality and quantity of these deposits.
12. A summary of the estimated emission changes for each criteria pollutant at TEC's proposed maximum blend of 5% for each biomass fuel contemplated. All assumptions should be clearly stated.
13. A modeling analysis to evaluate ambient impacts for any criteria pollutant where emissions are estimated to increase beyond the PSD thresholds.
14. The past 2 year emissions of PSD pollutants.
15. The Department has made a recent determination that Polk Unit 1 should be fitted with an SCR. In the event that this is ultimately required, please discuss TEC's expectations regarding the performance of the SCR in light of the proposed change in (gasified) fuel slate.
16. Additional approvals for the test-burn should be sought from the appropriate regulating agencies on issues such as biomass storage, fuel pile storm-water runoff, etc.
17. Indicate whether other IGCC facilities (with an entrained-flow gasifier) have combusted a blend of coal and biomass fuel. Provide the Department with any information available to TEC concerning that experience, particularly related to the Department's questions noted above.
18. Indicate whether models are available for conducting heat and material balances (e.g. EPRI, DOE, etc.) and if available, provide the Department with such analyses.
19. Please provide an approval by the facility Designated Representative on the test burn request and response letter.

We will include the EPA and the National Park Service within this review. Should we receive written comments, we will forward them to you when received and they will comprise part of this completeness review.

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. Please note that per Rule 62-4.055(1): *"The applicant shall have ninety days after the Department mails a timely request for additional information to submit that information to the Department."*

If you have any questions, please call me at 850/921-9532 or Al Linero at 850/921-9523.

Sincerely,

Scott M. Sheplak, P.E.
Administrator
Title V Section

cc: Mr. Jerry Kissel, FDEP-SWD
Mr. A.A. Linero, FDEP-BAR

11/20/01 cc: Mike Halpin
Reading File
Mailed 11/20/01

Copy
mtg Hilpi

TAMPA ELECTRIC

RECEIVED

OCT 25 2001

BUREAU OF AIR REGULATION

October 24, 2001

Mr. Clair Fancy
Chief Bureau of Air Regulation
Florida Department of Environmental Protection
111 South Magnolia Drive, Suite 4
Tallahassee, FL 32301

Via FedEx
Airbill No. 7901 9545 4825

Re: Tampa Electric Company (TEC)
Polk Power Station
Biomass Test Burn Project No. 1050233-010

Dear Mr. Fancy:

Tampa Electric Company (TEC) requests permission to conduct a test burn at Polk Power Station (PPS) Unit 1 under the authority of the current Title V operating permit (PSD-FL-194). The test burn would be conducted to test the feasibility of firing syngas produced from the gasification of a biomass based renewable resource fuel (biomass) blended with other currently permitted fuels (coal and petcoke). Biomass fuel is defined here as a renewable resource fuel consisting primarily of natural vegetative matter.

TEC requests authorization to conduct the comparison test burn for a period of up to 28-days (see Attachment A for details). This will allow TEC to evaluate the impacts of the material on the fuel handling systems and other associated process equipment as well as evaluate the effects, if any, of firing syngas produced from the gasification of a blend of biomass and other currently permitted fuels.

TEC will conduct a baseline test burn to establish the representative emissions from Unit 1 prior to the introduction of biomass into the gasifier. Baseline testing will last up to seven days and will consist of sulfur dioxide (SO_2) and nitrogen oxides (NO_x) data collection through the use of Continuous Emissions Monitors (CEMs).

Following the baseline test, TEC will conduct a biomass blend test burn of syngas produced from the gasification of up to 5% biomass and up to 95% fuel blend. Biomass blend testing will last up to 21 days and will consist of sulfur dioxide (SO_2) and nitrogen oxides (NO_x) data collection through the use CEMs. Because of the nature of the gasification process, it is logical to assume that particulate matter emissions and sulfuric acid mist emissions will not be affected by the firing of the syngas produced from the gasification of the biomass blend.

The baseline and biomass blend test burns will be conducted under standard PPS operating conditions and, to the extent possible, at least 90% of the maximum permitted heat input. Data will be compiled and results reported to the Florida Department of Environmental Protection (DEP) within 60 days of the

completion of the test burn. Any residual biomass fuel stock that is on hand after the test burn will be consumed immediately after the test burn is completed. TEC will bring enough fuel on-site to supply the needs of the test burn, with perhaps a slight margin to compensate for unforeseen circumstances. TEC intends to begin the test burn upon receiving approval from DEP.

PPS is interested in firing syngas produced from the gasification of biomass for several reasons. First, certain governmental initiatives may make it financially advantageous to gasify biomass at the PPS. The possible economic advantages of one particular program are currently under investigation, and this test burn is being proposed to allow for further evaluation. Second, biomass is a renewable resource, and utilizing it as a fuel source at Polk Power Station will help support the Company's commitment to the use of renewable energy sources. Biomass contains less sulfur than coal, so there may be a measurable reduction in SO_2 emissions. Given the variability of fuel pricing, biomass may be less expensive then coal and may improve the economic feasibility of PPS.

TEC appreciates the cooperation and consideration of the Department in this matter. If you have any questions or comments pertaining to this request please direct them to Dru Latchman at (813) 641-5034.

Sincerely,

Dlatchman

Dru Latchman
Associate Engineer
Environmental Affairs

EA/br/DNL102

Enclosure

c/enc: Mr. Jerry Kissel - FDEP SW
Mr. Scott Sheplak, FDEP

Attachment A
Polk Power Station Unit 1
Biomass Test Protocol

Tampa Electric Company (TEC) proposes to conduct a test burn at Polk Power Station Unit 1 (PPS) to compare the standard fuel blend of up to 60% petcoke and coal by weight to a blend containing up to 5% biomass and 95% of the standard blend.

The baseline test burn will evaluate SO_2 and NO_x emissions as a result of firing syngas produced from the gasification of a petcoke and coal fuel blend consisting of up to 60% petcoke. This baseline test will last for up to seven days to facilitate collection of representative data.

The biomass blend test burn will evaluate the SO_2 and NO_x emissions produced from the gasification of the above mentioned biomass fuel blend. This biomass blend test burn will last for up to 21 days to facilitate collection of representative data. Any residual biomass fuel stock that is on hand after the test burn will be consumed immediately after the test burn is completed.

The SO_2 and NO_x test burn data will be collected and analyzed using the methodologies found in Table 1. Prior to blending, fuel testing will be done on the standard fuel blend and the biomass fuel individually. Continuous emissions monitors (CEMS), located in the combustion turbine stack, will be used to collect representative data for SO_2 and NO_x, emissions during the test burn. CEMS will be quality assured pursuant to 40 CFR 75, Appendix B. The data assessment report from 40 CFR 60, Appendix F, for the most recent relative accuracy test audit (RATA) and most recent cylinder gas audit (CGA), will be submitted with the test burn report.

During these tests, PPS Unit 1 will be operated at a minimum of 90% of the maximum permitted heat input. Upon completion of all testing, TEC will compile test results in a report to be submitted to the Florida Department of Environmental Protection within 60 days of completion of the test burn.

Table 1. Summary of data collection and monitoring methodologies to be used during the PPS biomass test burn.

Test	SO_2	NO_x	Fuel Analysis
Baseline Test 7 Days	CEM Data[1]	CEM Data[1]	Weekly composite fuel analysis[2]
Biomass Test 21 Days	CEM Data[1]	CEM Data[1]	Weekly composite fuel analysis[2]

[1]Equivalent CEM data will be used in lieu of stack test data.

[2]Composite weekly fuel analysis results will be supplied during the baseline and test burn. Fuel analyses will include the following:

Fuel Analysis: Sulfur, wt. %,Volatiles, Content, wt. %, Nitrogen, wt. %, Ash, wt. %, Calorific Value, BTU/#, Carbon, wt. %, Moisture, wt. %

File

Department of Environmental Protection

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

Jeb Bush
Governor

David B. Struhs
Secretary

July 25, 2001

Mr. Mark J. Hornick
General Manager, Polk Power Station
Tampa Electric Company
P. O. Box 111
Tampa, Florida 33601-0111

Re: Request for Guidance
Polk Power Station

Dear Mr. Hornick:

The Title V Section has received and reviewed your request for guidance to combust a combination of syngas and fuel oil dated July 10, 2001. Our review of your current operating permit has yielded the following:

The current Title V operating permit for the facility allows for the combustion of either syngas or Number 2 fuel oil in Polk Unit 1. Syngas is permitted as the primary fuel. Fuel oil is permitted to be fired no more than 876 hours per year, determined by using an annual capacity factor calculation. Recordkeeping requirements are included in the permit to assure compliance with this capacity factor limitation. The permit contains emission limits when firing either fuel is fired. The permit does not address emission limits when a combination of the two fuels are fired.

Since there are no emission limits included in the permit for the co-firing of syngas and fuel oil, it is presumed that co-firing of the two fuels was not anticipated at the time Polk Unit 1 underwent PSD and Preconstruction review. Since the Title V operating permit is dependent on these permits, it appears that the co-firing of the two fuels is not currently allowed.

If you have any other questions, please contact Edward J. Svec at 850/921-8985.

Sincerely,

Scott M. Sheplak, P.E.
Administrator
Title V Section

SMS/es

copy furnished to:
Mr. A. Linero, P.E., FDEP, NSR
Mr. J. Kissel, P.E., FDEP, SWD

Department of Environmental Protection

Jeb Bush
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

David B. Struhs
Secretary

July 23, 2001

Ms. Laura R. Crouch
Manager – Air Programs
Environmental Affairs
Tampa Electric Company
6499 U.S. Highway 41 North
Apollo Beach, FL 33572-9200

Re: Tampa Electric Polk Power Station
Coal Residual Beneficiation

Dear Ms. Crouch:

The Department has received your letter dated June 25, 2001, which requests confirmation that the coal residual beneficiation process planned for the Polk Power Station qualifies for the generic emissions unit exemption pursuant to Rule 62-210.300(3)(b)1., F.A.C.

As the potential particulate matter emissions from this process are projected to be less than one ton per year; there is no unit-specific applicable requirement; and the particulate matter emissions, in combination with the emissions of other units and activities at the facility, would not result in a modification subject to preconstruction review requirements; the Department hereby confirms that the coal residual beneficiation process planned for the Polk Power Station qualifies for the generic emissions unit permit exemption pursuant to Rule 62-210.300(3)(b)1., F.A.C.

At the time of application for renewal of the Title V Operation Permit for this facility, please include this emissions unit in the list of Insignificant Emissions Units.

Please contact Mr. Buck Oven of the Department's Siting Coordination Office to address any necessary revisions to the Polk Power Station's Site Certification.

Sincerely,

for C. H. Fancy, P.E., Chief
Bureau of Air Regulation

c: Mr. Buck Oven, FDEP
Mr. Bill Thomas, SWD-FDEP

June 25, 2001

Mr. Scott M. Sheplak, P.E.
Administrator, Title V Section
Florida Department of Environmental Protection
111 South Magnolia Drive, Suite 4
Tallahassee, Florida 32301

Via FedEx
Airbill No. 7900 8642 6427

Re: Tampa Electric Polk Power Station
Coal Residual Beneficiation

Dear Mr. Sheplak:

Tampa Electric Company (TEC) presently generates coal residual material, or slag, at its Polk Power Station as a by-product of the coal gasification process. An air source construction permit application to handle, store, beneficiate, and combust this by-product material at TEC's Big Bend Station was previously submitted to the Department and the Hillsborough County Environmental Protection Commission in May 2001. TEC now plans to install and operate the coal residual beneficiation process (i.e., the Charah Environmental Slag Beneficiation Process) at the Polk Power Station instead of the Big Bend Station. Coal residual beneficiated at the Polk Power Station will transferred by truck to the Big Bend Station for use as a supplemental fuel.

The coal residual beneficiation process is essentially a wet process and therefore will have insignificant fugitive particulate matter (PM) emissions. A process description, process flow diagram, and PM emission estimates are included with this letter as Attachments I through III, respectively. A professional engineer certification is provided in Attachment IV.

Estimates of potential fugitive PM emissions are projected to be less than one ton per year. Accordingly, the coal residual beneficiation process qualifies for the generic emissions unit exemption pursuant to Rule 62-210.300(3)(b)1., F.A.C. Department confirmation that the proposed Polk Power Station coal residual beneficiation process is exempt from permitting is requested. If you have any questions regarding this matter, please feel free to contact me at (813) 641-5376.

Sincerely,

Laura R. Crouch
Manager-Air Programs
Environmental Affairs

EA\tl\SKT262

Enclosures

c: Mr. Jerry Kissel, FDEP SW

ATTACHMENT I

TAMPA ELECTRIC COMPANY
POLK POWER STATION

COAL RESIDUAL BENEFICIATION
PROCESS DESCRIPTION

Coal residual material, or slag, is a by-product of the Polk Power Station (PPS) coal gasification process. Tampa Electric Company (TEC) plans to install the Charah Environmental slag beneficiation process at the PPS to process this by-product coal residual and produce a material suitable for use as a supplemental fuel at TEC's Big Bend Station. The Charah beneficiation process is essentially a wet process and therefore will have insignificant emissions of particulate matter. A process flow diagram of the Charah beneficiation process is provided as Attachment II. A description of the Charah beneficiation process follows this introduction.

Slag currently stockpiled at the PPS will be transported to the inlet feed hopper of the beneficiation process by a rubber tired front-end loader. The slag is then transferred from the feed hopper to the slurry blunger by means of a conveyor belt. Water is added and the slag crushed in the blunger to produce a slag slurry that is subsequently pumped to a three deck primary screen.

Spray water is added at the primary screen to wash fines from the +0.5 inch oversize material. The +0.5 inch oversized material will be recycled to the blunger for recrushing. The primary screen will produce a washed 20 mesh to 0.5 inch material that will be transported of-site by truck and sold as an aggregate product. Material passing through the bottom of the primary screen will be pumped to a high frequency dewatering screen.

Underflow from the high frequency dewatering screen will be pumped to cyclones for additional water separation. Underflow from the cyclones will combine with the oversize material from the high frequency dewatering screen to feed a centrifuge for final dewatering. The centrifuge produces a moist, beneficiated coal residual that will be transported from the PPS by truck for use at the Big Bend Station as a supplemental fuel.

The overheads of the cyclones will combine with the centrifuge underflow and be pumped to a thickener. Cationic and anionic polymers will be added to the thickener to improves solids concentration. Underflow (i.e., concentrated solids) from the thickener will be pumped to a filter press for dewatering. Overflow water from the thickener will be recycled and used as process water.

Dewatered cake from the filter press will be initially trucked to a landfill for disposal. In the future, this material may also be blended with the beneficiated coal residual. The underflow from the filter press will be recycled to the feed section of the thickener.

ATTACHMENT II

TAMPA ELECTRIC COMPANY
POLK POWER STATION

COAL RESIDUAL BENEFICIATION
PROCESS FLOW DIAGRAM

ATTACHMENT III

TAMPA ELECTRIC COMPANY
POLK POWER STATION

COAL RESIDUAL BENEFICIATION
EMISSION ESTIMATES

As previously noted in Attachment I (Process Description), the Charah beneficiation process is essentially a wet process and therefore will have insignificant emissions of particulate matter (PM).

Potential fugitive PM emission points include:

- Transfer of slag from the existing slag stockpile to the beneficiation process inlet feed hopper by front-end loader;
- Transfer of slag from the inlet feed hopper to the slurry blunger; and
- Truck traffic on plant roadways.

The slag inlet feed rate will be up to 100 tons per hour, on a dry basis. Up to 200 tons per day of beneficiated coal residual will be produced by the Charah Environmental process.

Estimates of potential fugitive PM/PM_{10} emissions due to slag handling (upstream of the slurry blunger) are projected to be less than one ton per year using EPA AP-42 algorithms. Details of the potential fugitive PM/PM_{10} emission estimates are provided on the attached worksheets.

Downstream of the slurry blunger, fugitive PM/PM_{10} emissions will be minimal since the coal residual will be in a slurry form or as a moist, solid material. Fugitive PM/PM_{10} emissions due to truck traffic will be insignificant since all PPS roadways are paved and the trucks will be hauling a moist material.

ATTACHMENT IV

TAMPA ELECTRIC COMPANY
POLK POWER STATION
COAL RESIDUAL BENEFICIATION

Professional Engineer Certification

Professional Engineer Statement:

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

(1) To the best of my knowledge, there is reasonable assurance that the permit exemption requested by Tampa Electric Company for the Polk Power Station residual coal beneficiation process permit exemption is in accordance with all applicable Florida Statutes and rules of the Department of Environmental Protection; and

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

_____ _____

Signature Date

(seal)

* Certification is applicable to the permit exemption request for the Tampa Electric Company Polk Power Station coal residual beneficiation process.