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BUREAU OF AIR REGULATION

October 21, 2002

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

Via FedEx
Airbill No. 7927 6027 6336

Re: Tampa Electric Company
Big Bend Station
FDEP File No. 0570039-010-AV
Request for Additional Information
Use of Nalcoal 7899® Binder as a Coal Dust Suppressant

Dear Mr. Sheplak:

Tampa Electric Company (TEC) has received your letter dated September 6, 2002 requesting additional information with regards to the use of Nalcoal® 7899 coal dust suppressant binder. 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 Item 1

It is your intent to use this product in addition to those binders previously approved on February 15 and September 16, 2002, or instead of?

TEC Response

TEC plans to use the Nalcoal 7899® binder in addition to the previously approved binders.

FDEP Item 2

Please provide a detailed evaluation of the effects of combustion of this polymerized hydrocarbon-based material, comparing future potential emissions to the past actual emissions from these boilers. Include a description of the type(s) of control device(s), their efficiencies, and the means of disposal of the collected ash.

TEC Response

As previously advised, the "as-received" Nalcoal 7899® binder is a light blue liquid comprised primarily of a high molecular weight vinyl acetate/ethylene copolymer (organic solids) and water. "As-received" refers to the liquid binder that is applied by the coal supplier. TEC plans to receive coal that has been previously treated with the Nalcoal® 7899 binder (i.e., on a dry basis following curing of the liquid binder). The high combustion temperatures and residence times occurring in the Big Bend Station coal-fired furnaces would be expected to result in essentially complete oxidation of the Nalcoal 7899® copolymer organic solids to carbon dioxide (CO2) and water (H2O).

The Nalcoal® 7899 binder contains 0.2 weight percent ash and 0.02 weight percent sulfur on a cured (i.e., dry) basis. These ash and sulfur levels are well below the levels found in the parent (i.e., untreated)

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coal. The dosage rate of the Nalcoal® 7899 binder is approximately 4 to 8 pounds of as-received liquid binder per ton of coal. Following curing, each ton of treated coal will contain approximately 2 to 4 pounds of binder copolymer solids. The Nalcoal® 7899 binder therefore represents a very small portion of the treated coal (i.e., from 0.1 to 0.2 weight percent on a dry binder basis).

In 2001, a total of 4,104,033 tons of coal was burned at the Big Bend Station. Assuming that all of the coal burned at the Big Bend Station is treated with the Nalcoal® 7899 binder (a conservative, unrealistic premise), up to 8,208 tons of binder copolymer solids will be used in a year based on the 2001 coal consumption rate. Uncontrolled PM and SO₂ emissions (i.e., upstream of the existing air pollution control systems) resulting from the combustion of these binder copolymer solids, based on binder copolymer ash and sulfur contents of 0.2 and 0.02 weight percent, respectively, are calculated to be 16.4 and 3.3 tons per year respectively. The Big Bend Station boilers are all equipped with electrostatic precipitators (ESPs) for PM control and wet flue gas desulfurization (FGD) technology for abatement of SO₂ emissions. Assuming conservative control efficiencies of 99.0 and 90.0 percent for the ESP and FGD control systems, respectively, controlled PM and SO₂ emissions (i.e., downstream of the existing air pollution control systems) resulting from the combustion of these binder copolymer solids are calculated to be only 0.16 and 0.33 tons per year, respectively. These very low emission estimates are conservative (i.e., over-estimations) since not all of the Big Bend Station coal will be treated with the Nalcoal® 7899 binder and since actual ESP and FGD control efficiencies are higher than the assumed levels. As stated in TEC's August 6, 2001 request to the Department, no changes in emissions rates of pollutants that are primarily affected by combustion process conditions (i.e., NO_x, CO, and VOCs) are expected since boiler operating conditions will not change due to use of the Nalcoal® 7899 binder treated coal.

The emission estimates provided above are also conservative in that the estimates are based on the premise that the Nalcoal® 7899 binder copolymer solids will not displace any coal; i.e., emissions resulting from binder copolymer combustion were assumed to be additive to coal combustion emissions. The higher heating value (HHV) of the binder copolymer solids (based on an ultimate dry binder analysis of 59.76% carbon, 6.46% hydrogen, 0.18% nitrogen, 33.38% oxygen, and 0.02% sulfur) is 12,370 Btu/lb. The average heat content of coal combusted at the Big Bend Station is approximately 12,000 Btu/lb, HHV. Accordingly, the Nalcoal® 7899 binder copolymer solids will completely displace coal on a mass basis. Since the Nalcoal® 7899 binder copolymer solids contain significantly less ash and sulfur than coal, displacement of coal by the Nalcoal® 7899 binder will result in lower potential PM and SO₂ emissions. Due to the small concentration of applied Nalcoal® 7899 binder, these emission decreases will be insignificant.

In summary, coal and coal treated with a small amount of the Nalcoal® 7899 binder (i.e., from 0.1 to 0.2 weight percent on a dry binder basis) will have essentially the same characteristics and emission rates.

Fly ash collected by the ESPs at the Big Bend Station is transferred pneumatically to storage silos and then transported by truck for off-site use.

FDEP Item 3

The Material Safety Data Sheet lists several hazardous air pollutants (HAPs) as constituents of this product. Please address the potential increase in hazardous air pollutant (HAP) emissions, as well as all criteria pollutant emissions, as a result of the combustion of this polymerized hydrocarbon-based material.

TEC Response

Please see the response to FDEP Item 2 above. Due to the small concentration of Nalcoal® 7899 binder in the treated coal (i.e., from 0.1 to 0.2 weight percent on a dry binder basis), the displacement of coal by the Nalcoal® 7899 binder, essentially complete oxidation of the binder material in the Big Bend Station coal-fired furnaces, and removal of air pollutants by the existing ESP and FGD control systems, any

change in HAP or criteria pollutant emission rates due to the combustion of Nalcoal® 7899 binder treated coal at the Big Bend Station will be negligible.

It is noted that the Nalcoal® 7899 binder Material Safety Data Sheet (MSDS) lists one HAP (glycol ethers) in Section 15., Regulatory Information. Since TEC plans to receive coal that has been previously treated with the Nalcoal® 7899 binder (i.e., on a dry basis following curing of the binder), the treated coal would not be expected to contain any volatile materials (i.e., water or glycol ethers) that were initially present in the as-received liquid binder.

FDEP Item 4

The Material Safety Data Sheet lists several hazardous/heavy metals as constituents of this product. Please address the potential increase in emissions of heavy metals as a result of the combustion of this polymerized hydrocarbon-based material.

TEC Response

Please see the response to FDEP Item 2 above. Due to the small concentration of Nalcoal® 7899 binder in the treated coal (i.e., from 0.1 to 0.2 weight percent on a dry binder basis), the displacement of coal by the Nalcoal® 7899 binder, essentially complete oxidation of the binder material in the Big Bend Station coal-fired furnaces, and removal of PM by the existing ESP and FGD control systems, any change in heavy metal emission rates due to the combustion of Nalcoal® 7899 binder treated coal at the Big Bend Station will be negligible.

For example, the Nalcoal® 7899 Product Information Bulletin indicates that the as-received liquid binder contains lead in a concentration of 0.86 parts per million by weight (ppmw). The concentrations of other heavy metals of concern are all much lower; e.g., arsenic concentration is 0.32 ppmw. Assuming that all of the coal burned at the Big Bend Station is treated with the Nalcoal® 7899 binder, up to 16,416 tons of as-received liquid binder will be used in a year based on the 2001 coal consumption rate. This amount of as-received liquid binder will contain 0.014 tons of lead based on a concentration of 0.86 parts per million by weight (ppmw). Lead contained in the Nalcoal® 7899 binder would be expected to be emitted in the solid phase (i.e., as a lead oxide particulate) following combustion. Assuming all lead is emitted as fly ash, uncontrolled lead emissions (i.e., upstream of the existing air pollution control systems) resulting from the combustion of the Nalcoal® 7899 binder are 0.014 tons per year (as Pb). Assuming a conservative 99.0 percent ESP lead removal efficiency, controlled lead emissions are estimated to be only 0.00014 tons per year.

This estimate conservatively assumes no displacement of coal by the Nalcoal® 7899 binder. Since the Nalcoal® 7899 binder contains significantly lower concentrations of heavy metals than coal, displacement of coal by the Nalcoal® 7899 binder will result in lower potential heavy metal emissions. Due to the small amount of applied Nalcoal® 7899 binder, these emission decreases will be insignificant. In summary, coal and coal treated with a small concentration of the Nalcoal® 7899 binder (i.e., from 0.1

to 0.2 weight percent on a cured binder basis) will have essentially the same characteristics and heavy metal emission rates.

FDEP Item 5

The Material Safety Data Sheet lists several halogens as constituents of this product. Please address the potential increase in emissions of individual (particularly fluoride) and total halogens as a result of the combustion of this polymerized hydrocarbon-based material.

TEC Response

Please see the response to FDEP Item 2 above. Due to the small concentration of Nalcoal® 7899 binder in the treated coal (i.e., from 0.1 to 0.2 weight percent on a dry binder basis), the displacement of coal by the Nalcoal® 7899 binder, essentially complete oxidation of the binder material in the Big Bend Station coal-fired furnaces, and removal of air pollutants by the existing ESP and FGD control systems, any change in halogen emission rates due to the combustion of Nalcoal® 7899 binder treated coal at the Big Bend Station will be negligible.

For example, the Nalcoal® 7899 Product Information Bulletin indicates that the as-received liquid binder contains fluorine in a concentration of 22 parts per million by weight (ppmw). Assuming that all of the coal burned at the Big Bend Station is treated with the Nalcoal® 7899 binder, up to 16,416 tons of as-received binder will be used in a year based on the 2001 coal consumption rate. This amount of as-received liquid binder will contain 0.36 tons of fluorine based on a concentration of 22 parts per million by weight (ppmw). Fluorine contained in the Nalcoal® 7899 binder would be expected to be emitted in the gaseous phase (i.e., as hydrogen fluoride [HF]) following combustion. The uncontrolled HF emission rate (i.e., upstream of the existing air pollution control systems) resulting from the combustion of the Nalcoal® 7899 binder is estimated at 0.38 tons per year. Assuming a 34.0 percent FGD HF removal efficiency, controlled HF emissions are estimated to be only 0.25 tons per year.

This estimate conservatively assumes no displacement of coal by the Nalcoal® 7899 binder. Since the Nalcoal® 7899 binder contains significantly lower concentrations of halogens than coal, displacement of coal by the Nalcoal® 7899 binder will result in lower potential halogen emissions. Due to the small amount of applied Nalcoal® 7899 binder, these emission decreases will be insignificant. In summary, coal and coal treated with a small concentration of the Nalcoal® 7899 binder (i.e., from 0.1 to 0.2 weight percent on a cured binder basis) will have essentially the same characteristics and halogen emission rates.

FDEP Item 6

Please provide information regarding the “volatile matter” which comprises 53-56% of the as-received material. What is the volatile matter if it is not VOC? Does “as-received” indicate the liquid phase that is received at the coal supplier or the solid phase that is received with your coal?

TEC Response

The “as-received” Nalcoal® 7899 binder is a liquid copolymer that consists of: (a) 52.5 weight percent proprietary emulsion of high molecular weight vinyl acetate/ethylene copolymer (organic solids), (b) 1.0 percent by weight diethylene glycol (aqueous diethylene glycol solution contains approximately 20 percent by weight diethylene glycol and 80 percent by weight water), and (c) 46.5 weight percent water. Range of binder organic solids is 52 to 55 weight percent and range of water content is 45 to 48 weight percent. Accordingly, the majority (i.e., 97.8%) of the Nalcoal® 7899 binder volatile material is water with the balance (i.e., 2.2%) diethylene glycol.

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"As-received" refers to the liquid Nalcoal® 7899 binder that is applied by the coal supplier. Since TEC plans to receive coal that has been previously treated with the Nalcoal® 7899 binder (i.e., on a dry basis following curing of the binder), the treated coal would not be expected to contain any volatile materials (i.e., water or glycol ethers) that were initially present in the as-received liquid binder.

FDEP Issue 7

Please provide information on the percentage, by weight, that this material will comprise in the coal, as it is being combusted.

TEC Response

The treated coal will contain from 0.1 to 0.2 weight percent Nalcoal® 7899 binder on a cured binder basis (i.e., on a dry basis).

FDEP Issue 8

What is the Btu value of the dried remainder of this product that is bound to your coal?

TEC Response

The higher heating value (HHV) of the dry, binder copolymer solids (based on an ultimate binder analysis of 59.76% carbon, 6.46% hydrogen, 0.18% nitrogen, 33.38% oxygen, and 0.02% sulfur) is 12,370 Btu/lb.

As noted above, the treated coal will contain from 0.1 to 0.2 weight percent Nalcoal® 7899 binder on a dry binder basis. The average heat content of coal combusted at the Big Bend Station is approximately 12,000 Btu/lb, HHV. The treated coal will therefore have an average heat content of 12,001 Btu/lb. Accordingly, there will no significant difference in the heat content of coal and the Nalcoal® 7899 binder treated coal.

TEC understands that with the submission of this additional information, the Department will continue processing our request to combust Nalcoal® 7899 binder treated coal at the Big Bend Station. If you have any further questions regarding this matter, please contact me at (813) 641-5033.

Sincerely,

Shelly Castro
for

Shelly Castro
Associate Engineer
Environmental Affairs

EA/bmr/SSC136

Enclosure

c/enc: Mr. Jerry Campbell, EPCHC
Mr. Jonathan Holtom, FDEP
Mr. Jerry Kissel, FDEP-SW District

**Big Bend Synthetic Fuel
Nalcoal 7899 Binder**

A. Heat Content

Substance	Ultimate Analysis		LHV (Btu/lb)	HHV (Btu/lb)	Heat Content (LHV)		Heat Content (HHV)	
	As-Received Wt %	Dry Wt %			As-Received (Btu/lb)	Dry (Btu/lb)	As-Received (Btu/lb)	Dry (Btu/lb)
Carbon	33.12	59.76	14,093	14,093	4,668	8,422	4,668	8,422
Hydrogen	3.58	6.46	51,623	61,100	1,848	3,335	2,187	3,947
Nitrogen	0.10	0.18	0	0	0	0	0	0
Oxygen	18.50	33.38	0	0	0	0	0	0
Sulfur	0.01	0.02	3,983	3,983	0	1	0	1
Water	44.69		0	0	0	0	0	0
Totals	100.00	99.80			6,516	11,758	6,855	12,370

B. PM, Pb, HF, HCl and SO₂ Emissions

2001 Coal Use:	4,104,033	ton/yr
Binder Ash:	0.20	weight %
Binder S:	0.02	weight %
Binder Pb:	0.86	ppmw (wet)
Binder F:	22.00	ppmw (wet)
Binder Cl:	170.00	ppmw (wet)
Binder Rate (dry):	4.00	lb / ton coal
Binder Rate (wet):	8.00	lb / ton coal
ESP PM/Pb Efficiency	99.00	percent
FGD SO ₂ Efficiency	90.00	percent
FGD HF Efficiency	34.00	percent
FGD HCl Efficiency	94.00	percent
Binder Use (dry):	8,208	ton/yr
Binder Use (wet):	16,416	ton/yr
PM (uncontrolled)	16.4	ton/yr
PM (controlled)	0.16	ton/yr
SO ₂ (uncontrolled)	3.3	ton/yr
SO ₂ (controlled)	0.33	ton/yr
Pb (uncontrolled)	0.014	ton/yr
Pb (controlled)	0.00014	ton/yr
HF (uncontrolled)	0.38	ton/yr
HF (controlled)	0.25	ton/yr
HCl (uncontrolled)	2.9	ton/yr
HCl (controlled)	0.17	ton/yr
Btu (coal, HHV):	12,000	Btu/lb
Btu (dry binder, HHV):	12,370	Btu/lb
Btu (treated coal, HHV)	12,001	Btu/lb