SEMINOLE ELECTRIC COOPERATIVE INCORPORATED

January 15, 1997

Mr. Al Linero
Florida Department of Environmental Protection
2600 Blair Stone Road, MS48
Tallahassee, FL 32399-2400

Dear Al:

Attached is a draft Preliminary Determination for Seminole's request to burn a petroleum coke/coal fuel blend, and to use No. 2 fuel oil for limited load generation.

I have also enclosed a disk of this draft in Microsoft Word format. I will give you a call next weed to discuss the overall status of Seminole's request.

If you have any questions before then, please give me a call.

Sincerely,

Kenneth L. Bachor

Kenneth L. Bachor, P.E.
Manager of Engineering

KLB/wjc

Attachment

cc: S. Arif
M. Opalinski

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DRAFT

Preliminary Determination

Seminole Electric Cooperative, Inc.
Seminole Power Plant
Units 1 & 2
Palatka, Florida

Electric Utility Steam Generating Units
Solid and Liquid Fuel-Fired Boilers
714.6 MW/unit

Permit No. PSD-FL-018

Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation

January ??, 1997

A. Applicant

Seminole Electric Cooperative, Inc.
16313 North Dale Mabry Highway
Tampa, Florida 33618-1342

B. Source Name and Location

Seminole Power Plant
Units 1 & 2
Palatka, Florida 32177

C. Source Description

The Seminole Electric Cooperative, Inc. (Seminole) power plant located in Palatka, Putnam County, Florida, is a baseload coal-fired steam electric utility generating facility. The Seminole Power Plant consists of two steam boilers (Units 1 and 2); two steam turbines; a recirculating cooling water system; coal, limestone, fly ash, and bottom ash handling equipment, a flue gas desulfurization (FGD) sludge stabilization facility; fuel oil storage tanks; water treatment facilities; a railcar maintenance facility; and other ancillary support equipment. Each boiler is equipped with electrostatic precipitators (ESPs), low-nitrogen oxide (NO_x) burners, and a FGD system to control emissions of particulate matter (PM), NO_x, and sulfur dioxide (SO_2), respectively. Units 1 and 2 each have a maximum electrical load rating of 714.6 megawatt (MW). The boilers are presently coal-fired with No. 2 fuel oil used for startups and flame stabilization.

D. Current Permit and Major Regulatory Program Status

Operation of the Seminole Power Plant is currently authorized by United States Environmental Protection Agency (EPA) Prevention of Significant Deterioration (PSD) Permit No. PSD-FL-018 and Florida Power Plant Siting Act (PPSA) Certification No. PA 78-10. In June 1996, Seminole submitted an application for a Title V operation permit; this application is presently undergoing Department review.

The initial construction of Units 1 and 2 was authorized pursuant to the PSD New Source Review (NSR) regulatory permitting program. Units 1 and 2 are subject to New Source Performance Standard (NSPS) Subpart Da - Standards of Performance for Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978. The Seminole Power Plant boilers are also subject to the Federal Acid Rain Program requirements applicable to Phase II units.

An amendment to Permit PSD-FL-018 (Attachment 1) was issued on December 11, 1995 following publication of the Department's Notice of Intent. This permit amendment authorized

Seminole to conduct performance tests on Unit 1 while firing various blends of coal and petroleum coke (petcoke). The petcoke test burns were conducted during December 1995 and January 1996. Seminole submitted a comprehensive report of the petcoke test burn results to the Department in February 1996.

E. Permit Amendment Request

On November 11, 1996, Seminole Electric Cooperative, Inc. (Seminole) submitted a request (Attachment 2) for an amendment to Permit PSD-FL-018 originally issued by EPA on August 13, 1979. The requested amendments are as follows:

- Allow co-firing of petcoke and coal in fuel blends containing up to 30 percent by weight petcoke as an alternate method of operation; and

- Allow use of No. 2 fuel oil to generate electric power during statewide emergency energy shortages to meet Florida Public Service Commission (FPSC) reserve and maximum continuous electric load requirements if coal quality, process conditions, and/or burner equipment prevents meeting demand with solid fuels only.

Following an initial review of the submitted material, the Department requested additional information in a letter to Seminole dated November 25, 1996. A meeting attended by Department staff and Seminole representatives to discuss the request was held on December 19, 1996. A response to the information requested in the Department's November 25th letter and other issues raised during the December 19th meeting was provided to the Department by Seminole in correspondence dated January 7, 1997.

F. Potentially Applicable Major Rules

Major rules that could potentially apply to this permit amendment request include the following:

- Florida Electrical Power Plant Siting, Chapter 62-217, F.A.C. and Sections 403.501-519, Florida Statutes (F.S.);

- 40 CFR 60 - Standards of Performance for New Stationary Sources, Subpart Da - "Standards of Performance for Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978" (NSPS Subpart Da) adopted by reference in Chapter 62-204, Florida Administrative Code (F.A.C.);

- Section 62-212.400, F.A.C. - "Prevention of Significant Deterioration of Air Quality", (PSD Rules); and

- Chapter 62-297, F.A.C., related to emission monitoring at stationary sources.

Seminole has requested amendments to its existing PSD permit and Site Certification. Matters related to Site Certification amendments will be handled separately by the Department's Office of Siting Coordination in accordance with Florida Power Plant Siting Act (PPSA) specified modification procedures.

As noted in Section D above, Units 1 and 2 are presently subject to the requirements of NSPS Subpart Da. In a prior opinion regarding a Kansas Power and Light facility, EPA determined that petcoke is not a fossil fuel with respect to NSPS Subpart D and Da, and therefore combustion of petcoke was not subject to the NSPS requirements. However, Seminole Units 1 and 2 will remain subject to NSPS Subpart Da requirements for the coal portion of coal and petcoke fuel blends. Petcoke SO_2 emissions will be held to each unit's historical two year annual average SO_2 emission rate.

The primary regulatory issue pertinent to Seminole's permit amendment request is that of PSD permitting applicability. Modifications which result in a *significant net emission rate increase* are classified as major modifications and therefore subject to PSD review. The procedures for determining whether a significant net emission rate increase will occur were changed by EPA in July 1992 as a result of the Wisconsin Electric Power Company (WEPCO) litigation. Prior to the WEPCO decision, the calculation of a net emission increase was based on comparing actual annual emissions for the two year period prior to the change (before case) with potential emissions following the change (after case). Another two year period (within a five year period prior to the change) could be used if it was demonstrated to be more representative of normal source operation. Unless constrained by a Federally enforceable permit condition, potential emissions would be calculated assuming continuous operation at rated capacity. This procedure is referred to as the *actual-to-potential* method.

As a result of the WEPCO litigation, the net emission increase for electric utility generating units is now determined by comparing actual emissions preceding the change with estimated future actual emissions or an *actual-to-actual* procedure. Any consecutive two year period within the preceding five years is used as the "before case". The "after case" is developed based on the projected future actual emission rates. The time period for the "after case" is the two years following the change or any other consecutive two year period within ten years after the change if that period would be more representative of normal source operations. Sources must monitor emissions for five years (or longer if the first five years are not representative of normal source operations) to document future actual emissions and to confirm that a significant net emission increase has not occurred. Increases in utilization that are unrelated to the physical change, such as demand growth, are not considered in calculating emission increases. The rationale for this exclusion is that these emission increases would have occurred in the absence of the physical change (assuming the unit was capable of increasing its capacity factor without the physical change).

Based on the petcoke test burn results, fuel analyses, historical emissions data, EPA emission factors, and evaluation of the Seminole Units 1 and 2 pollution control system capabilities, the

Department has determined that Seminole's permit amendment request is not subject to PSD review, subject to certain Federally enforceable permit conditions. A detailed evaluation of PSD applicability is provided in Section G below.

With respect to emissions monitoring, Units 1 and 2 are currently equipped with continuous emissions monitoring systems (CEMS) to monitor and record SO_2 and NO_x emission rates and continuous opacity monitoring systems (COMS) to monitor and record visible emissions. The units are also presently equipped to continuously monitor exhaust flow rates and carbon dioxide (CO_2) concentrations. On an annual basis, Units 1 and 2 are tested to determine PM emission rates. The current emissions monitoring program is conducted pursuant to NSPS Subpart Da and Acid Rain Program requirements.

G. Evaluation of PSD Applicability

The main issue regarding Seminole's permit amendment request is that of PSD review applicability. The Department's detailed assessment of this regulatory issue is provided in this section.

A brief description of the PSD review procedures resulting from the WEPCO litigation was provided above in Section F. Both EPA and the Department have revised their NSR permitting rules to implement the WEPCO PSD review procedures. The Department's revised definition of "actual emissions" [Chapter 62-204 (12), F.A.C.] follows:

(12) "Actual Emissions" The actual rate of emission of a pollutant from an emissions unit as determined in accordance with the following provisions:

(12)(a) In general, actual emissions as of a particular date shall equal the average rate, in tons per year, at which the emissions unit actually emitted the pollutant during a two year period which precedes the particular date and which is representative of the normal operation of the emissions unit.

The Department may allow the use of a different time period upon a determination that it is more representative of the normal operation of the emissions unit. Actual emissions shall be calculated using the emissions unit's actual operating hours, production rates and types of materials processed, stored, or combusted during the selected time period.

(12)(b) The Department may presume that unit-specific allowable emissions for an emissions unit are equivalent to the actual emissions of the emissions unit provided that, for any regulated air pollutant, such unit-specific allowable emissions limits are federally enforceable.

(12)(c) For any emissions unit (other than an electric utility steam generating unit specified in subparagraph (d) of this definition) which has not begun normal operations on a particular date, actual emissions shall equal the potential emissions of the emissions unit on that date.

(12)(d) For an electric utility steam generating unit (other than a new unit or the replacement of an existing unit) actual emissions of the unit following a physical or operational change shall equal the representative actual annual emissions of the unit following the physical or operational change, provided the owner or operator maintains and submits to the Department on an annual basis, for a period of 5 years representative of normal post-change operations of the unit, within the period not longer than 10 years following the change, information demonstrating that the physical or operational change did not result in an emissions increase. The definition of "representative actual annual emissions" found in 40 CFR 52.21(b) (33) is adopted and incorporated by reference in Rule 62-204.800, F.A.C.

The Federal definition of "representative actual annual emissions", which the Department has incorporated by reference, follows:

(33) Representative actual annual emissions means the average rate, in tons per year, at which the source is projected to emit a pollutant for the two-year period after a physical change or change in the method of operation of a unit, (or a different consecutive two-year period within 10 years after that change, where the Administrator determines that such period is more representative of normal source operations), considering the effect any such change will have on increasing or decreasing the hourly emissions rate and on projected capacity utilization.

In projecting future emissions the Administrator shall:

(i) Consider all relevant information, including but not limited to, historical operational data, the company's own representations, filings with the State or Federal regulatory authorities, and compliance plans under title IV of the Clean Air Act; and

(ii) Exclude, in calculating any increase in emissions that results from the particular physical change or change in the method of operation at an electric utility steam generating unit, that portion of the unit's emissions following the change that could have been accommodated during the representative baseline period and is attributable to an increase in projected capacity utilization at the unit that is unrelated to the particular change, including any increased utilization due to the rate of electricity demand growth for the utility system as a whole.

Seminole has submitted information which demonstrates that the planned combustion of coal and petcoke fuel blends and use of No. 2 fuel oil for electrical generation capacity will not increase actual emissions in accordance with the applicable regulations and therefore demonstrates that the requested permit amendments will not trigger PSD review. Seminole's analysis of PSD applicability is included in the submitted application as Appendix E and as Attachment 3 to this Preliminary Determination. Seminole's discussion of potential emission rate changes resulting from the use of No. 2 fuel oil to generate electric capacity is included in the submitted application as Appendix F.

Petcoke is a by-product of the petroleum refining process. Petcoke is a high carbon, relatively low ash content solid material that historically has been used in the manufacture of anodes and electrodes for aluminum reduction processes. Because of its favorable heating value and cost, petcoke is presently being considered by a number of electric utilities as a supplemental fuel source for coal-fired boilers.

The sulfur content of petcoke varies with the sulfur content of the refinery coker feedstock. Petcoke has a relatively low ash content; i.e., typically less than 1.0 weight percent. The lower heat content of petcoke, on a dry basis, is approximately 13,500 to 14,000 British thermal units (Btu) per pound. Moisture content of petcoke is in the range of 7 to 10 weight percent. The nitrogen content of petcoke is comparable to that of coal; i.e., approximately 1.3 weight percent on a dry basis. As with coal, petcoke also contains a variety of trace metals. These general characteristics of petcoke indicate that the primary concern, from an emissions viewpoint, is potential increases in SO_2 emissions.

Seminole Units 1 and 2 presently meet an overall 90 percent reduction in potential SO_2 emissions from coal as required by NSPS Subpart Da using a combination of pre-combustion fuel treatment (e.g., coal washing) and post-combustion FGD sulfur removal technologies. The current average FGD SO_2 removal efficiency for Units No. 1 and 2 is approximately 84.5% which, together with a typical coal washing credit of 6.0 percent, is sufficient to meet the NSPS Subpart Da 90.0 percent SO_2 removal requirement. To ensure that no increases in actual SO_2 emissions above the historical two year averages occur due to the use of petcoke, Seminole proposes to increase the SO_2 removal efficiency of the current FGD systems. Seminole has submitted information demonstrating that under worst-case conditions (i.e., combustion of coal and petcoke fuel blends containing the maximum requested amount of petcoke and maximum requested coal and petcoke sulfur contents), a FGD SO_2 removal efficiency of 88 percent will be required. This removal efficiency represents an approximate four percent increase over that currently required of Units 1 and 2 FGD systems by NSPS Subpart Da. Seminole also submitted information demonstrating that the existing FGD systems have been able to successfully achieve a SO_2 removal efficiency in excess of 90 percent, excluding the coal washing credit. Units 1 and 2 are each equipped with five FGD scrubber modules and include provisions for the addition of adipic acid additive to increase SO_2 removal efficiencies. Presently, the 5th FGD scrubber module for each unit serves as a spare. The demonstration of FGD SO_2 removal efficiencies in excess of 90 percent was conducted with only four FGD scrubber modules in use. Due to the proven successful operation of the existing FGD system and the demonstrated ability of the current FGD system to achieve SO_2 removal efficiencies in excess of 90 percent (or two percent above the projected maximum FGD removal efficiency required during combustion of coal and petcoke blends), the Department concludes that there is reasonable assurance that the use of petcoke will not result in an actual increase in SO_2 emissions. In addition, Seminole's optional use of the 5th FGD scrubber module and/or increased use of adipic acid additive provides further assurance that an actual increase in SO_2 emissions will not occur.

The information submitted by Seminole with respect to the remaining PSD regulated pollutants indicates that there will also be no actual emission increases for any of these pollutants including NO_x, CO, PM, and sulfuric acid mist (H_2SO_4). Information provided by Seminole to support this conclusion include the petcoke test burn results, typical coal and petcoke compositions, and EPA emission factors. For NO_x, CO, PM, and H_2SO_4, the petcoke test burn results provide reasonable assurance that actual emission increases will not occur for these pollutants due to the use of petcoke. Regarding future actual NO_x emissions, Seminole has elected to be subject to the Federal Acid Rain Program NO_x emission limits contained in 40 CFR §76.5 under the Acid Rain NO_x Early Election Program for Group 1, Phase II boilers. Under the NO_x Early Election Program, Seminole is required to meet an annual average NO_x emission limit of 0.50 lb/MMBtu effective January 1, 1997. Seminole's participation in the Acid Rain NO_x Early Election Program provides further reasonable assurance that a significant net increase in NO_x emissions will not occur due to the use of petcoke. With respect to future actual PM emission rates, the lower ash content of petcoke compared to coal provides further assurance that an actual increase in emissions will not occur. The ash content of petcoke (approximately 0.5 percent by weight) is only 5.5% of the ash content of coal (approximately 9 percent by weight). Accordingly, petcoke combustion will generate significantly less fly ash (i.e., PM emissions) than the combustion of coal.

The Seminole Power Plant is a baseload facility currently operating at an approximate 80 percent capacity factor. This relatively high capacity factor (a typical industry average for baseload units is 70 percent) will not increase due to the use of petcoke. Accordingly, an increase in actual emissions because of increased utilization is not expected.

Based on the performance test results, fuel analyses, historical emissions data, EPA emission factors, and evaluation of pollution control system capabilities, the Department concludes that the use of petcoke as described in Seminole's permit application will not result in a significant net increase in any PSD regulated pollutant and therefore the permit amendment request regarding the use of petcoke in Units 1 and 2 is not subject to PSD review. As discussed below in Section I, the Department plans to include appropriate permit conditions to ensure that no significant increases in PSD regulated pollutants occur due to the use of petcoke at the Seminole Power Plant.

Seminole's discussion in its permit amendment request to use No. 2 fuel oil to generate electric capacity (reference Appendix F of the submitted application) concludes that an actual emission *decrease* of PSD regulated pollutants will occur if No. 2 oil is used to generate electric load because the fuel oil is displacing coal as a fuel source. As an example, the projected SO_2 emission factor for No. 2 fuel oil is 0.08 lb of SO_2 per million British thermal units of heat input (lb/MMBtu) in comparison to a coal SO_2 emission factor of 0.76 lb/MMBtu based on an assumed 84% FGD SO_2 removal efficiency and 6% coal washing credit. Seminole projects limited usage of No. 2 fuel oil because of economic considerations; i.e., No. 2 fuel oil is a considerably more expensive source of fuel to generate electricity in comparison to coal. In a worst-case scenario, Seminole projects that fuel oil would constitute only 6.3 percent of the instantaneous hourly heat and 0.14 percent of the annual heat input to Units 1 and 2. Because the emission rates resulting from the combustion of No. 2 fuel oil are substantially lower than the emissions due to coal combustion and due to the projected limited usage of fuel oil, the Department concludes that the use of No. 2 fuel to generate electric capacity as described in Appendix F of Seminole's permit application will not result in a significant net actual increase in any PSD regulated pollutant and therefore the permit amendment request regarding the use of No. 2 fuel oil to generate electric capacity is not subject to PSD review.

H. Proposed Addition of New Conditions of Approval to Permit PSD-FL-018

Following review of the test burn report, permit amendment request application, and the additional information submitted by Seminole, the Department proposes adding the following new conditions of approval to permit PSD-FL-018:

Section D (new)

D. FOR THE ELECTRIC UTILITY STEAM GENERATING UNITS WHEN BURNING COAL AND PETROLEUM COKE FUEL BLENDS

Stack emissions from Units 1 and 2 shall not exceed the limitations contained in Items 1, 2, and 3 below when burning blends of coal and petroleum coke:

Item 1 - Sulfur Dioxide Emissions

(a) Unit 1:

$$E_{SO2} = [(\%C_{HI} / 100) * (P_S) * (1 - (\% R_o / 100))] + [(1 - (\%C_{HI} / 100)) * (0.74 \text{ lb } SO_2 / \text{MMBtu})] \quad \text{(Eqn. 1)}$$

(b) Unit 2:

$$E_{SO2} = [(\%C_{HI} / 100) * (P_S) * (1 - (\% R_o / 100))] + [(1 - (\%C_{HI} / 100)) * (0.72 \text{ lb } SO_2 / \text{MMBtu})] \quad \text{(Eqn. 2)}$$

where:

E_{SO2}	=	allowable SO_2 emission rate; lb SO_2/MMBtu, 30-day rolling average
$\%C_{HI}$	=	percent of coal used on a heat input basis
P_S	=	potential SO_2 combustion concentration (unwashed coal without emission control systems) as defined by NSPS Subpart Da; lb SO_2/MMBtu, 30-day rolling average
$\% R_o$	=	overall percent SO_2 reduction from Equation 19-21 of EPA Reference Method 19. Per NSPS Subpart Da, $\% R_o$ must not be less than 90%, 30-day rolling average
0.74	=	historical 2-year annual average SO_2 emission rate for Unit 1; lb/MMBtu
0.72	=	historical 2-year annual average SO_2 emission rate for Unit 2; lb/MMBtu

Compliance with the lb per million Btu heat input emission limitations and percent reduction requirement shall be determined on a 30-day rolling average basis.

Item 2 - Nitrogen Oxide Emissions

(a) 0.60 lb. per million Btu heat input, and 35 percent of the potential combustion concentration (65 percent reduction). Compliance with the lb. per million Btu heat input emission limitation and percent reduction requirement shall be determined on a 30-day rolling average basis. Compliance with the 0.60 lb. per million Btu heat input emission limitation shall also constitute compliance with the 65 percent reduction requirement; and

(b) 0.50 lb. per million Btu heat input determined on an annual average basis, when subject to the 40 CFR §76.8 Early Election Program for Group 1, Phase II Boilers or in any year when petcoke is burned.

Item 3 - Particulate Matter Emissions

0.03 lb. per million Btu heat input, and 1 percent of the potential combustion concentration (99 percent reduction). Compliance with the 0.03 lb. per million Btu heat input emission limitation shall also constitute compliance with the 99 percent reduction requirement.

Item 4 - Fuel Specifications

Fuels fired shall consist of coal and petroleum coke blends containing a maximum of 30 percent petroleum coke by weight. The petroleum coke sulfur content shall not exceed 7.0 percent by weight, dry basis.

Item 5 - Reporting and Recordkeeping

(a) Documentation verifying that the coal and petroleum coke fuel blends combusted in Units 1 and 2 have not exceeded the 30 percent maximum petroleum coke by weight limit specified by Condition of Approval, Section D., Item 4 shall be maintained and submitted to the Department's Northeast District Office with each annual report; and

(b) The Permittee shall maintain and submit to the Department, on an annual basis for a period of five years from the date the units begin firing petroleum coke, data demonstrating that the operational change associated with the use of petroleum coke did not result in a significant emission increase pursuant to Rule 62-210.200(12)(d), F.A.C.

Item 6 - Handling of Petroleum Coke

All prior conditions of approval that address coal handling shall also apply to the handling of petroleum coke.

Section E (new)

E. FOR THE ELECTRIC UTILITY STEAM GENERATING UNITS
WHEN BURNING NO 2 FUEL OIL

Use of No. 2 fuel oil is authorized for startups, flame stabilization, to generate emergency electric reserve capacity requirements, and to meet normal continuous operating electric load ratings when coal quality, process conditions, and/or burner equipment prevents meeting demand with solid fuels only.

I. Discussion of Proposed New Conditions of Approval to Permit PSD-FL-018

The proposed new conditions contained in Section G above address allowable emissions of SO_2, NO_x, and PM an addition to including provisions pertaining to fuel blend characteristics, reporting and recordkeeping, and petcoke handling.

The emission limits for SO_2 (Item 1) contain two algorithms (one for each unit) to ensure that actual increases in SO_2 emissions will not occur due to the use of petcoke. These algorithms contain two basic components which are enclosed in brackets. The first term in brackets addresses the coal portion of the coal and petcoke fuel blend and implements the current requirements of NSPS Subpart Da. The second term in brackets addresses the petcoke portion of the coal and petcoke fuel blend and represents the historical two year average SO_2 emission rate for each unit. Accordingly, NSPS Subpart Da SO_2 emission requirements will continue to apply to the coal portion of the fuel blends while petcoke SO_2 emissions will be held to each unit's historical two year annual average SO_2 emission rate.

The emission limits for NO_x (Item 2) implement current NSPS Subpart Da requirements as well as the new annual average limit that Seminole has elected to meet under the Acid Rain NO_x Early Election Program for Group 1, Phase II boilers. The emission limit for PM (Item 3) implements current NSPS Subpart Da requirements.

Item 4 of the proposed permit conditions contain constraints on the maximum amount of petcoke which may be blended and maximum petcoke sulfur content. These constraints are consistent with Seminole's permit amendment request and are included to provide assurance that an actual increase in SO_2 emissions will not occur.

Item 5 of the proposed permit conditions requires Seminole to demonstrate annually, for a period of five years, that an actual emission increase has not occurred due to the burning of petcoke. Seminole has indicated that it intends to make this demonstration using data obtained from the existing CEMS, fuel composition and usage rates, and results of periodic stack sampling.

J. Conclusions

The changes in operation authorized by these permit amendments are not expected to cause a net significant increase in actual emissions of any PSD regulated air pollutant. The changes will not result in any increases in ambient concentrations of any regulated air pollutants or cause or contribute to a violation of any ambient air quality standard or PSD increment.