STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

February 25, 1983

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. William S. O'Brien
Director, Environmental and
Licensing Affairs
Florida Power Corporation
Post Office Box 14042
St. Petersburg, Florida 33733

Dear Mr. O'Brien:

RE: Preliminary Determination - Florida Power Corporation
Bartow Units 2 and 3, PSD-FL-095, AC 52-54946
AC 52-54947 and AC 52-54948

Please find enclosed one copy of the Technical Review and Preliminary Determination, public notice, and proposed permits for the above referenced state and federal applications to convert Bartow Units 2 and 3 to coal and install coal and fly ash handling systems. This proposed agency action supersedes the department's September 14, 1982, letter of Intent to Deny the applications.

Before final action can be taken on your proposed permits, you are required by Florida Administrative Code Rule 17-1.62(3) to publish the attached Notice of Proposed Agency Action in the legal advertising section of a newspaper of general circulation in Pinellas County no later than fourteen days after receipt of this letter. The department must be provided with proof of publication within seven days of the date the notice is published. Failure to publish the notice will be grounds for denial of the permit.

The enclosed materials constitute a proposed action of the department and are subject to administrative hearing under the provisions of Chapter 120, Florida Statutes, if requested within fourteen days from receipt of this letter. Any petition for hearing must comply with the requirements of Florida Administrative Code Rule 28-5.201 and be filed with the Office

of General Counsel, Florida Department of Environmental Regulation, Twin Towers Office Building, 2600 Blair Stone Road, Tallahassee, Florida 32301. Failure to file a request for hearing within fourteen days shall constitute a waiver of your right to a hearing. Filing is deemed complete upon receipt by the Office of General Counsel.

Please submit, in writing, any comments which you wish to have considered concerning the department's proposed action.

Sincerely,

Lawrence A. George

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/pa

Attachment

cc: William O. May
Jake Varn
Elisabeth Cummings
William Hennessey
Joyce Gibbs
Martha Hall

Technical Evaluation

and

Preliminary Determination

Florida Power Corporation
Pinellas County, Florida

Bartow Units 2 and 3 Coal Conversion
and
Coal and Fly Ash Handling Systems

Permit Numbers

State: AC 52-54946
AC 52-54947
AC 52-54948

Federal: PSD-FL-095

Florida Department of Environmental Regulation
Bureau of Air Quality Management
Central Air Permitting

February 25, 1983

NOTICE OF PROPOSED AGENCY ACTION

The Department of Environmental Regulation gives notice of its intent to issue permits to Florida Power Corporation (FPC) to modify an air pollutant emitting facility. These permits will allow the burning of coal in Units 2 and 3 at the FPC Bartow plant and the installation of coal and fly ash handling systems at the plant site. This plant is located on Weedon Island near St. Petersburg in Pinellas County, Florida. A best available control technology (BACT) determination was required for emissions of sulfur dioxide (SO_2), nitrogen oxides (NO_x), particulate matter (PM), mercury (Hg), beryllium (Be), fluorides (F), and arsenic (As). A prevention of significant deterioration (PSD) increment analysis was required for emissions of SO_2 and PM. By authority of the U.S. Environmental Protection Agency, the Department has also reviewed the proposed modification under federal prevention of significant deterioration regulations (40 CFR 52.21) and has made a preliminary determination that the modification can be approved provided certain conditions are met.

Emissions of pollutants from the plant will increase by the following quantities in tons per year:

Pollutant	Emissions Increase
SO_2	499
NO_x	6,182
PM	997
Hg	0.028 to 0.234
Be	-0.056 to 0.125
F	149 to 150
As	-0.670 to 0.267

Emissions from the modified facility will consume PSD increment but will not violate any state or federal ambient air quality standards. The maximum percent of allowable PSD increment consumed will be as follows:

Class II Increment	Percent Consumed
SO_2	
Three-hour	0
24-hour	0
Annual	0
PM	
24-hour	70
Annual	17

Copies of the applications for permits submitted by Florida Power Corporation and a summary of the basis of the Department's proposed action are available for public review in the following locations:

Department of Environmental Regulation
Southwest District
7601 Highway 301 North
Tampa, Florida 33610

Department of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32301

Pinellas County Department of Environmental Management
Air and Water Quality Division
St. Pete-Clearwater Airport
Clearwater, Florida 33520

Any person may send written comments on the proposed action to Mr. Clair Fancy at the Department's Tallahassee address. All comments mailed within 30 days of publication of this notice will be considered in the Department's final determination.

Any person who is substantially affected by the Department's proposed permitting decision may request a hearing in accordance with Section 120.57, Florida Statutes, and Florida Administrative Code Rules 17-1 and 28-5. The request for hearing must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32301, within fourteen (14) days of publication of this notice. Failure to file a request for hearing within this time period shall constitute a waiver of any right such person may have to request a hearing under Section 120.57, Florida Statutes.

RULES OF THE ADMINISTRATIVE COMMISSION
MODEL RULES OF PROCEDURE
CHAPTER 28-5
DECISIONS DETERMINING SUBSTANTIAL INTERESTS

28-5.15 Requests for Formal and Informal Proceedings

(1) Requests for proceedings shall be made by petition to the agency involved. Each petition shall be printed typewritten or otherwise duplicated in legible form on white paper of standard legal size. Unless printed, the impression shall be on one side of the paper only and lines shall be double spaced and indented.

(2) All petitions filed under these rules should contain:

(a) The name and address of each agency affected and each agency's file or identification number, if known;

(b) The name and address of the petitioner or petitioners;

(c) All disputed issues of material fact. If there are none, the petition must so indicate;

(d) A concise statement of the ultimate facts alleged, and the rules, regulations and constitutional provisions which entitle the petitioner to relief;

(e) A statement summarizing any informal action taken to resolve the issues, and the results of that action;

(f) A demand for the relief to which the petitioner deems himself entitled; and

(g) Such other information which the petitioner contends is material.

TECHNICAL EVALUATION
and
PRELIMINARY DETERMINATION

CONTENTS

I. APPLICANT AND SOURCE LOCATION

A. Applicant

Florida Power Corporation (FPC)
P. O. Box 14042
St. Petersburg, Florida 33733

B. Location

The proposed modification will occur at Florida Power Corporation's Bartow plant in Pinellas County. The plant is located north of St. Petersburg on Weedon Island in Tampa Bay, just south of Rt. 92. The UTM coordinates of the plant are: Zone 17,342.4 km East and 3082.7 km North.

II. PROJECT DESCRIPTION

The FPC Bartow plant has three fossil steam units with a net generating capacity of 437 megawatts (MW): Unit 1 with a net generating capacity of 109 MW, Unit 2 with a capacity of 119 MW, and Unit 3 with a capacity of 209 MW. Currently, Unit 1 burns a mixture of coal and oil. Units 2 and 3 have burned heavy oil and natural gas since their in service dates of August 1961 and July 1963, respectively. A total of four gas turbine peaking units, with a net winter capacity of 204 MW, are also located at the Bartow facility.

FPC plans to convert Units 2 and 3 to coal and to add all the necessary supporting facilities for coal handling and firing. The steam generators for Units 2 and 3 were originally designed to accommodate the use of coal; therefore, major boiler modifications will not be necessary. To burn coal in these units, FPC must install coal handling, sizing, and storage facilities; fly ash handling and storage facilities; and air pollution control

equipment for the boilers and the coal and fly ash handling systems. FPC must also make certain minor modifications to the boilers for the firing of pulverized coal.

Coal hauled in by barges or ships will be unloaded at the site using a clamshell bucket. The coal will be transferred on covered belt conveyors to the storage area. The active stockout pile will be formed using a radial stacker having a telescopic chute to minimize free fall. Coal under 2 1/2 inch maximum size will be transferred from the active pile to the crusher building, where the coal will be reduced to 1 1/2 inch maximum size and stored in eight silos, three for Unit 2 and five for Unit 3, which will provide each boiler with a minimum of eight hours coal supply at maximum load. The coal is then pulverized to the fineness required (200 mesh) and delivered to the furnace for combustion.

Finely divided particles of ash (fly ash) removed from the flue gas streams by the air pollution control equipment (electrostatic precipitators) will be pneumatically conveyed to a common storage silo. The fly ash silo will have two telescopic discharge chutes and one rotary unloader. The fly ash will be loaded into covered trucks for removal from the site to purchasers or placed in a temporary onsite storage area for future sale. A windbreak enclosure will be erected to prevent fugitive dust emissions during truck loading. Baghouses will be used to control particulate emissions generated by the various operations.

III. EMISSIONS AND CONTROLS

As proposed by FPC, the coal conversion project would result in an increase in emissions of the criteria air pollutants sulfur dioxide, nitrogen oxides, and particulate matter from the boilers and in fugitive dust emissions from the coal and fly ash handling systems that will be installed at the Bartow plant site. FPC has proposed to fire medium (1.58%) sulfur coal for Units 2 and 3, without flue gas desulfurization systems, to control SO_2 emissions to less than 2.75 $lb/10^6$ Btu. For particulate emission control, FPC has proposed to install electrostatic precipitators (ESP's) on both units to limit emissions to less than 0.1 $lb/10^6$ Btu. Two-stage combustion was proposed for reducing nitrogen oxides emissions to below 0.6 $lb/10^6$ Btu. To reduce the dust emissions from the new coal and fly ash handling systems, FPC has proposed to use high efficiency baghouses, underground reclaim hoppers, and telescopic chutes.

IV. RULE APPLICABILITY

A. State Rule

The proposed project is subject to preconstruction review under the provisions of Chapter 403, Florida Statutes, and Rule 17-2, Florida Administrative Code, because it constitutes a modification to a facility as defined in Rule 17-2.100 (102). Specifically, the project is subject to review under the provisions of Rule 17-2.500, "Prevention of Significant Deterioration (PSD)," because:

(1) The Bartow plant is a major facility as defined in Rule 17-2.100(95) and Table 500-1;

(2) It is located in an area designated attainment for all criteria pollutants except ozone;

(3) The proposed project will result in a significant net emissions increase of one or more regulated pollutants other than volatile organic compounds; and

(4) The facility as whole was not capable of accomodating coal as a fuel before January 6, 1975, since no coal handling equipment has ever been installed at the plant (even though the Unit 2 and 3 boilers were originally designed to be capable of burning coal).

PSD review consists of a determination of best available control technology (BACT) and an air quality impact analysis for each regulated pollutant for which emissions would increase by a significant net amount. At the emission levels proposed by the applicant, the project would result in a significant emissions increase of seven regulated pollutants: sulfur dioxide (SO_2), nitrogen oxides (NO_x), particulate matter (PM), mercury (Hg), beryllium (Be), fluorides (F), and arsenic (As). At the emission levels determined as BACT and discussed elsewhere in this document, the project alone will result in a decrease in SO_2 emissions from Units 2 and 3; however, this decrease is more than offset by a contemporaneous increase in SO_2 emissions resulting from the 1981 conversion of Unit 1 at the facility from oil to coal-oil mixture (COM). The net emission increases resulting from the conversion of Units 2 and 3 from oil to coal, the

installation of coal handling equipment, and the contemporaneous conversion of Unit 1 to COM are given in Table 1, along with the significance levels for PSD review.

The Bartow plant is located in an ozone nonattainment area (Pinellas County) and within the areas of influence of both the Pinellas County SO_2 nonattainment area and the Hillsborough County particulate nonattainment area. The project is exempt from all nonattainment area new source review requirements under Rule 17-2.510, however, because:

(1) The net emissions increase of volatile organic compounds will be less than the significance level of 40 tons per year;

(2) The applicant has demonstrated that the net emissions increase of SO_2 will not have a significant impact on the SO_2 nonattainment area; and

(3) The unconfined PM emissions resulting from the project will occur more than five kilometers outside the boundary of the particulate nonattainment area, and the applicant has demonstrated that the remaining net emissions increase of PM will not have a significant impact on the nonattainment area.

Finally, the project is also exempt from all federal new source performance standards (NSPS) for fossil-fuel steam generators adopted by reference under Rule 17-2.660. Specifically, the conversion from oil to coal of the Unit 2 and 3 boilers is not

considered a modification of either boiler under 40 CFR 60.14, since each was designed to accomodate coal under construction specifications dated November 18, 1957 (Unit 2), and February 4, 1960 (Unit 3).

Federal Rule

The proposed project is subject to federal PSD review pursuant to 40 CFR 52.21(i) for the same reasons that it is subject to state PSD review under Rule 17-2.500. The PSD review requirements under both the federal and the state regulations are identical with the exception that under the federal regulations there is no requirement that emissions limitations for Units 2 and 3 be established through a BACT determination. To the extent that emissions from these units would increase, however, the department has the responsibility under 40 CFR 52.21(d) to ensure that no PSD increment or national ambient air quality standard will be violated.

V. CONTROL TECHNOLOGY REVIEW

Based on an analysis of the economic, environmental, and energy impacts of the proposed coal conversion project, the Department has made a preliminary BACT determination for the entire project, a copy of which is appended to this document. The emission limits from the BACT determination are as follows:

BACT Determined by DER:

Pollutant	Emission Limit
Particulates (Units 2 and 3)	0.10 pound per million Btu heat input, averaging time per 17-2.700
Sulfur Dioxide (Units 2 and 3)	1.2 pounds per million Btu heat input, daily average based on 3-hour composite fuel samples
Nitrogen Oxides (Units 2 and 3)	0.55 pound per million Btu heat input, averaging time per 17-2.700
Visible Emissions (VE) (Units 2 and 3)	Not greater than 20 percent opacity, six-minute average, except for one six-minute period per hour of not more than 27 percent opacity.
Visible Emissions (VE) (Fugitive emissions)	Not greater than 10 percent opacity, six-minute average
Visible Emissions (VE) (Baghouses)	Not greater than 5 percent opacity, six-minute average

The baghouses referred to in the BACT determination will be installed at various locations as listed below.

BAGHOUSE INVENTORY

FIG. 1 ITEM NO.	Location	Estimated Particulate Emissions lb/hr	TPY
2	Clamshell (coal)	1.08	0.45
4	Transfer Point 1 (coal)	0.14	.06
6	Transfer Point 2 (coal)	0.26	.22
11	Reclaim Area (coal)	0.09	.12
15	Crusher Building (coal)	0.23	.31
17	Transfer Point 3 (coal)	0.37	.52
19	Transfer Point 4 (coal)	0.37	.22
23	Transfer Point 5 (coal)	0.54	.45
21	Unit 2 Coal Silos (3)	0.26	.15
31	Unit 3 Coal Silos (3)	0.26	.13
24	Unit 3 Coal Silos (2)	0.17	.06
	Fly Ash Transfer	0.11	.17
	Fly Ash Transfer	0.11	.17
	Fly Ash Transfer (Stand-by)	0.11	.00
29	Fly Ash Silo	0.43	.18

The elements mercury, beryllium, and arsenic are present in flue gas emissions when burning bituminous coal. These trace elements are emitted as part of the particulate matter and removed from the flue gas stream by the ESP's. Beryllium is the only element of the three listed that is considered to be of environmental significance. EPA project summary 600/52-80-042C indicates the controlled emission factor for beryllium to be 4.2×10^{-5} lb/ton coal. The emissions of beryllium from the proposed conversion should be equal to or less than this value. Considering the control efficiencies of the ESP's and the small predicted impacts on air quality, no further control of these pollutants is warranted.

Fluorides are emitted from coal combustion primarily in the gaseous phase. Therefore, post-combustion control of these

pollutants would require the costly addition of wet scrubbers to the units. Such scrubbers could achieve 80 percent or greater removal efficiency. However, considering the small predicted air quality impacts and small increases in emissions for these pollutants, additional controls are considered unnecessary.

The principle difference between the BACT determination made by the Department and that proposed by FPC is in the SO_2 emission limit--1.2 lb/10^6 Btu compared to 2.75 lb/10^6 Btu as proposed by FPC. The FPC proposal would increase annual SO_2 emissions from 1976-1979 levels of about 18,000 tons/year for Units 2 and 3 to about 30,000 tons/year, assuming a future .785 annual capacity factor. The net savings to FPC of this proposal would be about $22,400,000 per year. Using the same projected capacity factor the Department's BACT determination would decrease SO_2 emissions from the two units to about 13,000 tons/year, while still saving FPC about $19,000,000 per year. Details of the Department's BACT determination are appended to this document.

VI. AIR QUALITY IMPACT ANALYSIS

An air quality impact analysis is required for each pollutant for which there will be a significant net emissions increase. For the proposed project, a significant increase will occur for PM, SO_2, NO_x, and fluorides. Ranges of emission of Hg, Be, and As have been estimated from the literature. At the upper end of each range all three of these substances would also have a significant emissions increase. These pollutants have thus been included in the air quality analysis. Components of the air quality analysis are as follows:

- An analysis of existing air quality;
- A PSD increment analysis (for PM and SO_2 only);
- A Florida Ambient Air Quality Standards (FAAQS) analysis;
- An analysis of impacts on soils, vegetation, and visibility and growth-related air quality impacts; and
- A "Good Engineering Practice (GEP)" stack height analysis

The analysis of existing air quality generally relies on preconstruction monitoring data collected in accordance with EPA-approved methods. The PSD increment and FAAQS analysis depend on air quality modeling carried out in accordance with EPA guidelines.

Based on these required analyses, the Department has reasonable assurance that the proposed oil-to-coal conversion for FPC Bartow Units 2 and 3, as described in this permit and subject to the conditions of approval proposed herein, will not cause or contribute to a violation of any PSD increment or ambient air quality standard. A discussion of the modeling methodology and required analyses follows.

A. Modeling Methodology

Two EPA- and FDER-approved dispersion models were used in the air quality impact analysis. These were the Industrial Source Complex Short-Term (ISCST) and Long-Term (ISCLT) models. The ISCST and ISCLT are multivariant Gaussian dispersion models used to simulate effluent diffusion at downwind distances from sources or groups of sources. ISCST uses a sequential hour-by-hour meteorological record to estimate maximum short-term (e.g. 3-hour and 24-hour) concentrations. ISCLT uses statistical

wind summaries to calculate annual ground-level concentrations. The ISC models have a number of options that may be used as appropriate such as: area, volume, or point sources; polar or cartesian coordinate systems; deposition or concentration calculations; wake effects; stack tip downwash; source separation; terrain effects; and exponential decay.

Receptors were placed at one kilometer range intervals and ten degree azimuth intervals for short-term calculations and one kilometer square grid intervals for annual calculations. Receptors were also located at the boundaries of the Chassahowitzka Class I area and the PM and SO_2 nonattainment areas.

The surface meteorological data used in the models were National Weather Service data collected at the Tampa International Airport during the period 1970-1974. Upper air meteorological data used in the models were collected at the National Weather Service office in Ruskin, Florida during the same time period.

Stack parameters and emission rates used in evaluating the proposed coal conversion are contained in Table 2.

B. Analysis of Existing Air Quality

Preconstruction ambient air quality monitoring has not been performed by the applicant for any of the seven pollutants subject to PSD review. Exemption from this requirement for a particular pollutant may be obtained if the increase in ground-level concentration due to the proposed project is less than a certain de minimus value or the ambient concentration of

the pollutant is less than the appropriate de minimus value, (Rule 17-2.500(3)(e)). Table 2 lists the increases in ground-level concentration for each pollutant for the appropriate averaging time to compare with the de minimus values.

All pollutants except fluorides are predicted to be below the de minimus concentration thresholds and have thus been excempted by the Department from the preconstruction monitoring requirement. Since no other sources of fluorides are nearby (within 15 km), it is likely that the ambient level of fluorides in the surrounding area of the facility is less than the de minimus value; therefore, preconstruction monitoring for fluorides has also not been required by the Department. Arsenic does not have a de minimus threshold level for comparison, and there is no acceptable method at this time for measurement of ambient levels; therefore, no monitoring has been required for this pollutant.

Background air quailty levels for SO_2, PM, and NO_2 have been developed from the nearest monitors for these pollutants. The monitors for PM and SO_2 are located approximately 2.2 kilometers west of the plant. The NO_2 monitor is located 16 kilometers southwest of the plant. The applicant has proposed that the annual mean monitored value over the previous year be used as the annual background concentration for PM, SO_2, and NO_2. The applicant has also proposed that the highest monitored PM 24-hour average concentration be used as the 24-hour PM background value and that statistically derived background values for SO_2 24 and 3-hour averaging periods equal to the

93rd and 99.4th percentile concentrations, respectively, be used.

For annual and short-term (24-hour and 3-hour) averaging periods, the Department has chosen to use the two-year (1980-81) mean and highest, second-highest measured concentrations for SO_2 and PM background values. The purpose of this change is to make consistent the way in which background concentrations are determined for both PM and SO_2 and to be consistent with EPA policy which generally requires that two years of data be used for air quality planning purposes. This choice is considered conservative, however, in that these recorded values include the impact of the facility under study.

Table 4 lists the monitored values of SO_2, PM, and NO_2 at the aforementioned sites for the period 1980-81.

C. PSD Increment Analysis

The FPC Bartow facility is located in an area where the Class II PSD increments apply. The nearest Class I area is the Chassahowitzka National Wilderness Area located 82 kilometers to the north.

The proposed maximum hourly emission rates for both PM and SO_2 from units 2 and 3 are equal to or less than the actual maximum hourly rates on the baseline date. Furthermore, the conversion from oil to coal fuel in Units 2 and 3 will result in a greater exit temperature and a greater exit velocity (or flow rate). Both of these changes will act to increase plume rise and therefore decrease ground-level concentrations. As such, no PSD increment will be consumed over any short-term averaging period

for either PM or SO_2 by Units 2 and 3. Unit 1, which has previously been converted to a coal-oil mix (COM) fuel, also has not changed its maximum hourly emission rate and will not consume increment. Thus, the only short-term increment consumption to be realized from the conversion to coal will be from the new coal and fly ash handling facilities and from the fugitive emissions.

The coal and fly ash handling emission points along with the fugitive emissions associated with the coal pile were modeled using the ISCST model. Receptors were located at the closest distances to which the public has access at the plant boundaries. Based upon this modeling, the highest, second-high 24-hour concentration predicted is 26 ug/m^3. No other increment-consuming source has been identified in the area which could significantly increase this value.

In contrast to the short-term emissions, annual average emissions of PM and SO_2 from the Bartow plant will increase from the baseline date as a result of the proposed project and the previous conversion of Unit 1 to COM. In addition, there will be an increase in annual PM emissions associated with the coal and fly ash handling operations and coal pile. The applicant has developed an emission inventory of significant sources of PM and SO_2 in the surrounding area for both the baseline date and present conditions. These sources were modeled along with the FPC Bartow sources to predict the maximum annual increment consumption. The annual average concentrations associated with the coal and fly ash handling operations and the fugitive emissions from the coal pile were

modeled separately. The maximum annual concentration due to these sources at the plant boundary is predicted to be 3.3 ug/m^3. This value is offset by a slight decrease (or increment expansion) realized from emission decreases of surrounding sources of PM in the Bartow area.

Table 5 shows the Class II increment consumed for all averaging times of PM and SO_2. No violation of any PSD increment is predicted as a result of the conversion from oil to coal of Units 2 and 3.

As shown in Table 6, all short-term SO_2 and PM impacts on the Chassahowitzka Class I area from the proposed conversion are negative or less than 1 ug/m^3. Due to emission reductions at other sources, annual impacts on the Class I area are also less than 0 ug/m^3 for SO_2 and much less than 1 ug/m^3 for PM.

D. FAAQS Analysis

Given existing air quality in the area, the proposed coal conversion of FPC Bartow Units 2 and 3 is not expected to cause or contribute to a violation of any FAAQS. The results of the FAAQS analysis are summarized in Table 7.

The predicted short-term concentrations given are the highest, second-high values since five years of meteorological data were used in the modeling. For both PM and SO_2, the background concentrations are conservatively estimated as the highest second-highest monitored value over the previous two years for the 24-hour and 3-hour averaging periods. The annual background concentrations used are the two-year means. These background concentrations include the impacts of most of the

sources modeled and thus represent an over-estimation of the concentrations due to natural background and distant man-made sources.

The other pollutants having significant emissions increases (Hg, Be, As, and fluorides) have no ambient air quality standards with which comparisons can be made.

E. Analysis of Impacts on Soils, Vegetation, and Visibility and Growth-Related Air Quality Impacts

The maximum ground-level concentrations of PM, SO_2, and NO_2 predicted to occur as a result of emissions increases from the FPC Bartow plant in conjunction with emissions from other surrounding sources are below all applicable FAAQS. These standards are equal to the federal secondary standards designed to protect public welfare-related values such as vegetation. The coal conversion at the plant will result in a decrease in the maximum short-term ground-level SO_2 concentrations with only a minimal increase in the annual level. There will be a minimal increase also in the NO_2 level. PM will increase significantly near the plant site due to the coal and fly ash handling and fugitive emissions; however, maximum concentrations will remain below the FAAQS.

No impact on visibility at the nearest Class I area is expected as a result of the coal conversion. All impacts at this area located 82 kilometers to the north are predicted to be less than 1 ug/m^3.

The significant emissions increases of Hg and Be result in predicted ground-level impacts less than the de minimus values.

Thus, these emissions will not cause a measurable increase in ambient concentrations. No de minimus impact level exists for arsenic at this time. The emissions increase of fluorides is predicted to only slightly increase ambient levels. Thus, the Department is reasonably assured that these increased emissions of non-criteria pollutants Hg, Be, As, and fluorides will not significantly impact soils and vegetation in the local region. In addition, no significant growth-related impacts are expected to occur as a result of this conversion.

F. GEP Stack Height Analysis

A Good Engineering Practice (GEP) stack height (Hs), as defined in 40 CFR 51.1, is calculated from the following formula for stack heights in existance prior to December 31, 1970: Hs = 2.5H, where H is the height of nearby structure(s) measured from ground-level elevation at the base of the stack. The building heights (H) for Units 1, 2, and 3 are 43.6, 43.6, and 52.4 meters, respectively. Therefore, the appropriate GEP stack heights are 109.0, 109.0, and 131.0 meters for Units 1, 2. and 3, respectively. Since the actual stack heights of 91.44 meters for each unit have been used in the air quality analysis, FPC has not taken credit for any stack heights in excess of the GEP values.

VII. CONCLUSIONS

Based on the foregoing technical evaluation of the applications and additional information submitted by FPC, the Department has made a preliminary determination that compliance

with all State and federal air pollution regulations will be achieved provided certain conditions are met. The general and specific conditions are listed in the ttached draft State permits (AC 52-54946, AC 52-54947, and AC 52-54948) and federal permit (PSD-FL-095). The BACT determination proposed as Attachment 6 to permits AC 52-54946 and AC 52-54947 is appended hereto.

Table I

Emissions of Regulated Pollutants - Bartow Plant Baseline and Projected Conditions

Criteria Pollutants	Emissions (tons/year) Baseline Conditions[1]	Projected Conditions[2] FPC Proposed Levels	DER Proposed Levels	Net Emissions Increase[6]	Significant Emission Rate[7]
Sulfur Dioxide	7,899	9,600[3]	9,600		
Unit 1	17,947	38,229[4]	16,745[5]		
Units 2 & 3					
Total	25,846	47,829	26,345	499	40
Nitrogen Oxides					
Unit 1	791	3,206[3]	3,206		
Unit 2 & 3	3,908	8,375[4]	7,675[5]		
Total	4,699	11,581	10,881	6,182	40
Particulate Matter					
Unit 1	249	354[3]	354		
Unit 2 & 3	540	1,395[4]	1,395[5]		
Coal and Fly Ash Emission Points	0	26[4]	26[5]		
Coal and Fly Ash Fugitive Emissions	0	11[4]	11[5]		
Total	789	1,786	1,786	997	25
Noncriteria Pollutants (Units 1-3)		FPC/DER Estimated Levels			
Mercury	0.041-0.068	0.069-0.302		0.028 to 0.234	0.1
Beryllium	0.087-0.108	0.0308-0.233		-0.056 to +0.125	0.0004
Fluorides	0.122-0.125	149-150		149 to 150	3
Arsenic	0.813	0.143-1.08		-0.670 to 0.267	0
Lead	1.54-3.61	0.448-2.06		-1.09 to -1.55	0.6
Sulfuric Acid Mist	1.14	2.55		1.41	7
Volatile Organic Compounds	1.35-66.8	17.6-80		16.3 to 13.2	40
Carbon Monoxide	182	204		22	100
Radionuclides	0.722	0.144		-0.578	0

See next page for Footnotes.

Table I Footnotes

(1) Average SO_2 and PM emission rates calculated from fuel burned from 1976 through 1979; average NO_x emission rates calculated from fuel burned from 1978 through 1979; other emission rates calculated using $4,442 \times 10^6$ Btu/hr total heat input rate for baseline conditions.

(2) All SO_2, NO_x, and PM emission rates calculated based on 100% annual capacity factor; other emission rates calculated using $4,406 \times 10^6$ Btu/hr total beat input rate accounting for COM at Unit 1 (761×10^6 Btu/hr--oil, $3,645 \times 10^6$ Btu/hr--coal).

(3) Change from baseline emission level due to 1981 conversion of Unit 1 to COM.

(4) Based on applicant's propoed BACT emission levels (2.75 lb/10^6 Btu--SO_2, 0.6 lb/10^6 Btu--NO_x)

(5) Based on DER BACT determination (1.2 lb/10^6 Btu--SO_2, 0.55 lb/10^6 Btu -- NO_x)

(6) Based on DER proposed levels; note that SO_2 and NO_x emissions from Units 2 and 3 would decrease using DER levels, but significant net emissions increases of each of these pollutants are projected due to the contemporaneous conversion of Unit 1 to COM.

(7) Rule 17-2.500, Table 500-2.

Table 2

Proposed FPC Bartow Stack Parameters and Emission Rates

Emissions Unit	Stack Height(m)	Stack Diameter(m)	Exit Velocity(m/s)	Exit Temp.(K)	Emission Rates (g/s) PM(2)	SO_2(3)	NOx(4)
Unit 1 (1)	91.44	2.74	36.27	428.	15.37	422.73	92.23
Unit 2	91.44	2.74	37.19	422.	15.12	180.17	83.16
Unit 3	91.44	3.35	40.84	419.	25.07	306.30	137.89

(1) This unit is not converting to coal but has recently been converted to a coal/oil mix fuel.

(2) Based on 0.1 lb PM per 10^6 Btu

(3) Based on 1.2 lb SO_2 per 10^6 Btu for Units 2 and 3 and 2.75 lb/10^6 for Unit 1

(4) Based on 0.55 lb NOx per 10^6 Btu for Units 2 and 3 and 0.6 lb/10^6 Btu for Unit 1

Table 2 (cont.)

Proposed FPC Bartow Coal and Fly Ash Handling Emission Rates

Emissions Unit	Stack Height(m)	Stack Diameter(m)	Exit Velocity(m/s)	Exit Temp.(K)	Emission Rate PM (g/s)
Clamshell Unloader	14.0	0.84	4.2	Ambient	1.08
Transfer Point 1	14.0	0.84	5.5	Ambient	0.14
Transfer Point 2	19.5	0.84	10.1	Ambient	0.26
Reclaim Structure	16.5	0.84	3.4	Ambient	0.09
Crusher Building	33.2	0.84	8.5	Ambient	0.22
Transfer Point 3	43.9	0.84	14.4	Ambient	0.37
Transfer Point 4	40.8	0.84	14.4	Ambient	0.37
Transfer Point 5	45.1	0.84	21.2	Ambient	0.54
Coal Silos(3) Unit 2	33.5	0.84	10.1	Ambient	0.26
Coal Silos(3) Unit 3	47.2	0.84	10.1	Ambient	0.26
Coal Silos(2) Unit 3	47.2	0.84	6.8	Ambient	0.17
Fly Ash Vacuum Pumps(2)	14.0	0.84	4.2	Ambient	0.11
Fly Ash Silo Vent	14.0	0.84	16.9	Ambient	0.43

Table 2 (cont.)

Proposed FPC Bartow Coal and Fly Ash Fugitive Emission Parameters

Area Source	Emision Height(m)	Vertical Dimension(m)	Horizontal Dimension(m)	Emission Rate PM g/m_2-s
Coal Pile	8.0	7.0	27.0	0.30
Fly Ash Silo Unloading	2.0	1.0	1.0	0.28
Radial Stacker	7.6	7.0	27.0	0.01

Table 3

Pollutant Concentration Increases For comparison to the Deminimus Levels

Pollutant	Averaging Period	Concentration Increase (ug/m^3)	De Minimus Level (ug/m^3)
SO_2	24-hour	<0	13
PM	24-hour	<0	10
NO_2	Annual	0.7	14
Hg	24-hour	0.00063	0.25
Be	24-hour	0.00048	0.0005
F	24-hour	0.31	0.25
As	--	--	--

Table 4

Existing Air Quality Levels for 1980-1981

Pollutant	Averaging Time	Two-Year Mean (ug/m^3)	Highest Second-Highest Value (ug/m^3)
SO_2	Annual	20	--
	24-hour	--	139
	3-hour	--	380
PM	Annual	44	
	24-hour	--	81
NO_2	Annual	31	--

Table 5

Class II PSD Increment Consumption

Pollutant	Averaging Time	Bartow Facility (ug/m^3)	Total Predicted Increment Consumed (ug/m^3)	PSD Class II Increment (ug/m^3)
PM	Annual	3.3	2.8	19
	24-hour	26	25	37
SO_2	Annual	<0	<0	20
	24-hour	<0	--	91
	3-hour	<0	--	512

Table 6

Class I PSD Increment Consumption

Pollutant	Averaging Time	Bartow Facility (ug/m^3)	Total Predicted Increment Consumed (ug/m^3)	PSD Class I Increment (ug/m^3)
PM	Annual	<1	<1	5
	24-hour	<1	<1	10
SO_2	Annual	0.4	<0	2
	24-hour	<0	--	5
	3-hour	<0	--	25

Table 7

Comparison to FAAQS

Pollutant	Averaging Time	Bartow Plant (ug/m^3)	Bartow Plant plus Surrounding Sources (ug/m^3)	Total Impact (1) (ug/m^3)	FAAQS (ug/m^3)
PM	Annual	3.3	16.4	60	60
	24-hour	26		107	150
SO_2	Annual	5.5	20.8	41	60
	24-hour	69		208	260
	3-hour	307		687	1300
NO_2	Annual	2		33	100

(1) Includes a background concentration for each pollutant and averaging time.

(Proposed Attachment 6 to Permits AC 52-54946 and AC 52-54947)

BEST AVAILABLE CONTROL TECHNOLOGY (BACT) DETERMINATION
Bartow Power Station, Weedon Island
Florida Power Corporation
Pinellas County

The applicant intends to install burners on two steam generators presently firing residual oil and natural gas to allow the firing of pulverized coal. The two steam generators to be modified are Bartow Unit 2 and Unit 3, both located at Weedon Island, St. Petersburg, Florida. The project also includes the construction of the following supporting facilities: 1) coal unloading, 2) coal storage, 3) coal transfer systems, 4) ash disposal system, 5) air pollutant control devices, and 6) fly ash disposal system.

Bartow Unit 2 has a maximum rated heat input of 1196 million Btu per hour and at this rate would consume approximately 52 tons of coal per hour. Bartow Unit 3 has a maximum rated heat input of 1990 million Btu per hour and at this rate would consume approximately 87 tons of coal per hour. Twelve coal nozzles will be installed in Unit 2 and twenty in Unit 3 to fire pulverized coal. An electrostatic precipitator (ESP) will be installed on each boiler flue gas stream to control particulate emissions. Sulfur dioxide emissions will be controlled by limiting the sulfur content in the coal fired. The furnace will use two stage (off-stoichiometric) combustion to reduce nitric oxide emissions. This method is considered the most effective for reducing the flame temperature and therefore, the temperature dependent conversion of atmospheric nitrogen to NO_x will be lowered.

Coal hauled in by barges or ships will be unloaded at the site using a clamshell bucket. The coal will be transferred on covered belt conveyors to the storage area. The active stockout pile will be formed using a radial stacker having a telescopic chute to minimize free fall. Coal under 2 1/2 inch maximum size will be transferred from the active pile to the crusher building, where the coal will be reduced to 1 1/2 inch maximum size and stored in eight silos, three for Unit 2 and five for Unit 3, which will provide each boiler with a minimum of 8 hours coal supply at maximum load. The coal is then pulverized to the fineness required (200 mesh) and delivered to the furnace for combustion.

Finely divided particles of ash (fly ash) removed from the flue gas streams by the ESP units will be pneumatically conveyed to a common storage silo. The fly ash silo will have two telescopic discharge chutes and one rotary unloader. The fly ash will be loaded into covered trucks for removal from the site to purchasers or placed in a temporary onsite storage area for future sale. A windbreak enclosure will be erected to prevent fugitive dust emissions during truck loading. Baghouses will be

used to control particulate emissions generated by various operations. These are shown in Figure 1 and listed in Table 1, below.

Table 1

BAGHOUSE INVENTORY

FIG. 1 ITEM NO.	Location	Estimated Particulate Emissions lb/hr	TPY
2	Clamshell (coal)	1.08	0.45
4	Transfer Point 1 (coal)	0.14	.06
6	Transfer Point 2 (coal)	0.26	.22
11	Reclaim Area (coal)	0.09	.12
15	Crusher Building (coal)	0.23	.31
17	Transfer Point 3 (coal)	0.37	.52
19	Transfer Point 4 (coal)	0.37	.22
23	Transfer Point 5 (coal)	0.54	.45
21	Unit 2 Coal Silos (3)	0.26	.15
31	Unit 3 Coal Silos (3)	0.26	.13
24	Unit 3 Coal Silos (2)	0.17	.06
	Fly Ash Transfer	0.11	.17
	Fly Ash Transfer	0.11	.17
	Fly Ash Transfer (Stand-by)	0.11	.00
29	Fly Ash Silo	0.43	.18

The two steam generators will be permitted to operate 8760 hours per year. Unit 2 steam output drives a turbine electric power generator that has a maximum rated capacity of 119 megawatts. Unit 3 drives a generator with a maximum rated capacity of 209 megawatts. The rate of firing each boiler will vary with the demand for electricity.

There are two New Source Performance Standards (NSPS) that set pollutant emission standards for sources such as Bartow Unit 2 and Unit 3. The NSPS 40 CFR 60.40, Subpart D, applicability date is August 17, 1971, and NSPS 40 CFR 60.40a, Subpart Da, applicability date is September 18, 1978. Both units were constructed prior to the applicability dates. The contract data sheet for each unit indicates that the original design included the possibility of firing pulverized coal. Therefore, the department finds that each unit was originally designed to accommodate the use of coal, and the proposed conversion therefore is not a modification that subjects either unit to the requirements of either NSPS. Although the two generating units were designed to accommodate coal, the Bartow facility as a whole is not capable of accommodating coal because it was not equipped with coal-handling facilities. Therefore, the project as a whole is subject to PSD review under Rule 17-2.500, FAC. Emissions of particulates, SO_2 and NO_x will increase above the Significant Emission Rates in Table 500-2, of Rule 17-2.500, FAC.

COAL CONVERSION FACILITIES LEGEND

FACILITY	REMARKS
OCEAN GOING BARGE	13,500 TONS
BARGE UNLOADER	
CONVEYOR 1	
TRANSFER PT 1	
CONVEYOR 2	
TRANSFER PT 2	
CONVEYOR 3	
RADIAL STACKER	
ACTIVE STOCKOUT PILE	
LOW SULFUR RESERVE STORAGE	51,000 TONS
HIGH SULFUR RESERVE STORAGE	22,000 TONS
RECLAIM HOPPER	
CONVEYOR 4	
CONVEYOR 5	
CONVEYOR 6	
CRUSHER BUILDING	
CONVEYOR 7	
TRANSFER PT 3	
CONVEYOR 8	
TRANSFER PT 4	
CONVEYOR 201	
CONVEYOR 202	
CONVEYOR 301	
TRANSFER POINT 5	
CONVEYOR 302	
CONVEYOR 303	
ASH WATER RECLAIM TANK	
UNIT 2 PRECIPITATOR	
UNIT 3 PRECIPITATOR	
FLY ASH SILO	
CRUSHER BUILDING CONTROL WING	HOUSES HVAC, ELECTRICAL & CONTROL EQUIPMENT
CONVEYOR 304	
TRANSFORMER T-3	
TRANSFORMER T-2	
ASH WATER RECLAIM PUMP SUS TRANSFORMER	
ASH WATER RECLAIM PUMP SUS	
CRUSHER BUILDING MCC TRANSFORMER	
TRANSFER POINT 2 ELECTRICAL EQUIPMENT ROOM	
TRANSFER POINT 2 MCC TRANSFORMER	
UNIT 2 ID FANS	
ASH TRENCH	
UNIT 3 ID FANS	
CONDENSATE TANK	RELOCATED
OIL UNLOADING STATION	RELOCATED
ASH SLUICE LINES	ABOVE GROUND EXCEPT AS SHOWN
ASH WATER RETURN LINE	ABOVE GROUND EXCEPT AS SHOWN
ASH WATER RECLAIM PUMPS	
ASH POND	
RECYCLE BASIN	
ASH REMOVAL CONTROL BLDG	
PULVERIZER REJECTS & ECONOMIZER ASH HOLDING TANK	
FLY ASH STORAGE	60 DAY
COAL PILE RUNOFF & ASH WATER BLOWDOWN BASIN	
FUEL SERVICE & VEHICLE MAINTENANCE FACILITY	
WAREHOUSE ADDITION	

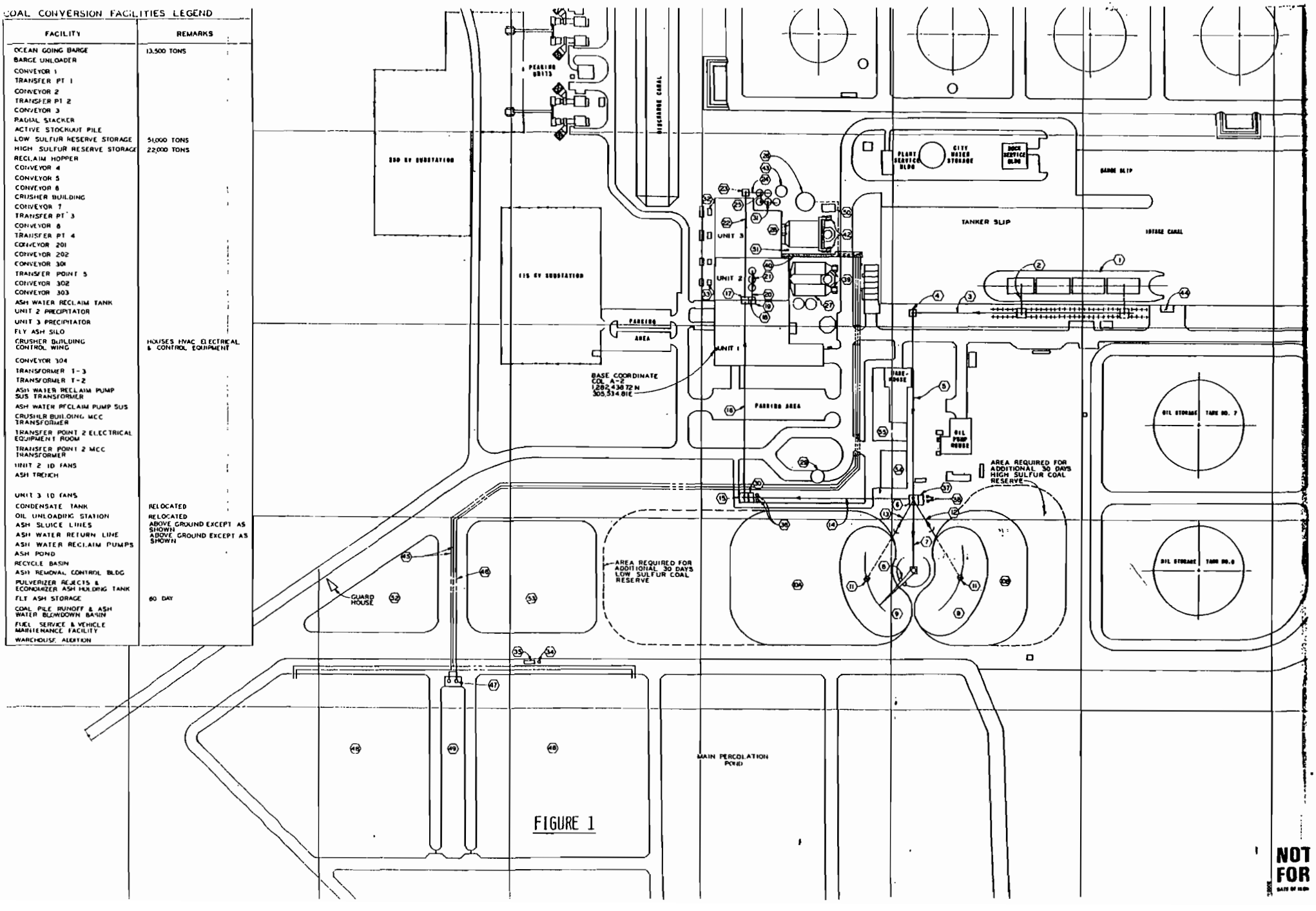


FIGURE 1

NOT FOR

Consequently a BACT determination is required for each of these pollutants as set forth in Rule 17-2.500 (2)(f), FAC.

BACT Determination Requested by the Applicant:

An electrostatic precipitator (ESP) will be installed to limit particulate emissions to 0.1 pounds per million Btu. A sulfur dioxide emission limit of 2.75 pounds per million Btu will be achieved by firing a medium sulfur content coal. The burners will be redesigned to use overfire air to limit NO_x emissions to less than 0.6 pounds per million Btu.

Date of Receipt of a BACT Application:

January 4, 1983

Notice of Receipt in the Florida Administrative Weekly:

January 14, 1983

Review Group Members:

Clair Fancy - Central Air Permitting - BAQM
Bob King - New Source Review Section - BAQM
Tom Rogers - Air Modeling Section - BAQM
Dan Williams - DER Southwest District Office

BACT Determined by DER:

Pollutant	Emission Limit
Particulates (Units 2 and 3)	0.10 pound per million Btu heat input, averaging time per 17-2.700
Sulfur Dioxide (Units 2 and 3)	1.2 pounds per million Btu heat input, daily average based on 3-hour composite fuel samples
Nitrogen Oxides (Units 2 and 3)	0.55 pound per million Btu heat input, averaging time per 17-2.700
Visible Emissions (VE) (Units 2 and 3)	Not greater than 20 percent opacity, six-minute average, except for one six-minute period per hour of not more than 27 percent opacity.
Visible Emissions (VE) (Fugitive emissions)	Not greater than 10 percent opacity, six-minute average
Visible Emissions (VE) (Baghouses-Table 1)	Not greater than 5 percent opacity, six-minute average

Compliance with the mass emission rate limits for particulate, SO_2 and NO_x for the boilers will be in accordance with Rule 17-2.700, FAC. Continuous compliance with the SO_2 24-hour limit will be demonstrated by composite 24-hour as-fired coal analysis using recognized ASTM methods.

Compliance with the opacity limits on Units 2 and 3, the baghouses listed in Table 1, and fugitive or unconfined particulate emissions will be in accordance with DER Method 9 (17-2.700(6)(a)9.,FAC). The baghouse sources listed in Table 1 are exempt from mass emission rate compliance tests so long as the visible emission limits are met, unless the department has other reasons to believe the mass emission limits are being exceeded.

A continuous opacity monitoring system to measure the visible emissions from Unit 2 and Unit 3 will be installed, calibrated, maintained, and operated in accordance with the provisions of Rule 17-2.710, FAC, Continuous Monitoring Requirements.

BACT Determination Rationale:
This facility is exempt from the NSPS for electric generating stations promulgated June 11, 1979, per the applicability subsection

40 CFR 60.40a(d). The applicant proposes that particulate emissions be no greater than 0.1 pounds per million Btu, which is equal to the particulate standard stipulated in the NSPS for fossil-fuel-fired steam generators (Subpart D) promulgated December 23, 1971. DER agrees that this limit meets BACT for particulate emissions from Unit 2 and Unit 3. The collection efficiency required would be between 98 and 99 percent.

The applicant proposes that sulfur dioxide emissions be no greater than 2.75 pounds per million Btu. Compliance with the proposed SO_2 emission limit would be obtained by the burning of a medium sulfur content (1.5%) coal instead of a flue gas desulfurization (FGD) system. DER does not agree that this limit meets BACT for SO_2 emissions. DER has determined that BACT for this project is 1.2 pounds SO_2 per million Btu, which is equal to the emission limit stipulated in the aforementioned NSPS Subpart D. The maximum SO_2 emission rate from Unit 2 is 1435 lb/hr and 2388 lb/hr from Unit 3. The reasoning for this is that although the department agrees that a flue gas desulfurization system is generally not practical for retrofitting on an existing small electric generating station, we do not agree that the costs of burning low sulfur coal (0.7%S) are excessive as compared to buying medium sulfur coal (1.5%S). The assumptions in arriving at this determination are as follows:

A. The cost of 2.5%S oil is $3.84/mmBtu, based on $24.00/bbl (Platt's Oilgram Price Report, Dec. 1982).

B. The cost of 0.7%S coal is $2.20/mmBtu, based on $52.80/ton (Fuel Costs Reports from Gainesville Regional Utilities, Apr. 1982).

C. The cost of 1.5%S coal is $2.05/mmBtu, based on $49.20/ton (FPC's application, Dec. 1982).

D. The cost of 3.5%S coal is $1.80/mmBtu, based on $43.20/ton (DOE's report, 1981).

E. After conversion, the plant will have a remaining useful life of 20 years.

F. The cost of money will be approximately 12% (compound interest factor 0.1339).

G. The capital cost of FGD systems for both units would be $100,000,000 (FGD Symposium, May 1982. Economic Evaluation and Comparison of Alternative Limestone Scrubbing Options).

H. The capital cost of the conversion of the boilers and auxiliary equipment would be $70,000,000 (PedCo Enviromental Report, Table 5-1, Nov. 1982).

I. The cost of all air pollution equipment (except FGD systems) would be $24,000,000 (FPC's original application, Apr. 1982).

J. The cost of the larger coal mills for handing the low sulfur coal would be $1,000,000 (FPC's application, Dec. 1982).

K. Operation and maintenance costs for all air pollution control equipment (except FGD) would be $4,200,000 annually (PedCo Environmental Report, Nov. 1982, Table 5-2).

L. Operation and maintenance costs for both FGD systems would be $10,000,000 annually. (FPC's application Dec. 1982).

Fuel savings would be calculated as follows:

Low sulfur coal: (1196 + 1990) x .785 x (3.84 - 2.20) x 24 x 365
= $35,900,000/year

Medium sulfur coal: (1196 + 1990) x .785 x (3.84 - 2.05) x 24 x 365 = $39,200,000/year

High sulfur coal: (1196 + 1990) x .785 x (3.84 - 1.80) x 24 x 365
= $44,700,000/year

Annual Net Savings

Case I: ESP, low sulfur coal (0.7%)

S = 35,900,000 - 4,200,000 - (70 + 24 + 1) x 1,000,000 x .1339
= $19,000,000

Case II: ESP, medium sulfur coal (1.5%)

S = 39,200,000 - 4,200,000 - (70 + 24) x 1,000,000 x .1339
= $22,400,000

Case III: ESP, FGD, high sulfur coal (3.5%)

S = 44,700,000 - 10,600,000 - 4,200,000 - (70 + 24 + 100) x 1,000,000 x .1339
= $3,900,000

By converting to the use of low sulfur coal, sulfur dioxide emissions will be reduced from 18,000 tons/year to 13,000 tons per year for Units 2 and 3, even though the capacity factors will increase from .64 to .785; and the company will save $19,000,000

per year. The use of medium sulfur coal would more than double annual SO_2 emissions from 13,000 tons/year to 30,000 tons/year and would save the company only an additional $3,400,000, or 18%. The use of an FGD system would lower the BACT emissions from 13,000 tons/year to 6,600 tons/year but would eliminate 80% of the savings that the company could obtain from burning low sulfur coal.

The applicant proposes to use combustion controls to guarantee a maximum NO_x emission rate. DER has determined the NO_x emission rate to be 0.55 pounds per million Btu as BACT for Unit 2 and Unit 3. This rate is more stringent than the NSPS Subpart D rate proposed by the applicant.

Details of the Analysis May be Obtained by Contacting:

Edward Palagyi, BACT Coordinator
Department of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32301

Recommended By:

_____
C. H. Fancy, Deputy Bureau Chief

Date:_____

Approved:

_____
Victoria J. Tschinkel, Secretary

Date:_____

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE: Fla. Power Corp.
P. O. Box 14042
St. Petersburg,
Florida 33733

Permit Number: AC 52-54946
Expiration Date: June 30, 1986
County: Pinellas
Latitude/Longitude: 27° 51' 40"N/
82° 36' 09"W
Project: Bartow Unit 2 Coal Conversion with Electrostatic Precipitator

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For coal conversion modification of Bartow Unit 2 (119 MW) with 1196 million Btu heat input capacity located at existing Bartow plant site on Weedon Island near St. Petersburg, Florida.

Construction shall be in accordance with the attached permit application and additional information except as otherwise noted on pages 4 and 5, Specific Conditions.

Attachments:
1. Application to Construct Air Pollution Sources, DER Form 17-1.122(16), received on April 20, 1982.
2. DER's incompleteness letter to FPC, dated May 20, 1982.
3. FPC's response to DER, received on June 14, 1982.
4. DER's incompleteness letters to FPC, dated July 14 and September 14, 1982.
5. FPC's responses to DER, received on December 6 and 27, 1982.
6. BACT determination.
7. EPA Memo concerning soot blowing performance testing dated March 6, 1979.
8. Fuel Sampling and Analysis Procedures.

PERMITTEE: Fla. Power Corp.
P. O. Box 14042
St. Petersburg,
Florida 33733

I. D. Number:
Permit Number: AC 52-54946
Expiration Date: June 30, 1986

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.

GENERAL CONDITIONS:

6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

a. Having access to and copying any records that must be kept under the conditions of the permit;

b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and

c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:

a. a description of and cause of non-compliance; and

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.

12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

(x) Determination of Best Available Control Technology (BACT)
(x) Determination of Prevention of Significant Deterioration (PSD)
( ) Compliance with New Source Performance Standards.

14. The permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.

GENERAL CONDITIONS:

b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the date(s) analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

SPECIFIC CONDITIONS:

PERMITTEE: Fla. Power Corp.
P. O. Box 14042
St. Petersburg,
Florida 33733

I.D. Number:
Permit Number: AC 52-54946
Expiration Date: June 30, 1986

SPECIFIC CONDITIONS:

1. Except as required pursuant to DER's BACT determination, (attachment 6) the proposed boiler modification shall be carried out in accordance with the statements in the application and additional information supplied by the applicant.

2. The boiler's maximum emission rates shall not exceed the emission limits listed below:

		Maximum Allowable Emissions	
Pollutant	$lb/10^6$ Btu	lb/hr	tons/year*
PM	0.10, averaging time per 17-2.700	120	524
SO_2	1.20, 24-hour average based on 3-hour composite samples	1,435	6,286
NOx	0.55, averaging time per 17-2.700	658	2,881

* Based on 100% load factor. The Company projects a load factor not to exceed 78.5%.

3. Visible emissions shall not be greater than 20 percent opacity, six-minute average, except for one six-minute period per hour of not more than 27 percent opacity, demonstrated in accordance with DER Method 9 (Rule 17-2.700(6)(a)9.,FAC).

4. Compliance with the mass emission rate limits for particulate, SO_2, and NOx for the boiler shall be demonstrated in accordance with the applicable provisions of Rule 17-2.700, FAC. Continuous compliance with the SO_2 24-hour limit shall be demonstrated by taking as-fired coal samples every three hours starting at midnight and performing a composite 24-hour coal analysis daily, using recognized ASTM methods, as summarized in Attachment 8. Reports shall be submitted quarterly to the DER Southwest District office and the Environmental Management Department of Pinellas County.

5. Instruments shall be installed, calibrated, and maintained to continuously measure the amount of coal used by the boiler. The records of fuel usage shall be kept by the company, available for regulatory agencies inspection, for a two-year period.

6. The electrostatic precipitator shall be operated during firing of the boiler on coal and no flue gas bypass of the precipitator shall be permitted.

PERMITTEE: Fla. Power Corp.
P. O. Box 14042
St. Petersburg,
Florida 33733

I. D. Number:
Permit Number: AC 52-54946
Expiration Date: June 30, 1986

SPECIFIC CONDITIONS:

7. In accordance with Rule 17-2.700(4),FAC, the stack sampling configuration of the proposed boiler shall comply with the minimum of 2D downstream and 0.5 D upstream distances to the sampling ports required to use DER Method 2 (Rule 17-2.700(6)(a)3.,FAC).

8. A continuous opacity monitoring system to measure the visible emissions from Unit 2 shall be installed, calibrated, maintained, and operated in accordance with the provisions of Rule 17-2.710, FAC, Continuous Monitoring Requirements.

9. Compliance with the particulate emission limit in Specific Condition No. 2, shall be demonstrated by EPA Methods 5 or 17. The PM performance test shall include the emissions from soot blowing. The method for calculating particulate emissions from soot blowing may be determined by the method described in the attached EPA memorandum dated March 6, 1979 (Attachment 7).

10. Compliance with the NOx emission limit in Specific Condition No. 2 shall be demonstrated by EPA Method 7.

11. Compliance with the SO_2 emission limit in Specific Condition No. 2 shall be demonstrated by EPA Method 19.

12. The hours of operation shall not exceed 24 hours per day, 7 days per week, 52 weeks per year or 8,760 hours per year.

13. Reasonable precautions to prevent fugitive particulate emissions at the site, such as coating of roads and construction sites used by contractors and regrassing or watering areas of disturbed soils or coal, shall be taken by the permittee.

PERMITTEE: **Fla. Power Corp.**
P. O. Box 14042
St. Petersburg,
Florida 33733

I. D. Number:
Permit Number: AC 52-54946
Expiration Date: June 30, 1986

SPECIFIC CONDITIONS:

14. Prior to 90 days before the expiration of this permit, a complete application for an operating permit shall be submitted to the DER Southwest District office. Full operation of the source may then be conducted in compliance with the terms of this permit until its expiration or until receipt of an operating permit.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

VICTORIA J. TSCHINKEL, Secretary

____ pages attached.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE: Fla. Power Corp.
P. O. Box 14042
St. Petersburg,
Florida 33733

Permit Number: AC 52-54947
Expiration Date: June 30, 1986
County: Pinellas
Latitude/Longitude: 27° 51' 40"N/
82° 36' 09"W
Project: Bartow Unit 3 Coal Conversion with Electrostatic Precipitator

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For coal conversion modification of Bartow Unit 3 (209 MW) with 1990 million Btu heat input capacity located at existing Bartow plant site on Weedon Island near St. Petersburg, Florida.

Construction shall be in accordance with the attached permit application and additional information except as otherwise noted on pages 4 and 5, Specific Conditions.

Attachments:
1. Application to Construct Air Pollution Sources, DER Form 17-1.122(16), received on April 20, 1982.
2. DER's incompleteness letter to FPC, dated May 20, 1982.
3. FPC's response to DER, received on June 14, 1982.
4. DER's incompleteness letters to FPC, dated July 14 and September 14, 1982.
5. FPC's responses to DER, received on December 6 and 27, 1982.
6. BACT determination.
7. EPA Memo concerning soot blowing performance testing dated March 6, 1979.
8. Fuel Sampling and Analysis Procedures.

PERMITTEE: Fla. Power Corp.
P. O. Box 14042
St. Petersburg,
Florida 33733

I. D. Number:
Permit Number: AC 52-54947
Expiration Date: June 30, 1986

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.

GENERAL CONDITIONS:

6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

a. Having access to and copying any records that must be kept under the conditions of the permit;

b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and

c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:

a. a description of and cause of non-compliance; and

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.

12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

(x) Determination of Best Available Control Technology (BACT)
(x) Determination of Prevention of Significant Deterioration (PSD)
( ) Compliance with New Source Performance Standards.

14. The permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.

GENERAL CONDITIONS:

b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the date(s) analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

SPECIFIC CONDITIONS:

PERMITTEE: Fla. Power Corp.
P. O. Box 14042
St. Petersburg,
Florida 33733

I.D. Number:
Permit Number: AC 52-54947
Expiration Date: June 30, 1986

SPECIFIC CONDITIONS:

1. Except as required pursuant to DER's BACT determination, (attachment 6) the proposed boiler modification shall be carried out in accordance with the statements in the application and additional information supplied by the applicant.

2. The boiler's maximum emission rates shall not exceed the emission limits listed below:

Pollutant	Maximum Allowable Emissions lb/10^6 Btu	lb/hr	tons/year*
PM	0.10, averaging time per 17-2.700	199	871
SO_2	1.20, 24-hour average based on 3-hour composite samples	2,388	10,459
NOx	0.55, averaging time per 17-2.700	1,095	4,794

* Based on 100% load factor. The Company projects a load factor not to exceed 78.5%.

3. Visible emissions shall not be greater than 20 percent opacity, six-minute average, except for one six-minute period per hour of not more than 27 percent opacity, demonstrated in accordance with DER Method 9 (Rule 17-2.700(6)(a)9.,FAC).

4. Compliance with the mass emission rate limits for particulate, SO_2, and NOx for the boiler shall be demonstrated in accordance with the applicable provisions of Rule 17-2.700, FAC. Continuous compliance with the SO_2 24-hour limit shall be demonstrated by taking as-fired coal samples every three hours starting at midnight and performing a composite 24-hour coal analysis daily, using recognized ASTM methods, as summarized in Attachment 8. Reports shall be submitted quarterly to the DER Southwest District office and the Environmental Management Department of Pinellas County.

5. Instruments shall be installed, calibrated, and maintained to continuously measure the amount of coal used by the boiler. The records of fuel usage shall be kept by the company, available for regulatory agencies inspection, for a two-year period.

6. The electrostatic precipitator shall be operated during firing of the boiler on coal and no flue gas bypass of the precipitator shall be permitted.

SPECIFIC CONDITIONS:

7. In accordance with Rule 17-2.700(4),FAC, the stack sampling configuration of the proposed boiler shall comply with the minimum of 2D downstream and 0.5 D upstream distances to the sampling ports required to use DER Method 2 (Rule 17-2.700(6)(a)3.,FAC).

8. A continuous opacity monitoring system to measure the visible emissions from Unit 2 shall be installed, calibrated, maintained, and operated in accordance with the provisions of Rule 17-2.710, FAC, Continuous Monitoring Requirements.

9. Compliance with the particulate emission limit in Specific Condition No. 2, shall be demonstrated by EPA Methods 5 or 17. The PM performance test shall include the emissions from soot blowing. The method for calculating particulate emissions from soot blowing may be determined by the method described in the attached EPA memorandum dated March 6, 1979 (Attachment 7).

10. Compliance with the NOx emission limit in Specific Condition No. 2 shall be demonstrated by EPA Method 7.

11. Compliance with the SO_2 emission limit in Specific Condition No. 2 shall be demonstrated by EPA Method 19.

12. The hours of operation shall not exceed 24 hours per day, 7 days per week, 52 weeks per year or 8,760 hours per year.

13. Reasonable precautions to prevent fugitive particulate emissions at the site, such as coating of roads and construction sites used by contractors and regrassing or watering areas of disturbed soils or coal, shall be taken by the permittee.

PERMITTEE: Fla. Power Corp.
P. O. Box 14042
St. Petersburg,
Florida 33733

I. D. Number:
Permit Number: AC 52-54947
Expiration Date: June 30, 1986

SPECIFIC CONDITIONS:

14. Prior to 90 days before the expiration of this permit, a complete application for an operating permit shall be submitted to the DER Southwest District office. Full operation of the source may then be conducted in compliance with the terms of this permit until its expiration or until receipt of an operating permit.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

VICTORIA J. TSCHINKEL, Secretary

____ pages attached.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE: Fla. Power Corp.
P. O. Box 14042
St. Petersburg,
Florida 33733

Permit Number: AC 52-54948
Expiration Date: June 30, 1986
County: Pinellas
Latitude/Longitude: 27° 51' 40"N/
82° 36' 09"W
Project: Bartow Coal & Fly Ash
Handling Systems
Bagfilter Nos.1 through 15

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

The construction consists of installing coal unloading, handling, and storage facilities and fly ash conveying, handling and storage facilities for Bartow Units 2 and 3 located at existing Bartow plant site on Weedon Island near St. Petersburg, Florida.

A coal dust and fly ash control system will be installed to filter the dust-laden air collected at the various transfer and take off points. Construction shall be in accordance with the attached permit application and additional information except as otherwise noted on pages 4 and 5, Specific Conditions.

Attachments:
1. Application to Construct Air Pollution Sources, DER Form 17-1.122(16), received on April 20, 1982.
2. DER's incompleteness letter to FPC, dated May 20, 1982.
3. FPC's response to DER, received on June 14, 1982.
4. DER's incompleteness letters to FPC, dated July 14 and September 14, 1982.
5. FPC's responses to DER, received on December 6 and 27, 1982.
6. BACT determination.

PERMITTEE: Fla. Power Corp.
P. O. Box 14042
St. Petersburg,
Florida 33733

I. D. Number:
Permit Number: AC 52-54948
Expiration Date: June 30, 1986

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.

GENERAL CONDITIONS:

6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

a. Having access to and copying any records that must be kept under the conditions of the permit;

b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and

c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:

a. a description of and cause of non-compliance; and

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

PERMITTEE: Fla. Power Corp.
P. O. Box 14042
St. Petersburg
Florida 33733

I. D. Number:
Permit Number: AC 52-54948
Expiration Date: June 30, 1986

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.

12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

(x) Determination of Best Available Control Technology (BACT)
(x) Determination of Prevention of Significant Deterioration (PSD)
( ) Compliance with New Source Performance Standards.

14. The permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.

GENERAL CONDITIONS:

b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the date(s) analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

SPECIFIC CONDITIONS:

PERMITTEE: Fla. Power Corp.
P. O. Box 14042
St. Petersburg,
Florida 33733

I.D. Number:
Permit Number: AC 52-54948
Expiration Date: June 30, 1986

SPECIFIC CONDITIONS:

1. The coal and fly ash handling systems shall be constructed in accordance with the statements in the application and additional information supplied by the applicant. In case of conflict, conditions specified herein shall take precedence.

2. Bag filters shall be installed to control emissions at the following 15 locations in accordance with the BACT determination.

No.	Location	Estimated Particulate Emissions	
		lb/hr	TPY
2	Clamshell (coal)	1.08	0.45
4	Transfer Point 1 (coal)	0.14	.06
6	Transfer Point 2 (coal)	0.26	.22
11	Reclaim Area (coal)	0.09	.12
15	Crusher Building (coal)	0.23	.31
17	Transfer Point 3 (coal)	0.37	.52
19	Transfer Point 4 (coal)	0.37	.22
23	Transfer Point 5 (coal)	0.54	.45
21	Unit 2 Coal Silos (3)	0.26	.15
31	Unit 3 Coal Silos (3)	0.26	.13
24	Unit 3 Coal Silos (2)	0.17	.06
	Fly Ash Transfer	0.11	.17
	Fly Ash Transfer	0.11	.17
	Fly Ash Transfer (Stand-by)	0.11	.00
29	Fly Ash Silo	0.43	.18

3. Visible emissions caused by fugitive or unconfined particulate from coal and fly ash handling systems and storage areas shall not be greater than 10 percent opacity, six-minute average, demonstrated in accordance with DER Method 9 (Rule (17-2.700(b)(a)9.,FAC).

4. Visible emissions from the bag filter exits shall not be greater than 5 percent opacity, six-minute average, demonstrated in accordance with DER Method 9. The baghouse sources listed in Specific Condition No. 2 shall be exempt from mass emission rate compliance tests so long as the 5 percent opacity limits are met, unless the department has other reasons to believe the mass emission limits are being exceeded.

PERMITTEE: Fla. Power Corp.
P. O. Box 14042
St. Petersburg,
Florida 33733

I. D. Number:
Permit Number: AC 52-54948
Expiration Date: June 30, 1986

SPECIFIC CONDITIONS:

5. The hours of operation shall not exceed 24 hours per day, 7 days per week, 52 weeks per year or 8,760 hours per year.

6. Reasonable precautions to prevent fugitive particulate emissions at the site, such as coating of roads and construction sites used by contractors and regrassing or watering areas of disturbed soils or coal, shall be taken by the permittee.

7. Prior to 90 days before the expiration of this permit, a complete application for an operating permit shall be submitted to DER Southwest District office. Full operation of the source may then be conducted in compliance with the terms of this permit until its expiration or until receipt of an operating permit. Issued this ___ day of_____, 1984

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL REGULATION

_____
VICTORIA J. TSCHINKEL, Secretary

_____ pages attached.

Florida Power
CORPORATION

April 19, 1982

Mr. Steve Smallwood, Chief
Bureau of Air Quality
Florida Dept. of Enviromental Regulation
Twin Towers Office Building
2600 Blairstone Road
Tallahassee, FL 32301

Subject: Bartow Units 2 and 3 Coal Conversion
DER Construction Permits

Dear Mr. Smallwood:

Enclosed are applications for construction permits for Bartow Units 2 & 3 for their conversion to coal and for the bag filters that will be on the associated coal and fly ash handling facilities. We are making these applications on the basis that Units 2 and 3 are "capable of accommodating" coal in that they were originally designed and constructed with provisions for future conversion to coal prior to January 6, 1975. This is in accordance with Ch17- 2.500(2)(c)4. Also attached in a letter from Mr. W.O. May outlining the specific provisions that Florida Power Corporation took in the original design and construction of these units to assure their capability of burning coal in the future.

Please note that these conversions are to be made while meeting the emission limits presently required in the existing operating permits for these units. The units will maintain their oil firing capabilities for maximum fuel flexibility.

These applications have been prepared based on preliminary design requirements. Florida Power is currently preparing bid packages for the various pieces of equipment to be purchased and constructed. Once more specific manufacturers' design and performance specifications are developed we will provide them to the Departments.

If you have any questions or other informational needs, please contact Mr. T.H. Wooten at 813/866-5528.

Sincerely,

William S. O'Brien

William S. O'Brien
Director
Environmental & Licensing Affairs

WSO/gr

Enclosures

cc: W. K. Hennessey, DER, Tampa w/attachments
T. W. Devine, EPA, Atlanta, w/attachments

Florida Power
CORPORATION

April 19, 1982

Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blairstone Road
Tallahassee, Florida 32301

Subject: Bartow Plant
Original Design Provision For Future Coal

Gentlemen:

The original design of all three units at Bartow Plant, and the general arrangement of the plant site including the intake canal/barge slip, were designed and constructed with provision for possible future conversion to pulverizer coal operation.

Structural Considerations

Plant structures, including foundation piling, foundation mats, and structural steel were designed and constructed to accommodate future coal auxiliary equipment such as pulverizers, feeders and silos. A complete building bay 24 feet wide was provided between the turbine bay and the boiler house to allow space for future coal auxiliary equipment.

Mechanical Considerations

The boiler specifications and the resulting boiler contract performance guarantees are based on initial oil and natural gas operation and include predicted performance on future coal operation. Burner compartments were originally designed with space provision for future coal burner nozzles including wind box air compartment dampers. The furnace is designed with a V bottom sufficient in slope for bottom ash removal on future coal operation. The furnace was sized for low slagging bituminous coals with furnace volume and tube spacing sufficient to minimize fouling problems on coal operation.

The attached Contract Data Sheets, drawings, and predicted performance information support our position that Bartow Units 2 & 3 were designed and constructed with provision to burn coal in the future.

Very truly yours,

W. O. May, P. E.
Manager
Generation Projects Design

WOM/dhv

TO

TAB 15

CONTRACT DATA SHEET

September 30,1960

File alphabetically FLO
Destroy sheet dated

CONTRACT NUMBER 11157

DISTRICT OFFICE CHARLOTTE, KANSAS CITY & JACKSONVILLE
CREDITED WITH SALE

CONTRACT DATE November 18,1957

PURCHASER FLORIDA POWER CORPORATION, ST. PETERSBURG, FLORIDA

USER FLORIDA POWER CORPORATION, WEEDON'S ISLAND NEAR PINELLAS PARK, FLORIDA

PLANT NAME	CONS. ENGR.	INDUSTRY
PAUL L. BARTOW PLANT UNIT No. 2	BLACK & VEATCH KANSAS CITY, MO.	P. U.

PROPOSED FUEL No. 6 FUEL OIL & NATURAL GAS (FUTURE PULVERIZED COAL)

ASH FUS. TEMP. F	BTU PER LB AS FIRED	HARDGROVE GRIND
	18,180	OIL

C 85.0 %	H_2 10.7 %	O_2 0.70 %	N_2 0.8 %	S 2.8 %			
CH_4 93.5%	C_2H_6 1.4%	C_3H_8 .34%	CO_2 1.0%	N_2 3.3	HIGH HYDRO. 0.46	1025 cu/ft. N.G.	

FUEL BURNING EQUIPMENT CONT. SECT. Z — C-E Tilting Tangential Burners

FURNACE CONT. SECT. PFS — SQ.FT.H.S. PER FURN. 12,164 — TYPE OF BOTTOM Basket

Plain Tube Furnace - Skin Cased

FRONT TO REAR	WIDTH	VOLUME
24'-6-1/32"	33'-4-1/8"	66,600 CU.FT. GROSS

BOILER CONT. SECT. BR — NO. 1 — SQ.FT. H.S.EA. -

DESIGNATION 33'-4-1/8" / 24'-6-1/32" — 129-3 / 92-3 — RR 66

MFR. C-E

STEAM WASHER

PRESSURE DESIGN	PRESSURE OPERATING
2150	1850 at S.O.

BOILER NUMBER 2

SUPERHEATER CONT. SECT. SH — TYPE Multistage with Platens

DESUPERHEATER

CONTROL RANGE 400,000 to 900,000 with burner tilt & desuperheater

SQ.FT. H.S. 59,640

FOR SUPHT'R. Spray

REHEATER TYPE Interstage

SQ.FT. H.S. 17,240

FOR REHEATER Spray

ECONOMIZER CONT. SECT. CONS — NO. 1 — MAKE C-E

TYPE CF-S 68W x 8-1/2H x 33'-2-1/8" Lg.

SQ.FT. H.S.EA. 22,200

AIR HEATER CONT. SECT. CARL — NO. 2 — MAKE Ljungstrom

TYPE 23½ VI 54

SQ.FT. H.S.EA. 81,700

MISCELLANEOUS DATA Contract included structural steel (roof), steel-encased setting, insulation, ductwork, soot blowers, steam temp. controls, gas recirculation fan & steam air heaters.

EXPECTED PERFORMANCE

FUEL		OIL		NATURAL GAS	
LB STEAM PER HR-ACTUAL	PRIMARY	400,000	900,000	400,000	900,000
	REHEAT	331,000	708,230	331,000	708,230
FEEDWATER TEMP. TO	ECON.	430	516	430	516
	BOILER	534	558	515	559
STEAM TEMP. at S.O.& R.O.		1000	1000	1000	1000
HEAT RELEASE BTU/CU.FT./HR.		8,650	17,600	9,020	18,450
TEMP. GAS FROM AIR HEATER		292	320	239	301
TEMP. AIR FROM AIR HEATER		566	609	512	605
OVERALL EFFICIENCY %		88.61	*87.68	84.8	83.49

*Guaranteed

GENERATOR(S) 1 - 121,000 22½

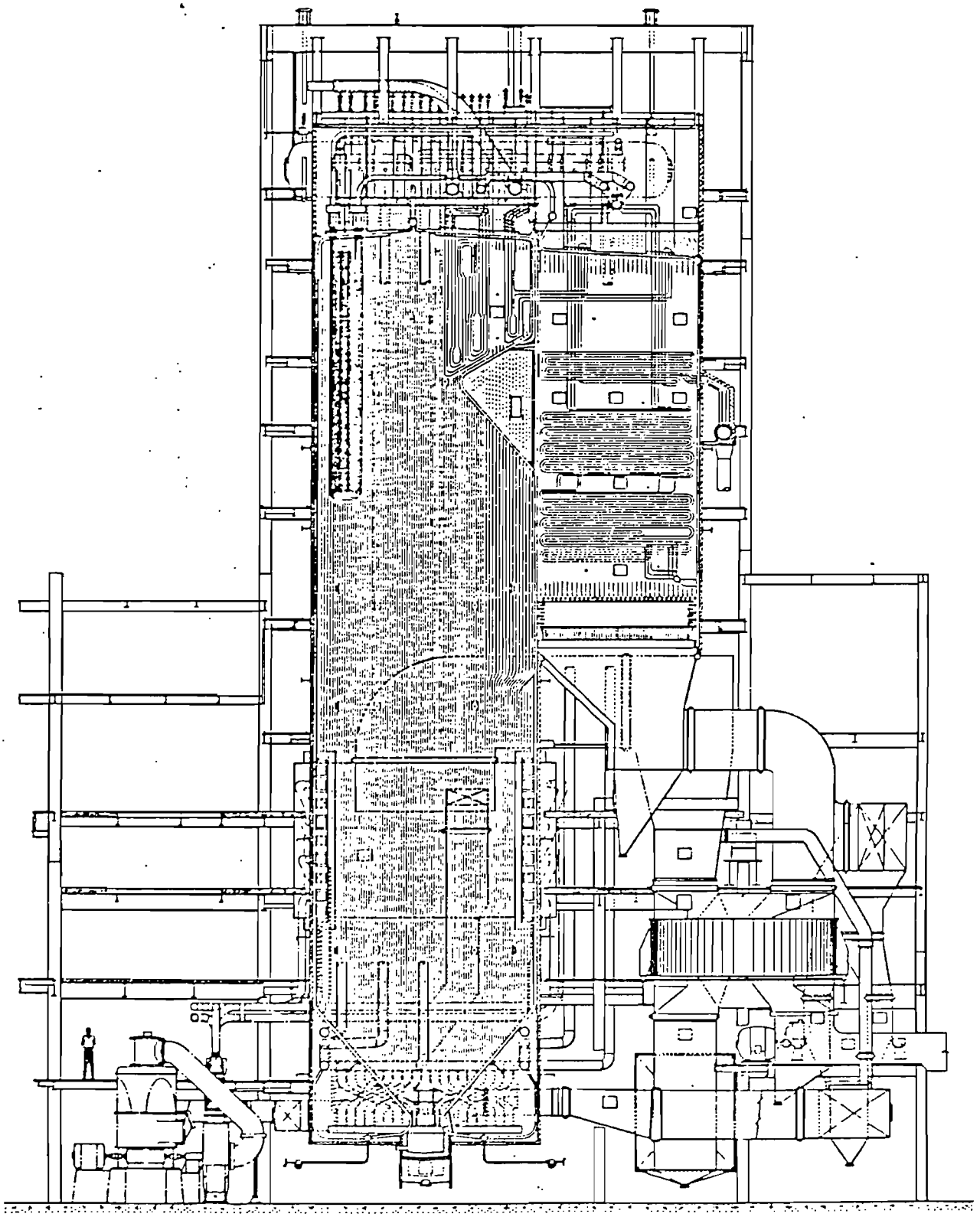
Peak - 920,000 lb per hr. - 4 hr.

REHEAT DATA

708,230 LB STEAM/HR.
Enter. Temp. 600 F
" Press. 326 Psi
Leav. Temp. 1000 F
" Press. 301 Psi

FORM 4-23-57

COMBUSTION ENGINEERING, INC.



Dwg. No. 30-343

STEAM GENERATING UNIT

PERFORMANCE GUARANTEES:

Subject to the performance conditions specified in preceding Paragraphs 1 through 16 the Company makes the following guarantees:

(a) PEAK LOAD CAPACITY

The unit can be operated for a period not exceeding four hr. at a capacity not exceeding 920,000 lb. steam per hr., with an interval of not less than twenty hr. between each period.

(b) MAXIMUM CONTINUOUS CAPACITY

The Company guarantees the equipment proposed hereunder to be capable of evaporating steam for a continuous period of 24 hours at a rate of 900,000 lbs. of steam per hour.

(c) PERFORMANCE (Based on Oil Firing)

At a capacity of 900,000 lbs. of steam per hr.

1.	Overall efficiency, pct	87.68
2.	Total steam temperature (plus or minus 10 deg F) from 400,000 to 900,000 lbs of steam per hr. at the superheater outlet, deg F	1,000
3.	Steam pressure drop through superheater, psi	70
4.	Water pressure drop through economizer, psi	10
5.	Total steam temperature (plus or minus 10 deg F) between reheat steam flows of 331,500 to 708,230 lbs per hr., deg F	1,000
6.	Steam pressure drop through reheater, psi	25
7.	Average solids carryover in steam leaving drum, ppm	1

(d) SMOKELESSNESS

The fuel burning equipment is capable of operation without objectionable smoke as defined by existing local smoke ordinance, but the Company assumes no responsibility for dust emission. (Applicable only when fuel burning equipment is furnished by the Company)

PREDICTED PERFORMANCE

The following performance data are predicted only and are not to be construed as being guaranteed except where points coincide with those given on the guarantee page of this proposal.

		OIL		NATURAL GAS	
Evaporation	M lb/hr	400	900	400	900
Temp. at superheater outlet	deg F	1,000	1,000	1,000	1,000
Pressure at superheater outlet	psi	1,850	1,850	1,850	1,850
Superheater pressure drop	psi	15.0	70.0	15.0	70.0
Economizer pressure drop	psi	2.5	10.0	2.5	10.0
Feedwater temperature	deg F	430	516	430	516
Efficiency	pct	88.61	87.68	84.80	83.49
Fuel Fired lb/hr Oil - M cu ft	Gas/hr	31,500	64,400	588	1,200
Combustion rate Btu/hr -	cu ft	7,530	15,280	7,660	16,050
Excess air leaving economizer	pct	20.0	20.0	20.0	20.0
Gas entering air heater	M lb/hr	564	1,130	573	1,150
Air leaving air heater	M lb/hr	488	1,022	502	1,050
Gas temp. leaving furnace	deg F	1,550	1,915	1,920	2,030
Gas temp. leaving economizer	deg F	637	735	578	733
Gas temp. leaving air heater, Uncorrected	deg F	295	321	239	301
Feedwater temp. leaving econ.	deg F	529	572	514	569
* Air temp. entering air heater	deg F	145	119	82	80
Air temp. leaving air heater	deg F	567	611	512	605
Draft losses: Furnace	"wg	0.15	0.15	0.15	0.15
Superheater & Reheater	"wg	1.80	2.50	1.30	2.20
Economizer	"wg	0.55	0.95	0.25	0.82
Air heater	"wg	0.75	2.40	0.80	2.60
Ducts	"wg	0.30	0.50	0.13	0.52
Precipitator	"wg	0.67	2.65	0.70	2.75
Total	"wg	4.22	9.15	3.33	9.04
Air pressure losses: Burners	"wg	3.00	4.00	3.00	4.00
Air heater	"wg	0.85	3.15	0.80	3.20
Steam airheater & Ducts	"wg	0.38	1.50	0.36	1.60
Total	"wg	4.23	8.65	4.16	8.80
Heat balance losses: Dry gas	pct	3.21	4.32	3.13	4.41
H_2O & H_2 in fuel	pct	6.07	6.13	9.96	10.22
H_2O in air	pct	0.08	0.11	0.08	0.12
Radiation	pct	0.53	0.26	0.53	0.26
Unaccounted for	pct	1.50	1.50	1.50	1.50
Total	pct	11.39	12.32	15.20	16.51
* Based on steam air heating from 80 °F					
Reheat steam flow	M lb/hr	331.5	708.23	331.5	708.23
Reheater entering temperature	deg F	515	602	515	602
Reheater entering pressure	psig	160	344	160	344
Reheater leaving temperature	deg F	1,000	1,000	1,000	1,000
Reheater leaving pressure	psig	154	319	154	319
Air heater leakage	lb/hr	71,000	92,000	71,000	96,000
Gas temp. leaving A. H. (Corr.)	deg F	279	307	224	285
Net heat release rate Btu/hr - sq ft EPRS		46,500	94,300	46,000	94,200

PREDICTED PERFORMANCE

For future pulverized coal based on fuel analysis given in the Purchaser's specification.

		COAL	
Evaporation	M lb/hr	400	900
Temperature at superheater outlet	deg F	1,000	1,000
Pressure at superheater outlet	psi	1,850	1,850
Superheater pressure drop	psi	15.0	70.0
Economizer pressure drop	psi	2.5	10.0
Feedwater temperature	deg F	430	516
Efficiency	pct	90.06	88.08
Fuel fired	lb/hr	45,400	93,400
Combustion rate Btu/hr - cu ft		7,430	15,220
Excess air leaving economizer	pct	25.0	25.0
Gas entering air heater	M lb/hr	599	1,201
Air leaving air heater	M lb/hr	500	1,000
Gas temperature leaving furnace	deg F	1,940	2,045
Gas temperature leaving economizer	deg F	580	744
Gas temperature leaving air heater, Uncorrected	deg F	265	317
Feedwater temperature leaving econ.	deg F	491	574
* Air temperature entering air heater	deg F	119	80
Air temperature leaving air heater	deg F	516	620
Draft losses: Furnace	"wg	0.15	0.15
Superheater and Reheater	"wg	1.40	2.35
Economizer	"wg	0.28	0.90
Air heater	"wg	0.75	2.55
Ducts	"wg	0.14	0.57
Precipitator	"wg	0.75	3.00
Total	"wg	3.47	9.52
Air pressure losses: Burners	"wg	3.00	4.00
Air heater	"wg	0.85	2.95
Steam air heater and Ducts	"wg	0.52	1.44
Total	"wg	4.37	8.39
Heat Balance Losses: Dry gas	pct	3.40	5.51
H_2O & H_2 in fuel	pct	4.13	4.22
H_2O in air	pct	0.08	0.13
Carbon	pct	0.30	0.30
Radiation	pct	0.53	0.26
Unaccounted for	pct	1.50	1.50
Total	pct	9.94	11.92
* Based on steam air heating from 80°F			
Reheat steam flow	M lb/hr	331.5	708.23
Reheater entering temperature	deg F	515	602
Reheater entering pressure	psig	160	344
Reheater leaving temperature	deg F	1,000	1,000
Reheater leaving pressure	psig	154	319
Air heater leakage	lb/hr	71,000	94,000
Gas temperature leaving air heater Corrected	deg F	251	301
Net heat release rate Btu/hr - sq ft EPRS		46,500	94,900

TO

TAB 15

CONTRACT DATA SHEET

FROM GENERAL SALES - DATA
August 28, 1962

File alphabetically FLO
Destroy sheet dated 6-6-62

CONTRACT END 10460

DISTRICT OFFICE CREDITED WITH SALE: JACKSONVILLE & KANSAS CITY

CONTRACT DATE: February 4, 1960

PURCHASER: FLORIDA POWER CORPORATION, ST. PETERSBURG, FLORIDA

USER: FLORIDA POWER CORPORATION, WEEDON'S ISLAND NEAR PINELLAS PARK, FLORIDA

PLANT NAME	PAUL L. BARTOW STA. UNIT NO. 3	CONS. ENGR.	BLACK & VEATCH KANSAS CITY, MO.
INDUSTRY	P. U.		

BOILER NO. 1 — SQ. FT. H.S. PER UNIT: 25,350

DESIGNATION: 43'-11-7/16" / 30'-0-3/4" — 173-3 / 108-3 — RRP 66

PRESSURES

DESIGN	2400
OPER. S.O.	2050
TURBINE THROTTLE	2000

FURNACE VOLUME CU. FT. TOTAL: 153,500 — TYPE OF BOTTOM: Basket — WIDTH: 43'-11-7/16"

Pressurized - Plain Tubes - Skin Cased — FRONT TO REAR: 30'-0-3/4"

SUPERHEATER TYPE: Multistage with Platens — **REHEATER** TYPE: Interstage

ECONOMIZER NO. 1 — TYPE: CF-S 68W x 11H x 43'-8"lg.

AIR HEATER NO. 1 — TYPE: 25½ VI 48 — MAKE: Ljungstrom

FUEL BURNING EQUIPMENT: Tilting Tangential Burners

FUEL: NO. 6 FUEL OIL, NAT. GAS (FUTURE PULV. COAL)

				ASH FUSION TEMP. F	GRINDABILITY	HHV
F. C. 59.70	VOL. 29.30	MOIST. 3.20	ASH 7.80	-	50	13,500
C 85.13	H_2 10.07	$O_2 + N_2$ 1.48	ASH .07	S 3.25		17,813
CH_4 93.50	N_2 3.37	CO_2 1.02	C_2H_6 1.41	C_4H_{10} 0.18	Higher Hydro Carbons 0.18	1025 / cu. ft.

OPERATING CONDITIONS

FUEL		OIL			NAT. GAS	COAL (F)
		CONTROL POINT	M. C.	4 Hr. 5% Peak	M. C.	M. C.
LB STEAM PER HOUR ACTUAL	PRIMARY	711,750	1,423,500	1,495,000	1,423,500	1,423,500
	REHEAT	664,647	1,309,562	1,482,000	1,309,562	1,309,562
STEAM TEMP. F LEAVING	SUPERHEATER	1000	1000	1000	1000	1000
	REHEATER	1000	1000	1000	1000	1000
REHEAT DATA	ENTERING TEMP.	573	651	665	651	651
	ENTERING PRESS.	235	475	535	475	475
FEEDWATER TEMP. F		397	460	405 TH°	460	460
TEMP. AIR TO AIR HEATER		150	131	132	80	80
TEMP. GAS FROM AIR HEATER		302	321	320	287	310
OVERALL EFFICIENCY % *Guaranteed		88.98	* 88.33	88.35	84.07	89.34

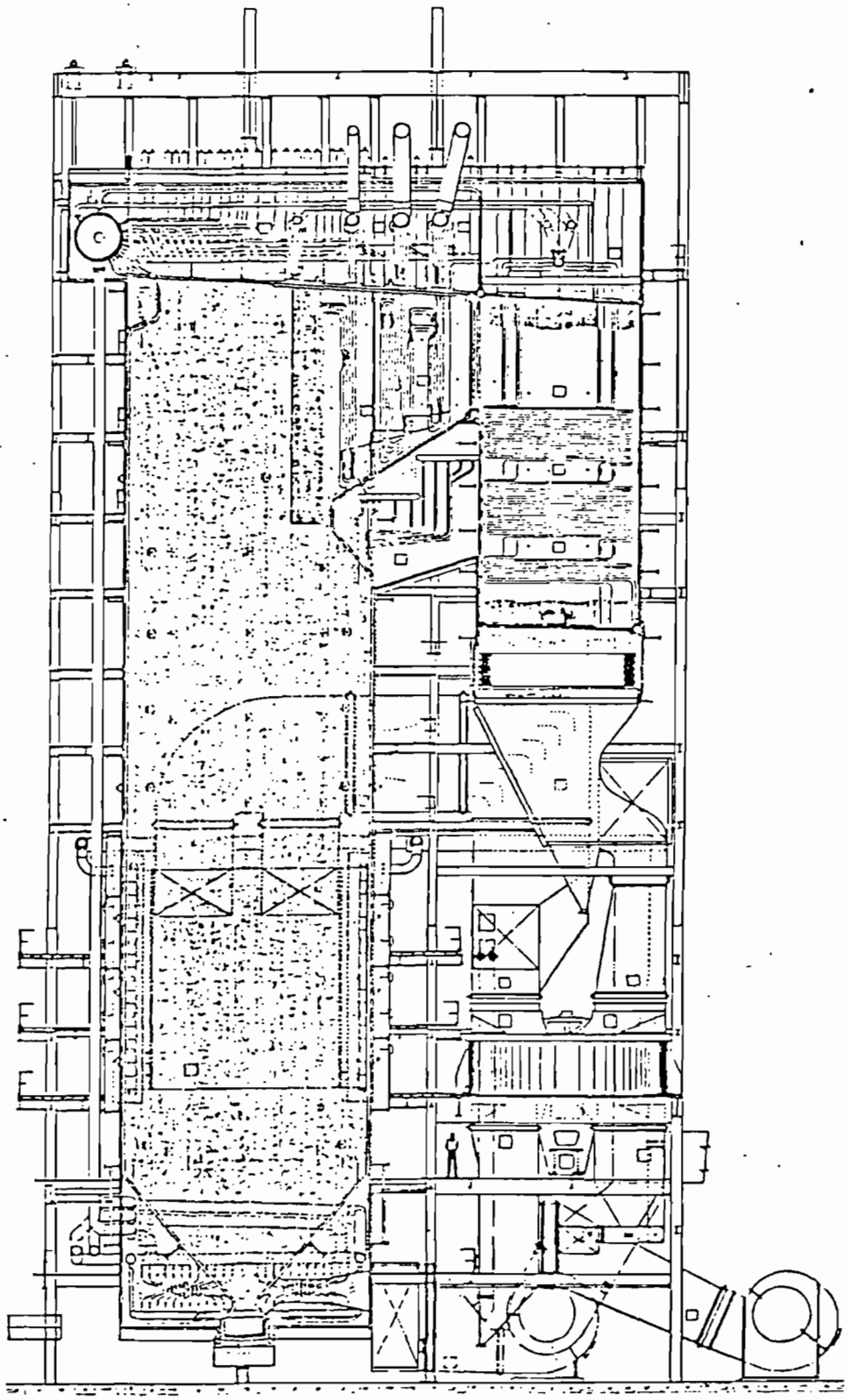
SUPPLEMENTARY DATA Contract included miscellaneous structural steel, steel-encased setting, insulation, ductwork, soot hoppers, desuperheaters, steam temperature controls, special tools, etc.

GENERATOR KW MFR. RATING: 1 - 204,000

PLANT ELEV. Sea Level

FORM NO. 1-2-62

LINE REVISED THIS ISSUE •



Dwg. No. 30-362

STEAM GENERATING UNIT

PERFORMANCE GUARANTEES:

Subject to the performance conditions specified in preceding Paragraphs 1 through 16 the Company makes the following guarantees:

(a) PEAK LOAD CAPACITY

The unit can be operated for a period not exceeding 4 hr. at a capacity not exceeding 1,495,000 lb. steam per hr., with an interval of not less than 20 hr. between each period.

(b) MAXIMUM CONTINUOUS CAPACITY

The Company guarantees the equipment proposed hereunder to be capable of evaporating steam for a continuous period of 24 hours at a rate of 1,423,500 lbs. of steam per hour.

(c)
PERFORMANCE

At a capacity of 1,423,500 lb. of steam per hr. based on oil firing

(1)	Overall efficiency, Pct.	85.33
(2)	Steam Temperature leaving Superheater, deg. F. (plus or minus 10 deg F)	1000 *
(3)	Steam Temperature leaving Reheater, deg F. (plus or minus 10 deg F)	1000 **
(4)	Steam Pressure Drop Across Superheater, PSIG.	120
(5)	Steam Pressure Drop Across Reheater, PSIG.	25
(6)	Water Pressure Drop Across Economizer, PSIG.	8
(7)	Solids in Steam Leaving Boiler Drum, PPM	1

* Controlled at essentially 1000 deg F (Plus or Minus 10 deg F) from an evaporation of 711,750.

**Controlled at essentially 1000 deg F (Plus or Minus 10 deg F) from a reheat steam flow of 664,647.

(d) SMOKELESSNESS

The fuel burning equipment is capable of operation without objectionable smoke as defined by existing local smoke ordinance, but the Company assumes no responsibility for dust emission. (Applicable only when fuel burning equipment is furnished by the Company)

The following performance data is guaranteed subject to the tolerances construed as being guaranteed except where the points coincide with those given on the guarantee page of this proposal.

Fuel			Oil	Oil
Evaporation		lb/hr	711,750	1,423,500
Temperature at superheater outlet		deg F	1,000	1,000
Pressure at superheater outlet		psig	2,025	2,050
Superheater pressure drop		psi	120	33
Feedwater temperature		deg F	395	460
Feedwater temperature leaving economizer		deg F	479	508
Economizer pressure drop		psi	2	8
Reheater flow		lb/hr	664,647	1,309,690
Temperature at reheater outlet		deg F	1,000	1,000
Temperature at reheater inlet		deg F	573	651
Pressure at reheater inlet		psig	235	475
Reheater pressure drop		psi	14	25
Continuous blowdown		lb/hr	7,117	14,235
Gas temperature furnace		deg F	1,610	1,930
Gas temperature boiler		deg F	760	793
Gas temperature leaving economizer		deg F	612	662
Gas temp. leaving air heater, Uncorrected		deg F	302	321
Gas temp. leaving air heater, Corrected		deg F	290	310
Ambient air temperature		deg F	80	80
Air temperature entering air heater		deg F	150	131
Air temperature leaving air heater		deg F	524	532
Gas leaving economizer		lb/hr	994,000	1,840,000
Air leaving air heater		lb/hr	875,000	1,620,000
Air heater leakage		lb/hr	94,000	124,000
Excess air leaving economizer		pct	18	18
Heat losses:	Dry gas	pct	4.66	5.06
	H2O & H2 in fuel	pct	5.83	5.67
	H2O in air	pct	0.12	0.13
	Carbon	pct	--	--
	Radiation	pct	0.33	0.18
	Unacc. & Mfg. Margin	pct	1.50	1.50
	Total	pct	12.44	12.74
	Heat balance credit - steam air heater		1.42	1.07
Efficiency		pct	88.98	88.33
Fuel fired		lb/hr	56,500	109,500
Combustion rate		Btu/hr/cu ft	8,810	12,700
Net release rate		Btu/hr/sq ft EPRS	94,200	101,500
Pressure drop:	Windbox	"wg	2.85	3.70
	Air Heater, Air Side	"wg	1.05	3.30
	Air Ducts	"wg	0.30	1.00
	Steam Air Heater (By Purchaser)	"wg	0.15	0.50
	Total	"wg	4.35	8.50
Draft loss:	Furnace	"wg	0.15	0.15
	Superheater and Reheater	"wg	2.90	5.35
	Economizer	"wg	0.45	0.85
	Air Heater, Gas Side	"wg	0.90	2.45
	Gas Ducts	"wg	0.25	0.50
	Total	"wg	4.65	9.30

The following performance data are predicted only and are not to be construed as being guaranteed except where the points coincide with those given on the guarantee page of this proposal.

Fuel			Coal	
Evaporation		lb/hr	711,750	1,423,500
Temperature at superheater outlet		deg F	1,000	1,000
Pressure at superheater outlet		psi	2,050	2,050
Superheater pressure drop		psi	33	120
Economizer pressure drop		psi	2	8
Feedwater temperature		deg F	356	460
Efficiency		pct	90.01	89.34
Fuel fired		lb/hr	78,000	150,000
Combustion rate		Btu/cu ft	6,700	12,500
Excess air leaving economizer		pct	20	20
Gas leaving economizer		lb/hr	1,020,000	1,900,000
Air leaving air heater		lb/hr	830,000	1,590,000
Gas temperature leaving furnace		deg F	2,000	2,020
Gas temperature leaving boiler		deg F	735	785
Gas temperature leaving economizer		deg F	585	655
Gas temperature leaving air heater, uncorrected		deg F	270	310
Feedwater temperature leaving econ.		deg F	460	510
Air temperature entering air heater		deg F	80	80
Air temperature leaving air heater		deg F	525	550
Draft losses: Furnace		"wg	.15	.15
Superheater, Reheater and Boiler		"wg	1.30	4.50
Economizer		"wg	.40	.80
Air Heater		"wg	.95	2.50
Ducts		"wg	.25	.50
Precipitator - By Purchaser		"wg	1.00	3.50
Total		"wg	3.90	11.80
Air pressure losses: Burners		"wg	2.30	2.65
Air Heater		"wg	1.10	3.20
Ducts and Steam Air Heater by Purchaser		"wg	.45	1.50
Total		"wg	4.85	7.35
Heat balance losses: Dry gas		pct	4.24	5.13
H_2O & H_2 in fuel		pct	3.61	3.55
H_2O in air		pct	0.11	0.13
Carbon		pct	.15	.15
Radiation		pct	.38	.18
Unaccounted for		pct	1.50	1.50
Total		pct	9.99	10.64
Heat balance credit: Steam Air Heater		pct	0	0
Reheater flow		lb/hr	664,647	1,329,600
Temp. at reheater outlet		deg F	1,000	1,000
Reheater pressure drop		psi	14	25
Gas leaving air heater		lb/hr	1,106,000	2,020,000
Air entering air heater		lb/hr	916,000	1,710,000
Heat release in furnace		Btu/sq ft/hr	54,000	101,000
Temp. reheater inlet		deg F	573	651
Pressure reheater inlet		psig	235	475
Continuous blowdown		lb/hr	7,117	14,235

The following performance data is predicted only and is not to be construed as being guaranteed.

Fuel		Gas	Gas
Evaporation	lb/hr	711,750	1,423,500
Temperature at superheater outlet	deg F	1,000	1,000
Pressure at superheater outlet	psig	2,025	2,050
Superheater pressure drop	psi	30	120
Feedwater temperature	deg F	396	460
Feedwater temperature leaving Econ.	deg F	460	500
Economizer pressure drop	psi	2	8
Reheater flow	lb/hr	654,647	1,309,690
Temperature at reheater outlet	deg F	1,000	1,000
Temperature at reheater inlet	deg F	573	651
Pressure at reheater inlet	psig	235	475
Reheater pressure drop	psi	14	25
Continuous blowdown	lb/hr	7,117	14,235
Gas temperature leaving furnace	deg F	1,910	2,040
Gas temperature boiler	deg F	736	770
Gas temperature leaving economizer	deg F	567	645
Gas temperature leaving air heater, Uncorrected	deg F	251	287
Gas temperature leaving air heater, Corrected	deg F	238	276
Ambient air temperature	deg F	80	80
Air temperature entering air heater	deg F	80	80
Air temperature leaving air heater	deg F	494	509
Gas leaving economizer	lb/hr	1,013,000	1,880,000
Air leaving air heater	lb/hr	915,000	1,740,000
Air heater leakage	lb/hr	90,000	122,000
Excess air leaving economizer	pct	18	18
Heat Losses: Dry gas	pct	3.36	4.06
H2O & H2 in fuel	pct	10.00	10.08
H2O in air	pct	0.10	0.11
Radiation	pct	0.33	0.18
Unacc. & Mfg. Margin	pct	1.50	1.50
Total	pct	15.29	15.93
Efficiency	pct	84.71	84.07
Fuel Fired	CFH	1,072,000	2,000,000
Combustion Rate Btu/hr./cu.ft.		7,160	13,350
Net Release rate Btu/hr/sq. ft. EPRS		54,500	102,500
Pressure Drop: Windbox	"wg	3.00	3.85
Air Heater, Air Side	"wg	1.05	3.35
Air Ducts	"wg	0.30	1.10
Steam Air Heater (By Purchaser)	"wg	0.15	0.55
Total	"wg	4.50	8.85
Draft Loss: Furnace	"wg	0.15	0.15
Superheater & Reheater	"wg	1.65	4.25
Economizer	"wg	0.30	0.70
Air Heater, Gas Side	"wg	0.90	2.55
Gas Ducts	"wg	0.20	0.55
Total	"wg	3.20	8.20

AC 52-54946

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

DER

APR 20 1982

BAQM

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Fossil Fuel Steam Generator [ ] New[1] [X] Existing[1]

APPLICATION TYPE: [ ] Construction [ ] Operation [X] Modification

COMPANY NAME: Florida Power Corporation COUNTY: Pinellas

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peeking Unit No. 2, Gas Fired) Bartow Unit 2 with an electrostatic precipitator, coal or oil fired

SOURCE LOCATION: Street Weedon Island City St. Petersburg

UTM: East 342380 North 3082720

Latitude 27 ° 51 ' 40 "N Longitude 82 ° 36 ' 09 "W

APPLICANT NAME AND TITLE: W. S. O'Brien, Director of Environmental & Licensing Affairs

APPLICANT ADDRESS: P.O. Box 14042, St. Petersburg, Florida 33733

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Florida Power Corporation

I certify that the statements made in this application for a Construction permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: William S. O'Brien

W. S. O'Brien, Director Env. & Licensing Affairs

Name and Title (Please Type)

Date: 4/19/82 Telephone No. 813/866-4410

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed: W. O. May

W. O. May

Name (Please Type)

(Affix Seal)

Florida Power Corporation

Company Name (Please Type)

P.O. Box 14042, St. Petersburg, FL 33733

Mailing Address (Please Type)

Florida Registration No. 5000 Date: 4/19/82 Telephone No. 813/866-4162

[1]See Section 17-2.02(15) and (22), Florida Administrative Code, (F.A.C.)

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

Make modifications to Bartow Unit 2, which is capable of accommodating coal, but is presently firing oil, to permit utilization of either coal or oil. Modifications include construction of an electrostatic precipitator, coal unloading, and storage facilities, lined bottom ash storage ponds and fly ash silos and temporary on-site storage areas.

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction November 1, 1982 (Est.) Completion of Construction December, 1985 (Est.)

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

See attachment #1

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

Unit 2-A052-23168, issued 11/13/79, expires 10/23/84

Bartow Plant IO-52-22686, issued 10/16/79, expires 08/09/84

Bartow Pond I052-22688, issued 10/22/79, expires 08/09/84

E. Is this application associated with or part of a Development of Regional Impact (DRI) pursuant to Chapter 380, Florida Statutes, and Chapter 22F-2, Florida Administrative Code? ____ Yes X No

F. Normal equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ; if power plant, hrs/yr 8760 ;

if seasonal, describe:

G. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? NO

   a. If yes, has "offset" been applied?

   b. If yes, has "Lowest Achievable Emission Rate" been applied?

   c. If yes, list non-attainment pollutants.

2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. NO

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirements apply to this source? If yes, see Sections VI and VII. NO

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? NO

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? NO

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable. This unit is exempt from the above requirements in that it is a modification to a facility that is capable of accommodating an alternative fuel before January 6, 1975, per Ch17-2.500(2)(c)4.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable: N/A

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		

B. Process Rate, if applicable: (See Section V, Item 1) N/A

1. Total Process Input Rate (lbs/hr): _____

2. Product Weight (lbs/hr): _____

C. Airborne Contaminants Emitted:

Name of Contaminant	Emission[1]		Allowed Emission[2] Rate per Ch. 17-2, F.A.C.	Allowable[3] Emission lbs/hr	Potential Emission[4]		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr	T/yr	
Sulfur Dioxide	3,277	14,353	2.75 lbs/MMBTU	3,289	3,289	14,406	Stack
Particulate	119.6	523.8	.1 lbs/MMBTU	119.6	9,568	41,908	Stack

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles[5] Size Collected (in microns)	Basis for Efficiency (Sec. V, It[5]
Electrostatic Precipitator	Particulate	98.750	to be supplied by Mfg.	Design Req..
(See Attachment 2, Design Specification)				

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g., Section 17-2.05(6) Table II, E. (1), F.A.C. – 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard

[4]Emission, if source operated without control (See Section V, Item 3)

[5]If Applicable

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Coal	Varies	104,000	1196

*Units Natural Gas, MMCF/hr; Fuel Oils, barrels/hr; Coal, lbs/hr

Fuel Analysis:

Percent Sulfur: 1.58 Percent Ash: 11.5

Density: N/A lbs/gal Typical Percent Nitrogen: N/A

Heat Capacity: 11,500 BTU/lb N/A BTU/gal

Other Fuel Contaminants (which may cause air pollution): _____

F. If applicable, indicate the percent of fuel used for space heating. Annual Average n/a Maximum _____

G. Indicate liquid or solid wastes generated and method of disposal.

Fly ash-9568 lbs/hr - storage unloading silo for truck removal from site. Temporary on-site storage area will be provided.

Bottom ash - 2392 lbs/hr - on site lined pond

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: 300 ft. Stack Diameter: 9 ft.

Gas Flow Rate: 765,000 ACFM Gas Exit Temperature: 301 °F.

Water Vapor Content: 4.8 % Velocity: 121.6 FPS

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq & Gas By-prod.)	Type VI (Solid By-prod.)
Lbs/hr Incinerated							

Description of Waste _____

Total Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____

Approximate Number of Hours of Operation per day _____ days/week _____

Manufacturer _____

Date Constructed _____ Model No. _____

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: _____ ft. Stack Diameter _____ Stack Temp. _____

Gas Flow Rate: _____ ACFM _____ DSCFM* Velocity _____ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner [ ] Other (specify) _____

Brief description of operating characteristics of control devices: _____

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight – show derivation.
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.,) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, etc.).
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3, and 5 should be consistent: actual emissions = potential (1-efficiency).
6. An 8½" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.
7. An 8½" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).
8. An 8½" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. An application fee of $20, unless exempted by Section 17-4.05(3), F.A.C. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

N/A

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?
[ ] Yes [ ] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy) [ ] Yes [ ] No

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:
5. Useful Life:
6. Operating Costs:
7. Energy:
8. Maintenance Cost:
9. Emissions:

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

10. Stack Parameters

a. Height: ft. b. Diameter: ft.

c. Flow Rate: ACFM d. Temperature: °F

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy*:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy**:

h. Maintenance Costs:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

*Explain method of determining efficiency.

**Energy to be reported in units of electrical power – KWH design rate.

3.

a. Control Device:

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

*Explain method of determining efficiency above.

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space and operate within proposed levels:

4.

a. Control Device

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device:

2. Efficiency*:

3. Capital Cost:

4. Life:

5. Operating Cost:

6. Energy:

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

(5) Environmental Manager:

(6) Telephone No.:

*Explain method of determining efficiency above.

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

b.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII – PREVENTION OF SIGNIFICANT DETERIORATION N/A

A. Company Monitored Data

1. _____ no sites _____ TSP _____ ( ) SO^2* _____ Wind spd/dir

Period of monitoring _____/_____/_____ to _____/_____/_____
month day year month day year

Other data recorded _____

Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory

a) Was instrumentation EPA referenced or its equivalent? ____ Yes ____ No

b) Was instrumentation calibrated in accordance with Department procedures? ____ Yes ____ No ____ Unknown

B. Meteorological Data Used for Air Quality Modeling

1. _____ Year(s) of data from _____/_____/_____ to _____/_____/_____
month day year month day year

2. Surface data obtained from (location) _____

3. Upper air (mixing height) data obtained from (location) _____

4. Stability wind rose (STAR) data obtained from (location) _____

C. Computer Models Used

1. _____ Modified? If yes, attach description.
2. _____ Modified? If yes, attach description.
3. _____ Modified? If yes, attach description.
4. _____ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	_____ grams/sec
SO^2	_____ grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description on point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach *all other information supportive to the PSD review.*

*Specify bubbler (B) or continuous (C).

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

Attachment 1

ESTIMATED COST OF POLLUTION CONTROL SYSTEMS

	Unit 2	Unit 3	Common	Total
Fly Ash Handling	392,000	508,000	2,102,000	3,002,000
Ash Storage			725,000	725,000
Coal Dust Control	222,000	326,000	1,216,000	1,764,000
Particulate Removal	7,715,000	11,690,000		19,405,000
Particulate Removal Fire Protection	36,000	36,000		72,000
Waste Water Collection & Treatment			261,000	261,000

ATTACHMENT 2

PARTICULATE REMOVAL SYSTEM DESIGN CONDITIONS

Parameter	Value
Flue Gas Flow at System Inlet (total), acfm	464,000 estimated.
Temperature--Normal, F	320
Temperature--Maximum, F	750 F for 30 minutes
Maximum Particulate at outlet, Pounds per million Btu heat input	0.10
Opacity at chimney outlet, per cent	20
Approximate Total kVA Rating of Transformer-Rectifiers	640
Maximum Gas Velocity Through Precipitator, at design flow conditions, fps	4.0
Minimum Specific Collecting Area, square feet per 1,000 acfm (based on design flow conditions).	500
Maximum Pressure Drop, in. H_2O	To be supplied by precipitator manufacturer.
Design Pressure, in. H_2O at 300 F	±26
Maximum Height of Collecting Surfaces, feet	50
Approximate Aspect Ratio (effective length/ effective height)	1.5
Minimum Number of Transformer-Receifier Sets	10

Florida Power
CORPORATION

October 16, 1978

TO WHOM IT MAY CONCERN

Subject: Letter of Authorization

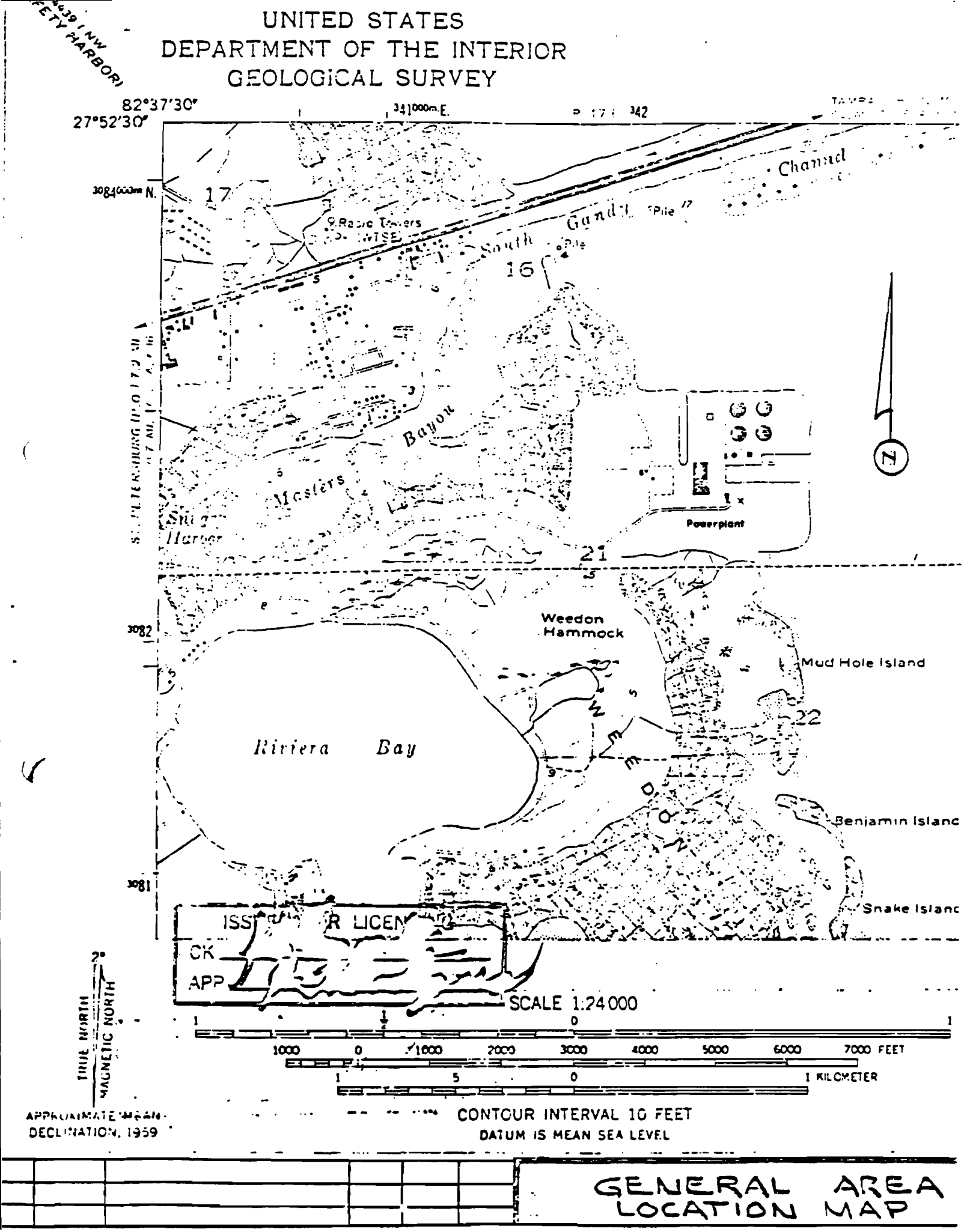
Please be advised that Mr. W. S. O'Brien, Director, Environmental & Licensing Affairs, is authorized to represent Florida Power Corporation in matters relating to necessary permits required from regulatory authority in the areas of air, water and power plant site certification.

Very truly yours,

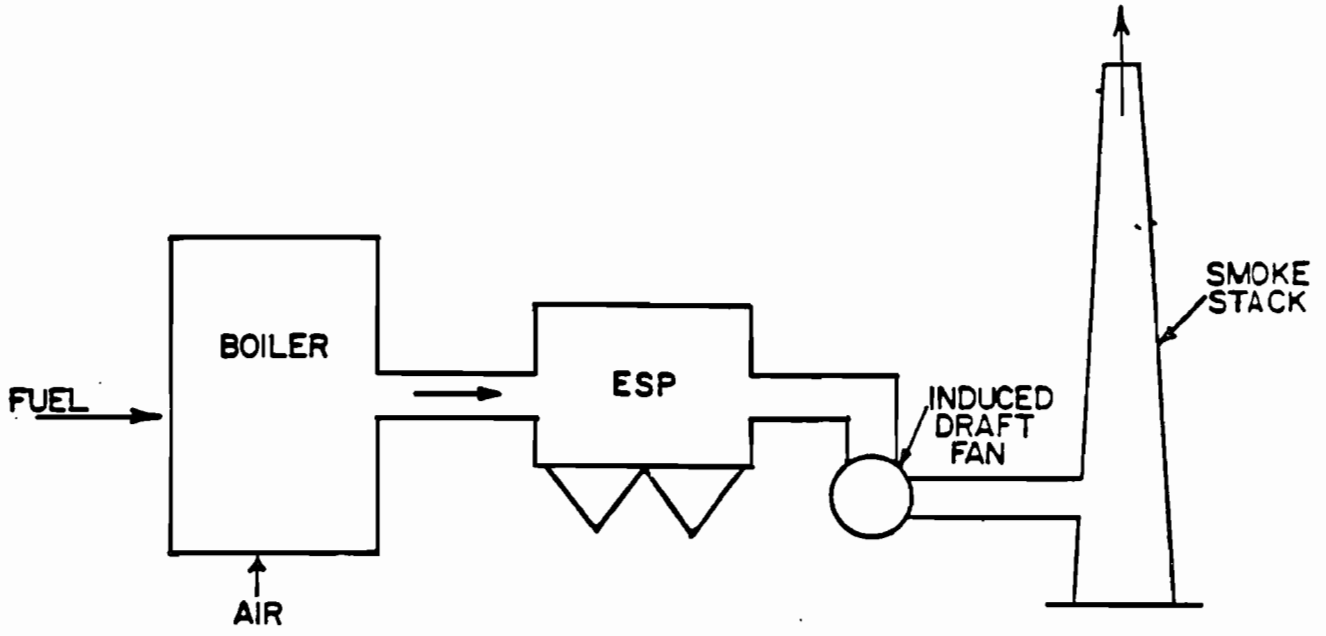
Ned B. Spake

Ned B. Spake
Vice President

NBS/db


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
82°37'30"
27°52'30"
341000m E.
3084000m N.
17
16
21
22
Channel
South Gandy
Pile 17
Pile 16
Radio Towers
WTSP
Bayou
Masters
Shell Harbor
Powerplant
Weedon Hammock
Mud Hole Island
Riviera Bay
Benjamin Island
Snake Island
3082
3081
SCALE 1:24000
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 5 0 1 KILOMETER
CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL
TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1959
GENERAL AREA LOCATION MAP

ATTACHMENT



Florida Power Corporation

BARTOW PLANT

UNIT 2 and 3
Coal Conversion Flow Diagram

AC 52-54947

DER

APR 20 1982

BAQM

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Fossil Fuel Steam Generator [ ] New[1] [X] Existing[1]

APPLICATION TYPE: [ ] Construction [ ] Operation [X] Modification

COMPANY NAME: Florida Power Corporation COUNTY: Pinellas

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peeking Unit No. 2, Gas Fired) Bartow Unit 3 with an electrostatic precipitator, coal or oil fired

SOURCE LOCATION: Street Weedon Island City St. Petersburg

UTM: East 342380 North 3082720

Latitude 27 ° 51 ' 40 "N Longitude 82 ° 36 ' 09 "W

APPLICANT NAME AND TITLE: W. S. O'Brien, Director of Environmental & Licensing Affairs

APPLICANT ADDRESS: P.O. Box 14042, St. Petersburg, Florida 33733

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Florida Power Corporation

I certify that the statements made in this application for a Construction permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: William S. O'Brien

W.S. O'Brien, Dir. Env. & Licensing Affairs
Name and Title (Please Type)

Date: 4/19/82 Telephone No. 813/866-4410

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed: W O May

W. O. May
Name (Please Type)

(Affix Seal)

Florida Power Corporation
Company Name (Please Type)

P.O. Box 14042, St. Petersburg, FL 33733
Mailing Address (Please Type)

Florida Registration No. 5000 Date: 4/19/82 Telephone No. 813/866-4162

[1]See Section 17-2.02(15) and (22), Florida Administrative Code, (F.A.C.)

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

Make modifications to Bartow Unit 3, which is capable of accommodating coal, but is presently firing oil, to permit utilization of either coal or oil. Modifications include construction of an electrostatic precipitator, coal unloading & storage facilities, lined bottom ash storage ponds, fly ash silos and temporary on-site storage areas.

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction November 1, 1982 (EST) Completion of Construction December, 1985, (EST)

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

See attachment #1

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

Unit 3-A052-6280, issued 06/23/78, expires 06/22/83

Bartow Plant-I052-22686, issued 10/16/79, expires 08/09/84

Bartow Pond-I052-22688, issued 10/22/79, expires 08/09/84

E. Is this application associated with or part of a Development of Regional Impact (DRI) pursuant to Chapter 380, Florida Statutes, and Chapter 22F-2, Florida Administrative Code? ____ Yes X No

F. Normal equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ; if power plant, hrs/yr 8760 ;

if seasonal, describe: ____

G. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? NO
   a. If yes, has "offset" been applied?
   b. If yes, has "Lowest Achievable Emission Rate" been applied?
   c. If yes, list non-attainment pollutants.
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. NO
3. Does the State "Prevention of Significant Deterioriation" (PSD) requirements apply to this source? If yes, see Sections VI and VII. NO
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? NO
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? NO

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable. This unit is exempt from the above requirements in that it is a modification to a facility that is capable of accommodating an alternative fuel before January 6, 1975 per Ch 17-2.500(2)(c)4

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable: N/A

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		

B. Process Rate, if applicable: (See Section V, Item 1) N/A

1. Total Process Input Rate (lbs/hr): _____

2. Product Weight (lbs/hr): _____

C. Airborne Contaminants Emitted:

Name of Contaminant	Emission[1]		Allowed Emission[2] Rate per Ch. 17-2, F.A.C.	Allowable[3] Emission lbs/hr	Potential Emission[4]		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr	T/yr	
Sulfur Dioxide	5451	23,876	2.75/lbs/MMBTU	5471	5471	23962	Stack
Particulate	199	871.4	.1 lbs/MMBTU	199	15,916	69,712.1	Stack

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles[5] Size Collected (in microns)	Basis for Efficiency (Sec. V, It[5]
Electrostatic Precipitator	Particulate	98.750	To be supplied by Mfg.	Design Spec.
(See attachment 2, Design	Specification)			

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g., Section 17-2.05(6) Table II, E. (1), F.A.C. – 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard

[4]Emission, if source operated without control (See Section V, Item 3)

[5]If Applicable

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Coal	Varies	173,000	1990

*Units Natural Gas, MMCF/hr; Fuel Oils, barrels/hr; Coal, lbs/hr

Fuel Analysis:

Percent Sulfur: 1.58 Percent Ash: 11.5

Density: N/A lbs/gal Typical Percent Nitrogen: N/A

Heat Capacity: 11,500 BTU/lb _____ BTU/gal

Other Fuel Contaminants (which may cause air pollution): _____

F. If applicable, indicate the percent of fuel used for space heating. Annual Average N/A Maximum _____

G. Indicate liquid or solid wastes generated and method of disposal.

Fly Ash-15916 lbs/hr - Storage unloading silo for truck removal. Temporary on-site storage area will be provided.

Bottom Ash-3,979 lbs/hr-on site lined pond.

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: 300 ft. Stack Diameter: 11 ft.

Gas Flow Rate: 765,000 ACFM Gas Exit Temperature: 294 °F.

Water Vapor Content: 4.8 % Velocity: 134.2 FPS

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq & Gas By-prod.)	Type VI (Solid By-prod.)
Lbs/hr Incinerated							

Description of Waste _____

Total Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____

Approximate Number of Hours of Operation per day _____ days/week _____

Manufacturer _____

Date Constructed _____ Model No. _____

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel		Temperature (^oF)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: _____ ft. Stack Diameter _____ Stack Temp. _____

Gas Flow Rate: _____ ACFM _____ DSCFM* Velocity _____ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner [ ] Other (specify) _____

Brief description of operating characteristics of control devices: _____

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight – show derivation.
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.,) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, etc.).
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3, and 5 should be consistent: actual emissions = potential (1-efficiency).
6. An 8½" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.
7. An 8½" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).
8. An 8½" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. An application fee of $20, unless exempted by Section 17-4.05(3), F.A.C. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

N/A

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?
[ ] Yes [ ] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy) [ ] Yes [ ] No

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:
5. Useful Life:
6. Operating Costs:
7. Energy:
8. Maintenance Cost:
9. Emissions:

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

10. Stack Parameters

a. Height: ft. b. Diameter: ft.

c. Flow Rate: ACFM d. Temperature: °F

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy*: h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy**: h. Maintenance Costs:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

*Explain method of determining efficiency.

**Energy to be reported in units of electrical power – KWH design rate.

3.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Life: f. Operating Cost:

g. Energy: h. Maintenance Cost:

*Explain method of determining efficiency above.

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space and operate within proposed levels:

4.

a. Control Device

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device:

2. Efficiency*:

3. Capital Cost:

4. Life:

5. Operating Cost:

6. Energy:

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

(5) Environmental Manager:

(6) Telephone No.:

*Explain method of determining efficiency above.

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

b.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII – PREVENTION OF SIGNIFICANT DETERIORATION N/A

A. Company Monitored Data

1. _____ no sites _____ TSP _____( )SO^{2*} _____ Wind spd/dir

Period of monitoring ____/____/____ to ____/____/____
month day year month day year

Other data recorded _____

Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory

a) Was instrumentation EPA referenced or its equivalent? _____ Yes _____ No

b) Was instrumentation calibrated in accordance with Department procedures? _____ Yes _____ No _____ Unknown

B. Meteorological Data Used for Air Quality Modeling

1. _____ Year(s) of data from ____/____/____ to ____/____/____
month day year month day year

2. Surface data obtained from (location) _____

3. Upper air (mixing height) data obtained from (location) _____

4. Stability wind rose (STAR) data obtained from (location) _____

C. Computer Models Used

1. _____ Modified? If yes, attach description.

2. _____ Modified? If yes, attach description.

3. _____ Modified? If yes, attach description.

4. _____ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	_____ grams/sec
SO^2	_____ grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description on point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

*Specify bubbler (B) or continuous (C).

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

Attachment 1

ESTIMATED COST OF POLLUTION CONTROL SYSTEMS

	Unit 2	Unit 3	Common	Total
Fly Ash Handling	392,000	508,000	2,102,000	3,002,000
Ash Storage			725,000	725,000
Coal Dust Control	222,000	326,000	1,216,000	1,764,000
Particulate Removal	7,715,000	11,690,000		19,405,000
Particulate Removal Fire Protection	36,000	36,000		72,000
Waste Water Collection & Treatment			261,000	261,000

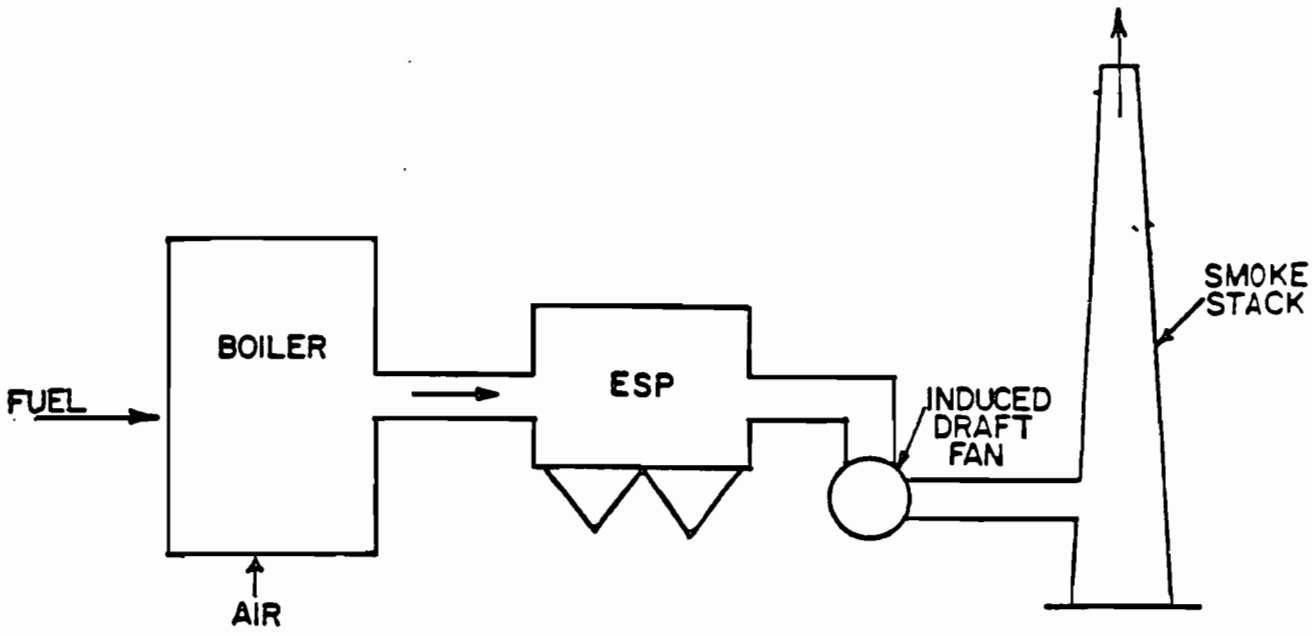
ATTACHMENT 2

PARTICULATE REMOVAL SYSTEM DESIGN CONDITIONS

Parameter	Value
Flue Gas Flow at System Inlet (total), acfm	464,000 estimated.
Temperature--Normal, F	320
Temperature--Maximum, F	750 F for 30 minutes
Maximum Particulate at outlet, Pounds per million Btu heat input	0.10
Opacity at chimney outlet, per cent	20
Approximate Total kVA Rating of Transformer-Rectifiers	640
Maximum Gas Velocity Through Precipitator, at design flow conditions, fps	4.0
Minimum Specific Collecting Area, square feet per 1,000 acfm (based on design flow conditions).	500
Maximum Pressure Drop, in. H_2O	To be supplied by precipitator manufacturer.
Design Pressure, in. H_2O at 300 F	±26
Maximum Height of Collecting Surfaces, feet	50
Approximate Aspect Ratio (effective length/effective height)	1.5
Minimum Number of Transformer-Rectifier Sets	10

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
82°37'30"
27°52'30"
3084000m N.
341000m E.
Channel
Gandy
South
Pile
Bayou
Powerplant
Weedon Hammock
Mud Hole Island
Riviera Bay
Benjamin Island
Snake Island
17
16
21
22
3082
3081
CK
APP
SCALE 1:24 000
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 5 0 1 KILOMETER
TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1959
CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL
GENERAL AREA LOCATION MAP

ATTACHMENT



Florida Power Corporation

BARTOW PLANT

UNIT 2 and 3
Coal Conversion Flow Diagram

Florida Power
CORPORATION

October 16, 1978

TO WHOM IT MAY CONCERN

Subject: Letter of Authorization

Please be advised that Mr. W. S. O'Brien, Director, Environmental & Licensing Affairs, is authorized to represent Florida Power Corporation in matters relating to necessary permits required from regulatory authority in the areas of air, water and power plant site certification.

Very truly yours,

Ned B. Spake

Ned B. Spake
Vice President

NBS/db

AC 52-54948

DER

APR 20 1982

BAQM

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Coal & Fly Ash Handling Systems [X] New[1] [ ] Existing[1]

APPLICATION TYPE: [X] Construction [ ] Operation [ ] Modification

COMPANY NAME: Florida Power Corporation COUNTY: Pinellas

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peeking Unit No. 2, Gas Fired) Bag filter Nos. 1 through 15 on Bartow Coal & Fly Ash Handling systems

SOURCE LOCATION: Street Weedon Island City St. Petersburg

UTM: East 342380 North 3082720

Latitude 27 ° 51 ' 40 "N Longitude 82 ° 36 ' 09 "W

APPLICANT NAME AND TITLE: W. S. O'Brien, Director of Environmental & Licensing Affairs

APPLICANT ADDRESS: P.O. Box 14042, St. Petersburg, FL 33733

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Florida Power Corporation

I certify that the statements made in this application for a Construction permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: William S O Brien

W. S. O'Brien, Director, Env. & Licensing Aff.
Name and Title (Please Type)

Date: 4/19/82 Telephone No. 813/866-4410

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed: W O May

W. O. May
Name (Please Type)

(Affix Seal)

Florida Power Corporation
Company Name (Please Type)

P.O. Box 14042
Mailing Address (Please Type)

Florida Registration No. 5000 Date: 4/19/82 Telephone No. 813/866-4162

[1]See Section 17-2.02(15) and (22), Florida Administrative Code, (F.A.C.)

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

See attachment #2

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction November 1, 1982 (est.) Completion of Construction December, 1985 (est.)

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

See attachment #1

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

NONE

E. Is this application associated with or part of a Development of Regional Impact (DRI) pursuant to Chapter 380, Florida Statutes, and Chapter 22F-2, Florida Administrative Code? ____ Yes X No

F. Normal equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ; if power plant, hrs/yr ____ ;

if seasonal, describe: ____

G. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? NO
   a. If yes, has "offset" been applied? ____
   b. If yes, has "Lowest Achievable Emission Rate" been applied? ____
   c. If yes, list non-attainment pollutants. ____
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. YES
3. Does the State "Prevention of Significant Deterioriation" (PSD) requirements apply to this source? If yes, see Sections VI and VII. NO, is a minor source
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? NO
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? NO

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable: SEE ATTACHMENT #3

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		

B. Process Rate, if applicable: (See Section V, Item 1) N/A

1. Total Process Input Rate (lbs/hr): _____

2. Product Weight (lbs/hr): _____

C. Airborne Contaminants Emitted: SEE ATTACHMENT #4

Name of Contaminant	Emission[1]		Allowed Emission[2] Rate per Ch. 17-2, F.A.C.	Allowable[3] Emission lbs/hr	Potential Emission[4]		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr	T/yr	

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles[5] Size Collected (in microns)	Basis for Efficiency (Sec. V, it[5]
Bag Filters	Coal dust	99.9		Design Requirement
Bag Filters	Fly Ash	99.9		Design Requirement

Facilities are in design stage; specific information will be supplied once equipment is bid and purchased.

[1] See Section V, Item 2.

[2] Reference applicable emission standards and units (e.g., Section 17-2.05(6) Table II, E. (1), F.A.C. – 0.1 pounds per million BTU heat input)

[3] Calculated from operating rate and applicable standard

[4] Emission, if source operated without control (See Section V, Item 3)

[5] If Applicable

E. Fuels N/A

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	

*Units Natural Gas, MMCF/hr; Fuel Oils, barrels/hr; Coal, lbs/hr

Fuel Analysis:

Percent Sulfur: _____ Percent Ash: _____

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: _____ BTU/lb _____ BTU/gal

Other Fuel Contaminants (which may cause air pollution): _____

F. If applicable, indicate the percent of fuel used for space heating. Annual Average N/A Maximum _____

G. Indicate liquid or solid wastes generated and method of disposal.

	UNIT 2	UNIT 3	DISPOSAL
Fly Ash	9568 lbs/hr	15,916 lbs/hr	Bottom Ash - on-site lined pond
Bottom Ash	2392 lbs/hr	3,979 lbs/hr	Fly Ash - storage unloading silo for truck removal to on-site landfill for sale

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack): N/A

Stack Height: _____ ft. Stack Diameter: _____ ft.

Gas Flow Rate: _____ ACFM Gas Exit Temperature: _____ °F.

Water Vapor Content: _____ % Velocity: _____ FPS

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq & Gas By-prod.)	Type VI (Solid By-prod.)
Lbs/hr Incinerated							

Description of Waste _____

Total Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____

Approximate Number of Hours of Operation per day _____ days/week _____

Manufacturer _____

Date Constructed _____ Model No. _____

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: _____ ft. Stack Diameter _____ Stack Temp. _____

Gas Flow Rate: _____ ACFM _____ DSCFM* Velocity _____ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner [ ] Other (specify) _____

Brief description of operating characteristics of control devices: _____

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight — show derivation.
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.,) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, etc.).
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3, and 5 should be consistent: actual emissions = potential (1-efficiency).
6. An 8½" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.
7. An 8½" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).
8. An 8½" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. An application fee of $20, unless exempted by Section 17-4.05(3), F.A.C. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?
[ ] Yes [X] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy) [X] Yes [ ] No

Contaminant	Rate or Concentration
Coal Dust	
Fly Ash	

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration
Coal Dust	99.9% collection efficiency

D. Describe the existing control and treatment technology (if any). N/A

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:
5. Useful Life:
6. Operating Costs:
7. Energy:
8. Maintenance Cost:
9. Emissions:

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

10. Stack Parameters

a.	Height:	ft.	b.	Diameter:	ft.
c.	Flow Rate:	ACFM	d.	Temperature:	°F
e.	Velocity:	FPS			

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1. See attachment 5 - DER BACT Determination for Crystal River Units 1 and 2. Fly-Ash handling system dated February 7, 1979.

a. Control Device:

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy*:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy**:

h. Maintenance Costs:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

*Explain method of determining efficiency.

**Energy to be reported in units of electrical power – KWH design rate.

3.

a. Control Device:

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

*Explain method of determining efficiency above.

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space and operate within proposed levels:

4.

a. Control Device

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device: Bag Dust collectors
2. Efficiency*: 99.9 (Design Spec.)
3. Capital Cost: Not currently available
4. Life: 20 years
5. Operating Cost: Not currently available
6. Energy: Nil
7. Maintenance Cost: Not currently available
8. Manufacturer: Not currently available, facilities are awaiting to be bid by manufactures
9. Other locations where employed on similar processes:

a.

(1) Company: Florida Power Corporation

(2) Mailing Address: P.O. Box 14042

(3) City: St. Petersburg, (4) State: Florida

(5) Environmental Manager: W. S. O'Brien

(6) Telephone No.: 813/866-4410

*Explain method of determining efficiency above.

(7) Emissions*: SEE ATTACHMENT #4

Contaminant	Rate or Concentration

(8) Process Rate*: SEE ATTACHMENT #3

b.

(1) Company:

(2) Mailing Address:

(3) City: (4) State:

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

*Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII – PREVENTION OF SIGNIFICANT DETERIORATION N/A

A. Company Monitored Data

1. _____ no sites _____ TSP _____ ( ) SO^2* _____ Wind spd/dir

Period of monitoring ___/___/___ to ___/___/___
month day year month day year

Other data recorded _____

Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory

a) Was instrumentation EPA referenced or its equivalent? ____ Yes ____ No

b) Was instrumentation calibrated in accordance with Department procedures? ____ Yes ____ No ____ Unknown

B. Meteorological Data Used for Air Quality Modeling

1. _____ Year(s) of data from ___/___/___ to ___/___/___
month day year month day year

2. Surface data obtained from (location) _____

3. Upper air (mixing height) data obtained from (location) _____

4. Stability wind rose (STAR) data obtained from (location) _____

C. Computer Models Used

1. _____ Modified? If yes, attach description.

2. _____ Modified? If yes, attach description.

3. _____ Modified? If yes, attach description.

4. _____ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	_____ grams/sec
SO^2	_____ grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description on point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

*Specify bubbler (B) or continuous (C).

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

Florida Power
CORPORATION

October 16, 1978

TO WHOM IT MAY CONCERN

Subject: Letter of Authorization

Please be advised that Mr. W. S. O'Brien, Director, Environmental & Licensing Affairs, is authorized to represent Florida Power Corporation in matters relating to necessary permits required from regulatory authority in the areas of air, water and power plant site certification.

Very truly yours,

Ned B. Spake

Ned B. Spake
Vice President

NBS/db

Attachment 1

ESTIMATED COST OF POLLUTION CONTROL SYSTEMS

	Unit 2	Unit 3	Common	Total
Fly Ash Handling	392,000	508,000	2,102,000	3,002,000
Ash Storage			725,000	725,000
Coal Dust Control	222,000	326,000	1,216,000	1,764,000
Particulate Removal	7,715,000	11,690,000		19,405,000
Particulate Removal Fire Protection	36,000	36,000		72,000
Waste Water Collection & Treatment			261,000	261,000

ATTACHMENT 2

The Project consists of installing coal unloading, handling and storage and fly ash coveying, handling and storage facilities for Bartow Units 2 and 3. The coal facilities will consist of the necessary equipment to unload oceangoing barges or ships and convey coal to the onsite storage area for storage and reclaiming. Unloading will be by a clamshell bucket type coal unloader. A radial stacker and underground reclaim hoppers will be used for placing the coal in the storage area and reclaiming it.

Fly ash will be pneumatically conveyed and collected in a sealed storage silo to be sold and removed by truck. A windbreak enclosure will be provided to prevent the release of fugitive dust from the ash silo unloading area. An emergency fly Ash Storage Area with 60 days storage capacity will be provided.

A coal dust and fly ash control system will be installed to filter the dust-laden air collected at the various transfer and takeoff points. Bag filters will be installed to control emissions at the following location:

1) Clamshell unloader
2) Transfer towers 1 through 5
3) Reclaim hoppers
4) Coal crusher building
5) Plant coal silos
6) Fly ash vacuum pumps
7) Fly ash silo vent

ATTACHMENT 3

Material	Process Rates, Max(T/hr)	Relate to Diagram Flow
Coal	1500	Clamshell Unloader
Coal	1500	Transfer Pt. 1
Coal	1500	Transfer Pt. 2
Coal	500	Reclaim Structure
Coal	500	Crusher Building
Coal	500	Transfer Pt. 3
Coal	500	" " 4
Coal	500	" " 5
Coal	500	Coal Silos Unit 2
Coal	500	Coal Silos Unit 3
Coal	500	Coal Silos Unit 3
Fly Ash	20	Vacuum pump
Fly Ash	20	Vacuum pump
Fly Ash	20	Vacuum pump
Fly Ash	150	Silo Vent

ATTACHMENT 4

Contaminant	Emission Max lbs/hr	Emission Actual T/yr	Allowed Emission Rate	Allowable Emission lbs/hr	Potential Emission lbs/hr	Potential Emission T/yr	Flow Diagram
Coal dust	1.08	.453	Process wt. table	55.78	1080.15	453.40	Clamshell Unloader
Coal dust	.14	.059	"	55.78	140.42	58.94	Transfer Pt. 1
Coal dust	.259	.218	"	55.78	259.24	217.63	Transfer Pt. 2
Coal dust	.086	.123	"	46.79	86.41	123.40	Reclaim Structure
Coal dust	.216	.308	"	46.79	216.03	308.49	Crusher Bldg
Coal dust	.367	.524	"	46.79	367.25	524.43	Transfer Pt. 3
Coal dust	.367	.217	"	46.79	367.25	217.41	Transfer Pt. 4
Coal dust	.540	.452	"	46.79	540.07	451.50	Transfer Pt. 5
Coal dust	.259	.153	"	46.79	259.24	153.47	Coal Silos-Unit 2
Coal dust	.259	.130	"	46.79	259.24	130.03	Coal Silos-Unit 3
Coal dust	.173	.058	"	46.79	172.82	57.79	Coal Silos-Unit 3
Fly Ash	.108	.170	"	23.00	108.01	170.12	Vacuum Pump
Fly Ash	.108	.170	"	23.00	108.01	170.12	Vacuum Pump
Fly Ash	.108	.000	"	23.00	108.01	.00	Vacuum Pump
Fly Ash	.432	.181	"	38.59	432.06	181.18	Silo Vent

ATTACHMENT 5

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

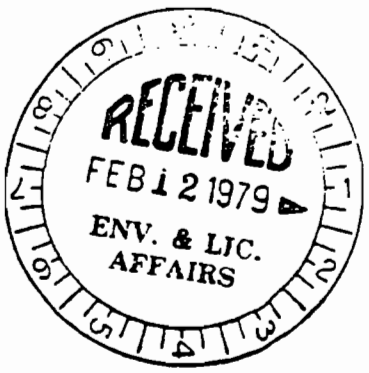
Bob Graham
GOVERNOR

Victoria Tschinkel
Acting SECRETARY

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

February 7, 1979



Mr. N.B. Spake, Vice President
Florida Power Corporation
P. O. Box 14042
St. Petersburg, Florida 33733

Dear Mr. Spake:

Subject: Best Available Control Technology (BACT)
Determination for Crystal River Units 1 and 2
Fly-Ash Handling System, FPC, Citrus County

The Department of Environmental Regulation has reviewed the BACT application submitted by you, and determined Best Available Control Technology for the above referenced source, as follows:

	Particulate lbs/hr.
Unit 1 conveying line	3.52 Attainable with 99.9+% efficient bag dust collector
Transfer silo vent	0.03 Attainable with 99.9+% efficient bag dust collector
Storage silo vent	0.59 Attainable with 99.9+% efficient bag dust collector

Opacity: Less than 5%

Test Method: EPA's methods 1-5 as described in the August 17, 1977 Federal Register.

The complete BACT documents are attached.

Sincerely

Victoria Martinez
BACT Coordinator

VM:es
attachment

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

INTEROFFICE MEMORANDUM

For Routing To District Offices And/Or To Other Than The Addressee
To: _____ Loctn.: _____
To: _____ Loctn.: _____
To: _____ Loctn.: _____
From: _____ Date: _____

TO: Victoria J. Tschinkel

FROM: Victoria Martinez Victoria Martinez

DATE: January 26, 1979

SUBJECT: BACT Determination, Florida Power Corporation Units 1 and 2 Fly Ash Handling System, Crystal River Plant, Citrus County

Facility: A fly ash handling system modifying the existing hydraulic system such that the fly ash generated by coal fired operation of Units #1 and #2 can be conveyed in a dry state to a storage silo providing for truck disposal. Currently, ash from unit #2 is hydraulically sluiced to an ash holding pond. The modification to handle fly ash as a dry material will include unit #1, to be converted from oil to coal in March, 1979. Fly ash particulate emission from the facilities are controlled by the following:

Source 1: Bag filter for unit 1 conveying line
Source 2: Bag filter for transfer silo vent
Source 3: Bag filter for storage silo vent

BACT Determination Requested by the Applicant:

Particulate*	lbs/hr.	tons/yr.**
Source 1	3.52	15.4
Source 2	0.03	0.13
Source 3	0.59	2.58

*Emission levels to be attained with 99.9+% efficient bag dust collectors

**Based on 100% continuous load

Date of Receipt of a Complete BACT Application:

November 16, 1978

Date of Publication in the Florida Administrative Weekly:

December 1, 1978

Date of Publication in a Newspaper of General Circulation:

May 5, 1978

Study Group Members:

Frank Darabi, DER St. Johns River Subdistrict, Gainesville;
Mike Harley, DER Bureau of Air Quality Management, Tallahassee;
George Layman, Gulf Power Company, Pensacola;
Dave Puchaty/
William Brown, DER Southwest District, Tampa

Study Group Recommendations:

	Particulate			Opacity
	Source 1	Source 2	Source 3	
Frank Darabi	Baghouse with 99.9+% efficiency/filter velocities should be checked when permit is issued to insure it is within acceptable limits; alarm system for bag blinding or bag tearing should be considered			N.R.*
Mike Harley	3.52 lbs/hr baghouse	0.03 lbs/hr baghouse	0.59 lbs/hr baghouse	N.R.*
George Layman	Baghouse is "State of the Art"			N.R.*
William Brown	3.52 lbs/hr baghouse	0.03 lbs/hr baghouse	0.59 lbs/hr baghouse	5%

*N.R. No response

BACT Determination by Florida Department of Environmental Regulation:

Particulate	lbs/hr.	
Source 1	3.52	Attainable with 99.9+% efficient bag dust collector
Source 2	0.03	Attainable with 99.9+% efficient bag dust collector
Source 3	0.59	Attainable with 99.9+% efficient bag dust collector
Opacity	Less than 5%	
Test Method:	EPA's methods 1 - 5 as described in the August 17, 1977 Federal Register	

Justification of DER Determination:

The low emission limitation determined as BACT for this fly ash handling system represents 99.9+% efficiency of control with the applicant's proposed bag dust collector. The reliability of the bag dust collector is well established and its efficiency is not surpassed by any other particulate pollution control device for the service proposed.

Details of Analysis May be Obtained by Contacting:

Victoria Martinez, BACT Coordinator
Department of Environmental Regulation
2600 Blair Stone Road
Twin Towers Office Building
Tallahassee, Florida 32301

Recommendation from: Bureau of Air Quality Management

by: JP Subramani
J. P. Subramani

Date: JANUARY 30, 1979

Approved by: Victoria J. Tschinkel
Victoria J. Tschinkel

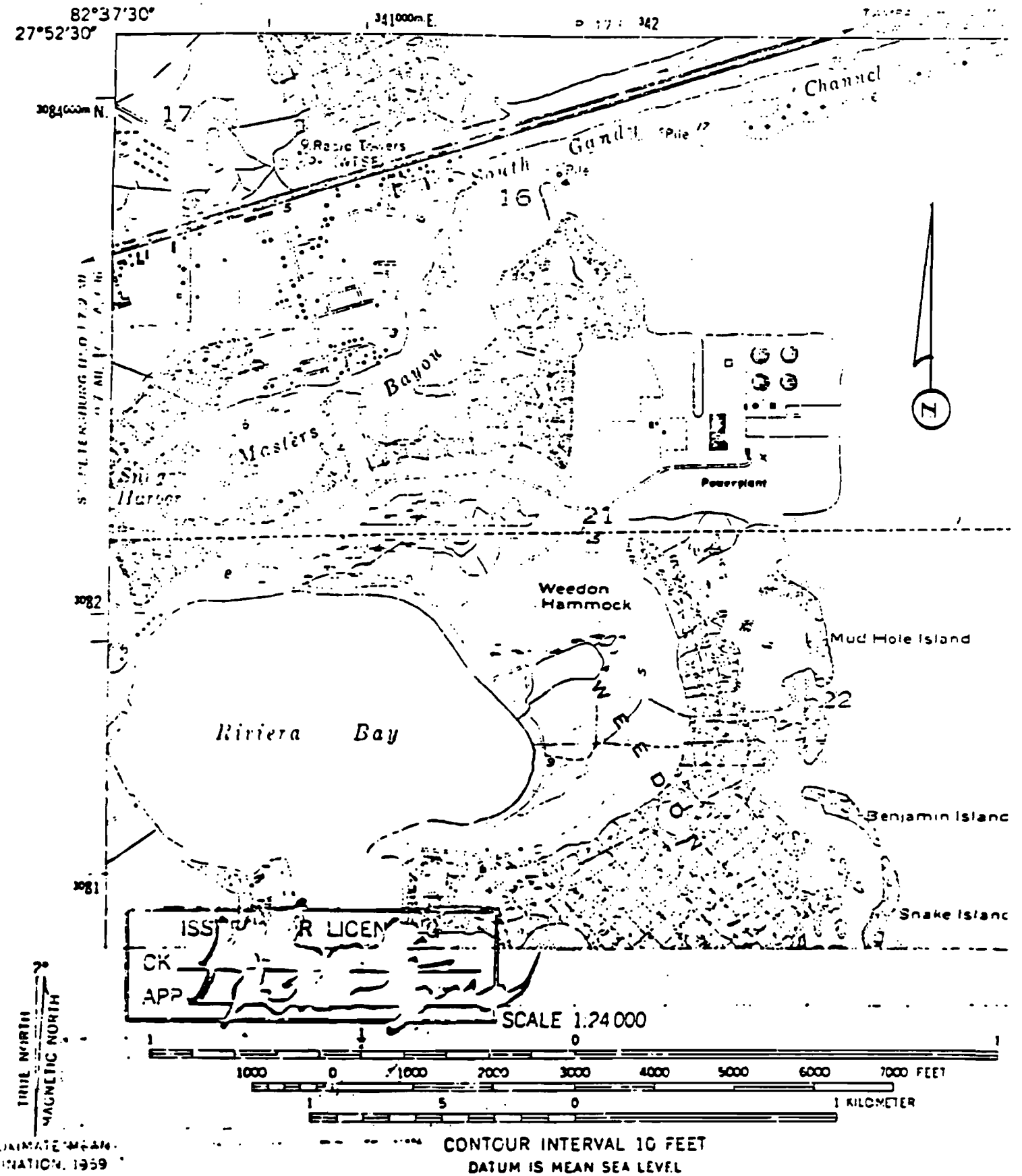
Date: February 5, 1979

VJT:es

Attachment

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

ATTACHMENT #6



GENERAL AREA LOCATION MAP

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

May 20, 1982

William S. O'Brien, Director
Env. and Licensing Affairs
Florida Power Corporation
P. O. Box 14042
St. Petersburg, Florida 33733

Dear Mr. O'Brien:

The Department has received your applications for construction permits to modify Bartow Units 2 and 3, and to construct coal and fly ash handling systems. Based on the initial review of your proposal, it has been determined that additional information is needed before we can process the application. The information required to complete the applications is listed below.

1. Although Units 2 and 3 as sources (17-2.100(150)) may have been designed with provisions for conversion to coal, the Bartow Plant, as a facility, (17-2.100(62)) & (17-2.500(2)(c)4) cannot be considered to be capable of accommodating coal since coal handling facilities do not exist and never have existed on the premises. On this basis the proposed conversion would be subject to state PSD if the actual increase of any criteria pollutant would exceed significance levels. If such is the case, then recommended BACT and modeling must be submitted.

   The BACT recommendations should provide information to evaluate several options in order to select the best specific alternative for the project. Due to the date of construction and the design provisions for use of coal in the boilers it is unlikely that BACT would be constrained by the limits of New Source Performance Standards (40 CFR 60.40-Subpart D). If a low sulfur coal is chosen as SO_2 control, we feel that a minimum of two options should be discussed-medium sulfur steam coal (approximately 1.5% S) and a low sulfur metallurgical coal (approximating 0.7% S). The discussions should include assurance of supplies and preparation such as washing etc. Expanded discussion in this area would facilitate the necessary evaluation of emission limits for optimum tradeoff among environmental effects, economics, availability and other considerations required by

BACT for long term operation. For each option control PM & NO_x as affected by that option should also be addressed as should proposed means of compliance verification. In the event that scrubbers are not selected, the justification for that decision must be discussed in detail.

2. At this time it seems probable that sufficient monitoring data is available to perform the required modeling without the necessity for any additional preconstruction monitoring.

3. What would be the NO_x emissions rate when 100% coal is fired in each unit? What is the NO_x emission increment for each unit due to coal conversion? What controls are proposed for increased NO_x emissions?

4. Give details of proposed modification on each boiler, such as numbers of burners to be added or removed.

5. Units 2 and 3 have been burning natural gas and oil. Does the coal conversion include any mixture of fuels burning, such as coal-gas or coal-oil firing in the same boiler?

6. The gas flow rate of 765,000 ACFM on Section III.H of each application for modification is much larger than fuel gas flow rate of 464,000 ACFM on the ESP design conditions table (attachment 2). Please explain why the difference exists between the two flow rates.

7. The capacity (1990 MMBtu/hr) of Unit 3 is much larger than the capacity (1196 MMBtu/hr) of Unit 2. Please explain why the particulate removal system's design conditions are exactly the same.

8. For this conversion project, is the installation of continuous monitoring devices for SO_2, PM, NO_x planned for compliance verification? If not, how will compliance with the required limits be verified?

9. Please submit copies of 1980, 1981 and 1982 annual emission test results for particulates, plume density, sulfur dioxide, and nitrogen oxides. The emission tests were required by the existing operation permits.

10. Point out all the areas or points where bag filter control cannot be applied for dust control, and estimate the quantity of dust emissions from each of these areas /points, such as dust control method to be applied on coal piles and the quantity of dust emissions from coal piles?

11. Give more detailed description of proposed coal and fly ash handling systems.

When we receive the required information, we will begin processing your application. If you have any questions on the data requested, please contact Bill Thomas or Bob King at (904) 488-1344.

Sincerely,

C. H. Fancy
Deputy Chief
Bureau of Air Quality Management

cc: Victoria J. Tschinkel
Thomas Devine, USEPA
Steve Smallwood
William Hennessey
Marti Hall

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

July 14, 1982

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

William S. O'Brien, Director
Environmental and Licensing Affairs
Florida Power Corporation
P.O. Box 14042
St. Petersburg, Florida 33733

Subject: Bartow Units 2 & 3 Coal Conversion

Dear Mr. O'Brien:

The Department has received yourletter of June 9, 1982 supplying additional information concerning your permit applications for the subject conversion. The information appears to be complete with the exception of the BACT recommendation and air quality impact analysis requested as item 1.

Review of past emissions and operation data adjusted to a common basis of operating hours and load factor indicates that emissions of SO_2, NO_x, and particulate matter would increase by amounts which would exceed the significance levels for PSD and nonattainment new source review rules. Florida currently has no rules for permitting any conversion that would result in an increase in emissions other than the PSD and nonattainment new source review rules.

The basic regulatory question involved in permitting a conversion is whether the proposed conversion would be considered a "modification" for the purposes of the NSPS (for fossil-fuel steam generators) and PSD rules. If the conversion would not result in an increase in actual emissions, it appears

that the project would not be a modification for NSPS or PSD purposes. If the conversion were to result in an increase in actual emissions, it appears that the conversion would be a modification unless a specific exemption applies. This leads to two exemption possibilities. One is if the unit is ordered to be converted under the Fuel Use Act. The other involves how the phrase "capable of accommodating" is interpreted.

If the coal conversion project is considered a modification under the NSPS rules, it appears that the converted unit would be subject to the emission limits of Subpart D. The "new" NSPS for boilers (Subpart Da) appears to apply only to new utility power plants, not to converted units. If this is a correct interpretation, the conversion could meet the Subpart D limits by burning 0.7% S metallurgical - grade coal with low NO_x burner design and with the flue gas cleaned with a high efficiency ESP. The automatic retrofit of an FGD scrubber, such as that required on new utility plant units by Subpart Da, would not be required. However, we believe that your project would not be a modification under NSPS.

The PSD rule is applied on a plant-wide basis. In the case of a change to a utility boiler, the overall situation at the power generating station is evaluated. If a coal conversion project is considered a modification under the PSD rules, the emissions would be limited by equipment, measures or practices that represent BACT. BACT is to be at least as stringent as any applicable NSPS. PSD review requires preconstruction monitoring, in most cases, and an analysis of the project's impact on ambient air quality. We assert that your project would be a modification under PSD.

The phrase "capable of accommodating" is used with both the NSPS and the PSD rules. In neither rule is it defined. The intent in both cases appears to be only to allow a unit that previously burned coal, or which was designed to burn coal (even if it never actually did), to be voluntarily converted to coal and not have to meet the NSPS emission limits. The Fuel Use Act orders appear to originally have been included to allow DOE to compel conversion of any unit where conversion was found to be feasible, whether the unit had been designed to burn coal or not.

A fuel conversion rule designed to specifically address

these questions is presently in planning stages but will require agreement on the intent of these exemptions prior to entry into the adoption proceedings.

You may wish to withdraw your application and resubmit after adoption of a fuel conversion rule. If, on the other hand the application is allowed to stand as submitted, a BACT recommendation and air quality impact analysis must be furnished before processing can begin on your application.

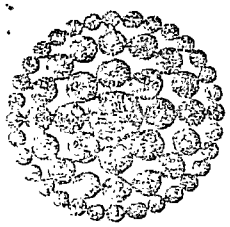
We would be happy to meet with you and discuss this matter at any time. If you wish to arrange such a meeting, please call me at (904) 488-1344.

Sincerely,

William Thomas, P.E.
Chief Engineer
New Source Review Section
Bureau of Air Quality
Management

WT:ras

cc: Martha Hall
Steve Smallwood
Clair Fancy



Florida Power
CORPORATION

June 9, 1982

Mr. C. H. Fancy, Deputy Chief
Bureau of Air Quality Management
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301

Subject: Bartow Units 2 and 3
Coal Conversion

Dear Mr. Fancy:

Attached is the information you requested in Items 3 through 11 of your letter dated May 20, 1982. (Item 2 does not require a response.)

In regard to Item 1, we do not agree that coal handling systems must be in existence at a facility in order for that facility to be determined "capable of accommodating". Prior to filing our application on April 19, 1982, we met with FDER and EPA to discuss the "capable of accommodating" determination for Bartow Units 2 and 3. On September 10, 1981, we met with Ms. Mary Clark and Messrs. Steve Smallwood and Bruce Mitchell at FDER; on October 6, 1981, we met with Mr. Thomas Devine and members of his staff at EPA; and on November 11, 1981, we met with Secretary Tschinkel, Ms. Mary Clark, and Mr. Steve Smallwood at FDER. At none of these meetings did anyone from FDER or EPA mention the need for the actual existence of coal handling facilities. To require the prior installation of specific ancillary equipment, such as coal handling facilities, would for all practicable purposes limit the applicability of the "capable of accommodating" determination to facilities that had previously fired coal. We do not believe the federal regulation 40CFR Part 51.24(b)(2)(i) nor its Florida counterpart, Section 7-2.500(2)(c)4, F.A.C., were intended to be interpreted that narrowly.

Nearly twenty-five years ago Florida Power Corporation planners and design engineers had the wisdom and foresight to design and construct the Paul L. Bartow facility with the flexibility to utilize oil, natural gas and coal. In the past, economic and other factors have dictated the use of two of those fuels-oil and natural gas. Current and predicted future factors, such as

economics, national energy independence, etc. now dictate the use of the third fuel-coal.

We respectfully request that FDER determine that Bartow Units 2 and 3 are "capable of accommodating" coal and proceed with its review of our application.

Sincerely,

William S. O'Brien

William S. O'Brien

WSO/gr

Enclosures

cc: Ms. V. J. Tschinkel
Ms. M. F. Clark
Mr. S. Smallwood
Mr. W. K. Hennessey w/attachments
Mr. T. W. Devine, US EPA, w/attachments

Item No. 3

State of the art NO_x control will be incorporated on both Units 2 and 3 as part of their conversion to coal firing. These units are both Combustion Engineering tangentially fired furnaces, and the state of the art NO_x control for this type of furnace utilizes overfire air. This should allow the units to operate well below the U.S. EPA new source performance standard for coal of 0.6 pounds NO_x/million BTU heat input.

It is estimated by Combustion Engineering that the NO_x emissions for these units, utilizing overfire air will be as follows:

Unit 2 - 0.52 pounds/million BTU
Unit 3 - 0.49 pounds/million BTU

Item No. 4

It is planned that the existing burners for both units be replaced in their entirety. This would include the wind box assemblies.

These compartments would be replaced with a combination of coal nozzles, oil burners and igniters, including the necessary air registers.

Unit No. 2 will utilize a total of 12 coal nozzles, three per each corner. The number of oil burners that will be used are presently not determined.

Unit No. 3 will utilize a total of 20 coal nozzles, five per each corner. The number of oil burners that will be used are presently not determined.

The arrangement of burner and air compartments for these units have not yet been detailed and will not be available until a specific contractor is selected to do the conversion design and construction for the Bartow Units.

Item No. 5

With the exception of the igniter and warmup burner operation, it is not planned to utilize a mixture of fuels in these boilers.

The conversion will allow either oil or coal firing but not simultaneously.

Item No. 6

We inadvertently listed the gas flow rate for Unit 3 for both units and provided the precipitator design specifications for Unit 2 for both units. Attached is a corrected Section III for Unit 2 and a copy of precipitator design specifications for Unit 3.

Item No. 7

See response for Item No. 6

Item No. 8

It is not planned to install continuous monitoring devices except for visible emissions. Compliance with emission limits will be checked by stack testing for particulate emissions and by fuel testing for sulfur dioxide emissions. Since there are no emission limits for NO_x for existing sources, there are no plans for monitoring or testing such emissions.

Item No. 9

Attached are copies of the annual emissions report for the calendar years 1980 and 1981. Additionally, attached are copies of the particulate compliance tests performed on Units 2 and 3 for the first quarter of 1982 and the first 1982 quarterly fuel reports for Unit 2 and 3 for sulfur dioxide compliance.

Item No. 10

Calculations were made for fugitive dust emissions from sources that cannot utilize bag filters for control. All formulas were taken from the "Workbook on Estimation of Emissions and Dispersion Modeling for Fugitive Particulate Sources" (September, 1981) prepared for the Utility Air Regulatory Group by Environmental Research and Technology, Inc. Following are the estimated annual emissions from such sources:

	Sources	Emissions (T/yr)
1.	Radial Stacker	.287
2.	Active Pile-Wind Erosion-L.S.	5.233
3.	Active Pile-Wind Erosion-H.S.	5.277
4.	Transfer to Reserve Pile-L.S.	.002
5.	Transfer to Reserve Pile-H.S.	.001
6.	Reserve Pile-Wind Erosion-L.S.	.006
7.	Reserve Pile-Wind Erosion-H.S.	.002
8.	Reserve Pile-Formation-L.S.	.109
9.	Reserve Pile-formation-H.S.	.047
10.	Traffic on Reserve Pile-L.S.	.764
11.	Traffic on Reserve Pile-H.S.	.327
12.	Transfer-Wind Erosion-L.S.	.052
13.	Transfer-Wind Erosion-H.S.	.022
14.	Transfer to Active Pile-L.S.	.002
15.	Transfer to Active Pile-H.S.	.001
16.	Conveyor #1	1.428
17.	Conveyor #2	.714
18.	Conveyor #3	.714
19.	Conveyor #4	.371
20.	Conveyor #5	.260
21.	Conveyor #6	.714

	Sources (cont.)	Emissions (T/yr)
22.	Conveyor #7	.214
23.	Conveyor #8	.296
24.	Conveyor #201	.296
25.	Conveyor #202	.099
26.	Conveyor #301	.418
27.	Conveyor #302	.418
28.	Conveyor #303	.251
29.	Conveyor #304	.084
30.	Fly Ash Silo Unloading	.472
	TOTAL	18.879

Please note that the formulas used to calculate the emissions probably overestimate them.

Item No. 11

Fly Ash System:

The flyash handling system will pneumatically convey the flyash collected in the precipitator hoppers to the flyash storage silo. Flyash will then either be loaded in trucks for removal from the site to purchasers or placed in a temporary on-site storage area for future sale.

The flyash storage silo will be sized to have sufficient volume capacity to accomodate 88 hours of fly ash production of both units at maximum load while firing the typical design coal plus a 4-hour margin for a total of 92 hours. The silo will be equipped with two telescopic discharge chutes and one rotary unloader. A windbreak enclosure will be provided to prevent the release of fugitive dust from the ash silo unloading area.

A vent filter will be provided on the silo to relieve the silo of the air displaced by incoming ash. The vent filter will be of the bag type and will remove flyash carryover from the air stream exiting the flyash silo.

A temporary flyash storage area will be provided to accomodate flyash generated over a 60 day period while operating at 80 percent load. This area is to be used in the event of a disruption of the offsite flyash transportation system.

Coal Handling System:

The coal handling system will consist of the following: receiving; stackout and reclaim; crushing and silo fill; and dust control.

The receiving system will consist of the necessary unloading equipment, conveyor, and associated equipment to unload oceangoing barges or ships and convey the coal to the onsite storage area.

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Coal	Varies	104,000	1196

*Units Natural Gas, MMCF/hr; Fuel Oils, barrels/hr; Coal, lbs/hr

Fuel Analysis:

Percent Sulfur: 1.58 Percent Ash: 11.5

Density: N/A lbs/gal Typical Percent Nitrogen: NA

Heat Capacity: 11,500 BTU/lb N/A BTU/gal

Other Fuel Contaminants (which may cause air pollution): _____

F. If applicable, indicate the percent of fuel used for space heating. Annual Average _____ Maximum _____

G. Indicate liquid or solid wastes generated and method of disposal.

Fly Ash - 9568 lbs/hr-storage unloading silo for truck removal from site. Temporary on-site storage will be provided.

Bottom Ash-2392 lbs/hr-on site lined pond

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: 300 ft. Stack Diameter: 9 ft.

Gas Flow Rate: 464,000 ACFM Gas Exit Temperature: 301 °F.

Water Vapor Content: 4.8 % Velocity: 121.6 FPS

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq & Gas By-prod.)	Type VI (Solid By-prod.)
Lbs/hr Incinerated							

Description of Waste _____

Total Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____

Approximate Number of Hours of Operation per day _____ days/week _____

Manufacturer _____

Date Constructed _____ Model No. _____

BARTOW UNIT 2

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable: N/A

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		

B. Process Rate, if applicable: (See Section V, Item 1) N/A

1. Total Process Input Rate (lbs/hr): _____

2. Product Weight (lbs/hr): _____

C. Airborne Contaminants Emitted:

Name of Contaminant	Emission[1]		Allowed Emission[2] Rate per Ch. 17-2, F.A.C.	Allowable[3] Emission lbs/hr	Potential Emission[4]		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr	T/yr	
Sulfur Dioxide	3277	14353	2.75 lbs/MMBTU	3289	3289	14406	STACK
Particulate	119.6	523.8	.1 lbs/MMBTU	119.6	9568	41908	STACK

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles[5] Size Collected (in microns)	Basis for Efficiency (Sec. V, It[5]
Electrostatic Precipitator	Particulate	98.75	to be supplied by Mfg.	Design Reg.
(See Attachment 2, Design Specifications)				

[1] See Section V, Item 2.

[2] Reference applicable emission standards and units (e.g., Section 17-2.05(6) Table II, E. (1), F.A.C. – 0.1 pounds per million BTU heat input)

[3] Calculated from operating rate and applicable standard

[4] Emission, if source operated without control (See Section V, Item 3)

[5] If Applicable

This includes a clamshell bucket type unloader and conveyor 1 which will transport coal from the clamshell unloader hopper to the chutework that loads Conveyor 2.

The stockout and reclaim system will consist of the necessary conveyors and equipment to place coal into storage and reclaim as required for plant use. The conveyors (2 through 6) will transport and elevate coal from transfer tower 1 to the radial stacker and from the reclaim hoppers to the coal crusher building. A radial stacker will receive coal from the clamshell unloader hopper through transfer tower 2 via conveyor 3 and place the coal into the active storage piles. The rail stacker will be a rail mounted mast with the capability of rotating 240 degrees. The boom rotation motion will form the pile while the telescopic chute will be positioned just above the top of the pile to minimize fugitive dust. Coal will be reclaimed from active storage via reclaim hoppers underneath the storage piles and will be conveyed (conveyors 4 & 5) to magnetic separators for tramp iron removal. The coal will then be conveyed (conveyor 6) to the crusher building.

The crushing and silo system will consist of the necessary crushers, conveyors and equipment to deliver the properly sized coal at the required feed rate to the plant silos. The crushers will be the ring type granulator crushers and will have dust-tight frames. Coal will be conveyed from the magnetic separators to the crushers. From the crusher the coal will then be conveyed to the coal silos either at Unit 2 or Unit 3. Unit 2 will have three silos and Unit 3 will have 5 silos. These silos will provide each unit with a minimum of 8 hours coal supply at maximum load.

A coal sampling and weighing system will be provided to sample and weigh "as received" and "as fired" coal. A sample cutting system is proposed to provide an unbiased representative sample of coal. The "as fired" sample collector will be arranged to index once every 3 hours at a minimum. The collector will be an automatic rotary collector with eight station arrangements.

ATTACHMENT 2

PARTICULATE REMOVAL SYSTEM DESIGN CONDITIONS

Parameter	Value
Flue Gas Flow at System Inlet (total), acfm	765,000 estimated
Temperature--Normal, F	320
Temperature--Normal, F	750 F for 30 min
Maximum Particulate at outlet, Pounds per million Btu heat input	0.10
Opacity at chimney outlet, per cent	20
Approximate Total kVA Rating of Transformer-Rectifiers	1,100
Maximium Gas Veloicy Through Precipitator, at design flow conditions, fps	4.0
Minimum Specific Collecting Area, square feet per 1,000 acim (based on design flow conditions).	500
Maximum Presure Drop, in H_2O	To be supplied by precipitator manufacturer.
Approximate Aspect Ratio (effective length/ effective height)	1.5
Minimum Number of Transformer-Receifier Sets	15
Design Pressure, in. H_2O at 300 F	$\pm$26
Maximum Height of Collecting Surfaces, feet	50

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

ANNUAL OPERATIONS REPORT FORM FOR AIR EMISSIONS SOURCES

For each permitted emission point, please submit a separate report for calendar year 1980 prior to March 1st of the following year.

I. GENERAL INFORMATION:

1. Source Name: Florida Power Corporation (Bartow #2)
2. Permit Number: A052-23168
3. Source Address: Weedon Island
   0011-02 St. Petersburg, FL 33702
4. Description of Source: Steam Unit

II. OPERATING SCHEDULE: 24 hrs/day 7 day/wk 52 wks/yr
Operated 6671.3 hours in 1980

III. RAW MATERIAL INPUT PROCESS WEIGHT:

Raw Material	Input Process Weight
N/A	tons/yr
	tons/yr
	tons/yr
	tons/yr
	tons/yr

Product Output (tons/yr - cubic feet/yr)

IV. TOTAL FUEL USAGE, including standby fuels. If fuel is oil, specify weight and sulfur content (e.g., No. 6 oil with 1%S).

	10^6 Cu. Ft. Natural Gas	39,873.12 10^3 gallons No. 6 Oil,	2.17%S
	10^3 gallons Propane	7.52 10^3 gallons No. 2 Oil,	0.26%S
	tons Coal		10^6 lb Black Liquid Solids
	tons Carbonaceous		tons Refuse

Other (Specify type and units) 7,440 Gal Fuel Additive

V. EMISSION LEVEL (tons/yr):

A.

201.88	Particulates 60.0 lb/hr		Carbon Monoxide
1151.48	Nitrogen Oxide		Total Reduced Sulfur
	Hydrocarbon		Flouride
7048.30	Sulfur Dioxide 2113 lb/hr		

Other (Specify type and units)

B. Method of calculating emission rates (e.g., use of fuel analysis and materials balance, emission factors drawn from AP 42, etc.)
Fuel Analysis and Emission Test Results

VI. CERTIFICATION:
I hereby certify that the information given in this report is correct to the best of my knowledge.

Signature of Owner or Authorized Representative

George C. Moore
Vice President, Power Production

February 20, 1981

DER Form PERM 12-15 (Jan78)
Roy(EmRpt)D48

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

ANNUAL OPERATIONS REPORT FORM
FOR AIR EMISSIONS SOURCES

For each permitted emission point, please submit a separate report for calendar year 1981 prior to March 1st of the following year.

I. GENERAL INFORMATION:

1. Source Name: Florida Power Corporation (Bartow #2)
2. Permit Number: A052-23168
3. Source Address: Weedon Island
   0011-02 St. Petersburg, FL 33702
4. Description of Source: Steam Unit

II. OPERATING SCHEDULE: 24 hrs/day 7 day/wk 52 wks/yr
Operated 5855.8 hours in 1981

III. RAW MATERIAL INPUT PROCESS WEIGHT:

Raw Material	Input Process Weight
N/A	tons/yr
	tons/yr
	tons/yr
	tons/yr
	tons/yr

Product Output (tons/yr - cubic feet/yr)

IV. TOTAL FUEL USAGE, including standby fuels. If fuel is oil, specify weight and sulfur content (e.g., No. 6 oil with 1%S).

	10^6 Cu. Ft. Natural Gas	29,362.83	10^3 gallons No. 6 Oil, 2.16%S
	10^3 gallons Propane	15.92	10^3 gallons No. 2 Oil, 0.23%S
	tons Coal		10^6 lb Black Liquid Solids
	tons Carbonaceous		tons Refuse

Other (Specify type and units) 12,636 Gal Fuel Additive

V. EMISSION LEVEL (tons/yr):

A.

161.13	Particulates 55 lb/hr		Carbon Monoxide
849.80	Nitrogen Oxide		Total Reduced Sulfur
	Hydrocarbon		Flouride
5200.11	Sulfur Dioxide 1776 lb/hr		

Other (Specify type and units)

B. Method of calculating emission rates (e.g., use of fuel analysis and materials balance, emission factors drawn from AP 42, etc.)
Fuel Analysis and Emission Test Results

VI. CERTIFICATION:
I hereby certify that the information given in this report is correct to the best of my knowledge.

Signature of Owner or Authorized Representative

G. C. Moore
Vice President, Power Production

February 15, 1982

DER Form PERM 12-15 (Jan78)
Roy(EmRpt)048

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

ANNUAL OPERATIONS REPORT FORM
FOR AIR EMISSIONS SOURCES

For each permitted emission point, please submit a separate report for calendar year 1981 prior to March 1st of the following year.

I. GENERAL INFORMATION:

1. Source Name: Florida Power Corporation (Bartow #3)
2. Permit Number: A052-6280
3. Source Address: Weedon Island
   0011-03 St. Petersburg, FL 33702
4. Description of Source: Steam Unit

II. OPERATING SCHEDULE: 24 hrs/day 7 day/wk 52 wks/yr
Operated 7963.7 hours in 1981

III. RAW MATERIAL INPUT PROCESS WEIGHT: 1231 0.64 factor

Raw Material	Input Process Weight
N/A	tons/yr
	tons/yr
	tons/yr
	tons/yr
	tons/yr

Product Output (tons/yr - cubic feet/yr)

IV. TOTAL FUEL USAGE, including standby fuels. If fuel is oil, specify weight and sulfur content (e.g., No. 6 oil with 1%S).

206.141 10^6 Cu. Ft. Natural Gas	70,873.99 10^3 gallons No. 6 Oil,	2.15%S
10^3 gallons Propane	39.48 10^3 gallons No. 2 Oil,	0.23%S
tons Coal	10^6 gallons No. Oil,	%S
tons Carbonaceous	tons Refuse	

Other (Specify type and units) 28,129 Gal Fuel Additive

V. EMISSION LEVEL (tons/yr):

A.

411.38	Particulates 103.3 lb/hr		Carbon Monoxide
1832.19	Nitrogen Oxide		Total Reduced Sulfur
	Hydrocarbon		Flouride
12551.67	Sulfur Dioxide 315.2 lb/hr		

Other (Specify type and units)

B. Method of calculating emission rates (e.g., use of fuel analysis and materials balance, emission factors drawn from AP 42, etc.)
Fuel Analysis and Emission Test Results

VI. CERTIFICATION:
I hereby certify that the information given in this report is correct to the best of my knowledge.

Signature of Owner or Authorized Representative

G. C. Moore
Vice President, Power Production

February 20, 1982

DER Form PERM 12-15 (Jan78)
Roy(Emkpt)048

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

ANNUAL OPERATIONS REPORT FORM
FOR AIR EMISSIONS SOURCES

For each permitted emission point, please submit a separate report for calendar year 1980 prior to March 1st of the following year.

I. GENERAL INFORMATION:

1. Source Name: Florida Power Corporation (Bartow #3)
2. Permit Number: A052-6280
3. Source Address: Weedon Island
   0011-03 St. Petersburg, FL 33702
4. Description of Source: Steam Unit

II. OPERATING SCHEDULE: 24 hrs/day 7 day/wk 52 wks/yr
Operated 6740.8 hours in 1980

III. RAW MATERIAL INPUT PROCESS WEIGHT:

Raw Material	Input Process Weight
N/A	tons/yr
	tons/yr
	tons/yr
	tons/yr
	tons/yr

Product Output (tons/yr - cubic feet/yr)

IV. TOTAL FUEL USAGE, including standby fuels. If fuel is oil, specify weight and sulfur content (e.g., No. 6 oil with 1%S).

106.763 10^6 Cu. Ft. Natural Gas	63,963.94 10^3 gallons No. 6 Oil,	2.17%S
10^3 gallons Propane	11.89 10^3 gallons No. 2 Oil,	0.26%S
tons Coal	10^6 gallons No. Oil,	%S
tons Carbonaceous	tons Refuse	

Other (Specify type and units) 12,297 Gal Fuel Additive

V. EMISSION LEVEL (tons/yr):

A. 382.19	Particulates 113.4 lb/hr		Carbon Monoxide
1635.83	Nitrogen Oxide		Total Reduced Sulfur
	Hydrocarbon		Flouride
11306.70	Sulfur Dioxide 3355 lb/hr		

Other (Specify type and units)

B. Method of calculating emission rates (e.g., use of fuel analysis and materials balance, emission factors drawn from AP 42, etc.)
Fuel Analysis and Emission Test Results

VI. CERTIFICATION:
I hereby certify that the information given in this report is correct to the best of my knowledge.

Signature of Owner or Authorized Representative

George C. Moore
Vice President, Power Production

February 20, 1981

DER Form PERM 12-15 (Jan78)
Roy(EmRpt)D48

Florida Power
CORPORATION

March 17, 1982

Mr. Peter A. Hessling
Department of Environmental Management
Air Quality Division
St. Petersburg-Clearwater International Airport
Clearwater, FL 33520

Dear Mr. Hessling:

The Florida Power Corporation submits the following environmental compliance test data on the Units 2 and 3 at the Bartow plant in St. Petersburg, Florida for the 1st quarter of 1982. All tests were conducted in accordance with procedures specified by the Department of Environmental Regulation. The particulate value is an average of the three required tests and the SO_2 number was calculated assuming 100% conversion of the fuel sulfur as determined from the attached analysis. The total BTUs fired per hour was calculated by multiplying the unit net heat rate (Btu/Kwh) and net load. The test results are:

Bartow #2 - Permit #AO 52-23166

Particulate	.063	$lb/10^6$ Btu - "State" method
SO_2	2.69	$lb/10^6$ Btu
Opacity	28.1	%
Btus	1.13 x $10x^9$	@ 215.4 MW Net

Bartow #3 - Permit #AO 52-6280

Particulate	.083	$lb/10^6$ Btu - "State" method
SO_2	2.69	$lb/10^6$ Btu
Opacity	18.7	%
Btus	1.97 x 10^9	@ 207.0 MW Net

An additional series of tests were performed on Units 2 & 3 during soot-blowing operations. All data enclosed was calculated as in the above tests. The test results are:

Bartow #2 - Permit #AO 52-23168

Particulate	.135	$lb/10^6$ Btu - "State" method
SO_2	2.69	$lb/10^6$ Btu
Opacity	30.8	%
Btus	1.13 x $10x^9$	@ 115.4 MW Net

Bartow #3 - Permit #AO 52-6280

Particulate	.129	$lb/10^6$ Btu - "State" method
SO_2	2.69	$lb/10^6$ Btu
Opacity	21.8	%
Btus	1.97×10^9 @ 207.0 MW Net	

Attached are copies of the field data sheets, visible emissions report, fuel oil analysis, computer printouts for each test and equipment calibration data.

Unit 1 will not be tested during the quarter because of construction activity associated with the conversion of the unit to a coal-oil mixture firing capability.

I hereby certify that all data submitted is correct to the best of my knowledge.

Should you have any questions concerning this information, please call me at 866-4281.

Sincerely,

D. A. Shantz/JLB

D. A. Shantz
Supervisor
Environmental Services

Attachments

cc: F. E. Martin/attach.
K. E. Roy/attach.
File: Environ 5-1
Readers File

Roy(Nov)D13

Florida Power
CORPORATION

April 15, 1982

Mr. W. K. Hennessey
Florida Department of
Environmental Regulation
7601 Highway 301 North
Tampa, FL 33610

Dear Mr. Hennessey:

Enclosed are the quarterly reports on fuel use and sulfur content for the following units:

Anclote No. 1	Crystal River No. 1
Anclote No. 2	Crystal River No. 2
Bartow No. 1	Higgins No. 1
Bartow No. 2	Higgins No. 2
Bartow No. 3	Higgins No. 3

Should there be any questions concerning these data, please contact me at (813) 866-4281.

Sincerely,

FLORIDA POWER CORPORATION

D. A. Shantz
Supervisor
Environmental Services

Shantz(QtrRpt)012

Enclosures

cc: D. I. Flynn
G. L. Macey
F. E. Martin
D. V. Pickett
T. L. Brouette w/attach.
Readers w/attach.

File: ENVIRON 5-1/attach.

FUEL REPORT

	ANCLOTE 1	ANCLOTE 2	BARTOW 1	BARTOW 2	BARTOW 3	HIGGINS 1	HIGGINS 2	HIGGINS 3
January 1982								
Fuel Oil (BBL)	321523	213906	44389	48810	113117	11025	10762	12051
Gas (MCF)	0	0	0	0	46008	0	4506	0
% Sulfur	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3
February 1982								
Fuel Oil	358107	314018	20858	80918	139181	9925	1900	8017
Gas	0	0	0	0	63757	801	154	0
% Sulfur	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.5
March 1982								
Fuel Oil	81339	364204	0	58954	142041	17311	10538	19843
Gas	0	0	0	0	108110	0	5396	0
% Sulfur	2.5	2.5	0	2.5	2.5	2.4	2.4	2.4

	CRYSTAL RIVER 1	CRYSTAL RIVER 2
January 1982		
Coal (Tons)	97010	112618
% Sulfur	1.9	1.9
February 1982		
Coal (Tons)	96502	97534
% Sulfur	1.8	1.8
March 1982		
Coal (Tons)	41587	114753
% Sulfur	1.9	1.9

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

September 14, 1982

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

DER
JAN 31 1983
BAQM

Mr. William S. O'Brien
Director
Florida Power Corporation
Post Office Box 14042
St. Petersburg, Florida 33733

Dear Mr. O'Brien:

RE: Bartow Units 2 & 3, Coal Conversion
Pinellas County, Weedon Island
AC 52-54946, AC 52-54947

The Department has received no written reply from you since our letter of July 14, 1982. Two questions remain unanswered:

1. Will there be significant increase in actual emissions of SO_2, NO_x, or PM after the conversion?

   It should be noted that NO_x is a criteria pollutant which the Company has not addressed quantitatively. Low NO_x burners were proposed for the modification but it was specifically stated that no emission tests would be conducted and no emission estimates were submitted. NO_x is subject to regulation and compliance must be verified.

2. If any significant increase will occur, what is your recommended BACT?

As stated in the July 14, 1982, letter these questions must be answered in order to establish applicable sections of 17-2 under which a permit could be issued.

In absence of any such answers, the Department must conclude that "reasonable assurance" has not been supplied to establish that criteria pollutants will not be emitted in contravention of Department regulations. In the absence of such assurance, the Department hereby gives notice of its intent to deny your application pursuant to Florida Administrative Code Rule 17-4.07.

This constitutes a proposed action of the Department and is subject to administrative hearing under the provisions of Chapter 120, Florida Statutes, if requested within fourteen days from receipt of this letter. Any petition for hearing must comply with the requirements of Florida Administrative Code Rule 28-5.201 and be filed with the Office of General Counsel, Florida Department of Environmental Regulation, Twin Towers Office Building, 2600 Blair Stone Road, Tallahassee, Florida 32301.

You are required by Florida Administrative Code Rule 17-1.62(3) to publish the attached Notice of Proposed Agency Action in the legal ad section of a newspaper of general circulation in Pinellas County no later than fourteen days after receipt of this letter. The Department must be provided with proof of publication within seven days of the date the notice is published.

Sincerely,

Victoria J. Tschinkel

Victoria J. Tschinkel
Secretary

VJT/pa

cc: Martha Harrell Hall
Steve Smallwood
Bill Hennessey
Joyce Gibbs
Marshall Mott-Smith

bc: Thomas Reese
David Gluckman

NOTICE OF PROPOSED AGENCY ACTION

The Department of Environmental Regulation gives notice of its intent to deny permits to Florida Power Corporation for conversion of Bartow Plant Units 2 and 3 to coal burning. This plant is located on Weedon Island, Pinellas County, Florida.

A person who is substantially affected by the Department's proposed permitting decision may request a hearing in accordance with Section 120.57, Florida Statutes, and Chapters 17-1 and 28-5, Florida Administrative Code. The request for hearing must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32301, within fourteen (14) days of publication of this notice. Failure to file a request for hearing within this time period shall constitute a waiver of any right such person may have to request a hearing under Section 120.57, Florida Statutes.

The applications and departmental intent are available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at the following locations:

DER, Bureau of Air Quality Mgmt.
2600 Blair Stone Road
Tallahassee, Florida

DER Southwest District
7601 Highway 301 North
Tampa, Florida 33610

Pinellas County Department of Environmental Management
Air and Water Quality Division
St. Pete-Clearwater Airport
Clearwater, Florida 33520

RULES OF THE ADMINISTRATIVE COMMISSION
MODEL RULES OF PROCEDURE
CHAPTER 28-5
DECISIONS DETERMINING SUBSTANTIAL INTERESTS

28-5.15 Requests for Formal and Informal Proceedings

(1) Requests for proceedings shall be made by petition to the agency involved. Each petition shall be printed typewritten or otherwise duplicated in legible form on white paper of standard legal size. Unless printed, the impression shall be on one side of the paper only and lines shall be double spaced and indented.

(2) All petitions filed under these rules should contain:

(a) The name and address of each agency affected and each agency's file or identification number, if known;

(b) The name and address of the petitioner or petitioners;

(c) All disputed issues of material fact. If there are none, the petition must so indicate;

(d) A concise statement of the ultimate facts alleged, and the rules, regulations and constitutional provisions which entitle the petitioner to relief;

(e) A statement summarizing any informal action taken to resolve the issues, and the results of that action;

(f) A demand for the relief to which the petitioner deems himself entitled; and

(g) Such other information which the petitioner contends is material.

E.P.

Florida Power
CORPORATION

December 3, 1982

Ms. Victoria J. Tschinkel
Secretary
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32304

Subject: Bartow Units 2 & 3
Coal Conversion

Dear Ms. Tschinkel:

We have reviewed the correspondence from FDER on the subject project and have identified several requests for information which we have not previously addressed. The items to which we have developed responses are as follows:

1. A response to item #1 in C. H. Fancy's letter of May 20, 1982, recommending Best Available Control Technology (BACT) for particulate matter, sulfur dioxide, and nitrogen oxides is in Attachment 1. For sulfur dioxide, an economic and engineering evaluation of burning .7% S coal (1.2 lbs of $SO_2/10^6$ BTU heat input) versus 1.5% S coal (2.75 lbs of $SO_2/10^6$ BTU heat input) as proposed in our application is provided, including a discussion of availability of supplies and any special processing, such as washing, etc. A discussion on why flue gas desulfurization equipment (scrubbers) is not proposed is included.

2. A response to a question in item #3 of C. H. Fancy's letter of May 20, 1982 regarding the NO_x emission rate on 100% coal and the amount of increase of the NO_x emission rate for each unit due to coal conversion is provided in Attachment 2.

3. A response to William Thomas' letter of July 14, 1982, providing the air quality impact analyses required for an application for modification under the PSD regulations is included in Attachment 3. These analyses show that the conversion will not violate the ambient air quality standards nor the PSD increments.

4. Items 1 & 2 in your letter of September 14, 1982, are addressed by the information provided in the above items.

5. Although not specifically requested in the Department's correspondence, we understand that your staff wanted information on the differences in capacity factors for the units on oil versus coal. This is shown in Attachment 4.

This provides all the information the Department has requested in order to complete the review of our applications. It is our understanding that the Department will work to respond in regards to issuance of the permit in approximately 30 days.

Sincerely,

William S. O'Brien

William S. O'Brien
Director
Environmental & Licensing Affairs

WSO/gr

Attachments

ATTACHMENT 1

1. Response to item #1 in C. H. Fancy's letter of May 20, 1982, recommending Best Available Control Technology (BACT) for particulate matter, sulfur dioxides, and nitrogen oxides:

A. Particulate Matter -
The recommended BACT for particulate matter is an electrostatic precipitator (ESP) that would provide compliance with the 0.1lbs/MBTU emission standard.

Both ESP and fabric filter bag houses were considered and evaluated in the conceptual design for the coal conversion.

The economics were basically a trade-off between the two collection systems.

For maximum fuel flexibility, we are retaining the oil firing capability on the units and will also use supplementary oil firing for flame stabilization at low loads. The ESP was selected becaused fabric filters do not operate effectively when firing heavy oil due to the oil flyash clogging the filters.

Design of the ESP is very conservative by requiring a minimum specific collection area (SCA) of 500. This will allow us to burn a range of different sulfur content coals and still meet the 0.1lbs/MBTU emission limit.

B. Sulfur Dioxide
The recommended BACT for sulfur dioxide is burning a medium sulfur coal with a sulfur dioxide emission rate of 2.75 lbs/MBTU. This will assure compliance of the applicable ambient air quality standards, the prevention of significant deterioration increment and not increase the present emission rate.

By way of comparison, use of a low sulfur coal with a sulfur dioxide emission rate of 1.2 lbs/MBTU would carry certain economic costs and design penalties. There are two major pieces of equipment needed for coal firing that could be affected if low sulfur coal was burned instead of the proposed coal. They are the ESP and the coal pulverizers.

An analysis made by the proposed precipitator manufacturer indicates that the ESP they would supply would be able to operate effectively with any of the four low sulfur coals studied as possible supplies. However, all of the four coals are more corrosive than the proposed design coal. This could increase the maintenance required on the units, but an actual dollar amount cannot presently be determined.

The grindability of the low sulfur coals is worse than the medium sulfur coal and would require an increase in the proposed mill sizes. There would be approximately a $1,000,000 cost increase for the larger coal mills.

B. Sulfur Dioxide (cont.)

Data from recent coal solicitations indicate that the present difference in cost of the low sulfur coal is approximately 15 cents/MBTU higher than the cost of medium sulfur coal. This difference will increase each year because of escalating costs for both types of coal.

Utilizing our most recent projections results in the following cost penalty over the first ten years of operation.

Fuel Cost Differential for 1985 - 1994

Unit No. 2	$40,997,000
Unit No. 3	$75,520,000
Total	$116,517,000

C. Nitrogen Oxides

The two units being converted for coal firing at Bartow Plant are both Combustion Engineering tangentially fired units.

In an effort to achieve a minimum NO_x formation on coal firing, it has been decided to redesign and replace the entire burner compartments on both units utilizing state of the art design developed by Combustion Engineering, Inc. and utilizing overfire air for NO_x control. This is the recommended BACT for NO_x control.

Overfire air operation has proven to be the most successful method for controlling NO_x in tangentially fired coal steam generators. Overfire air is introduced into the furnace tangentially through two additional air compartments, termed overfire air ports, designed as vertical extensions of the corner windboxes. These overfire air ports are provided with flow dampers adjusted according to total air and sized to handle 15 percent of the total windbox airflow. The system is also equipped with manual tilt control so that the overfire air compartment nozzles may be tilted independently of the remainder of the windbox nozzles. The position of overfire air dampers and tilt are optimized after initial operation to yield the lowest NO_x emissions consistent with satisfactory furnace performance.

The proven success of overfire air in controlling NO_x formation during coal combustion lies in the fact that this method inhibits formation of NO_x by both atmospheric nitrogen fixation (thermal NO_x) and fuel nitrogen conversion (fuel NO_x). When operating with design levels of overfire air, approximately 15 percent of the windbox airflow is introduced through the overfire air ports, thereby effecting a reduction in total oxygen supply to the primary flame zone. In this reduced oxygen environment, it is hypothesized that the nitrogen in the coal undergoes a recombination reaction forming molecular nitrogen, N_2 rather than nitric oxide, simply

C. Nitrogen Oxides (cont.)
due to insufficient oxygen in this zone and the intense competition with carbon species for the available oxygen. Consequently, the formation of NO through fuel nitrogen conversion is significantly reduced.

Similarly, overfire air operation results in a reduction in thermal NO_x formation through the highly temperature dependent Zeldovich mechanism. Heat release during the initial stages of combustion in the primary flame zone is somewhat reduced and delayed due to the reduced oxygen environment, with combustion readily completed in the vicinity of the overfire air injection ports. The stretching of the heat release over a greater furnace volume results in lower combustion temperatures, thereby reducing thermal NO_x formation.

The overfire NO_x control that will be incorporated into these units will allow the units to operate below the EPA new source performance standard for coal of 0.6 pounds NO_x/MBTU heat input. Combustion Engineering has estimated that the NO_x emission utilizing overfire air systems will be 0.52lbs/MBTU for Unit No. 2 and 0.49lbs/MBTU for Unit No. 3.

2. The decision of not installing scrubbers to control SO_2 emission is economic. The two main incentives for converting these units to coal were to reduce Florida Power's dependence on oil and to affect a fuel savings for our customers. Considering the enormous first cost for installing scrubbers and the continuing operation and maintenance costs, the economic justification for the project would disappear if scrubbers were required.

The following is an economic evaluation covering the initial cost, and the operating and maintenance costs that would be incurred if scrubbers were installed on the units.

These estimates were developed from information presented in Volume I, "Control of Emissions From Coal Fired Power Plants", presented in March 1981, at the EPA Emission Control Symposium.

Initial Equipment and Construction Cost - $156/KW

Unit No. 2 - (120,000 KW)(156)= $18,720,000
Unit No. 3 - (220,000 KW)(156)= $34,320,000
$55,020,000

1st Year Operating and Maintenance Costs = $10,600,000

Based upon these figures, the ownership costs and operating and maintenance costs are estimated to total more than $225,000,000 during the period 1985-1994.

ATTACHMENT 2

Response to item #3 in C. H. Fancy's letter of May 20, 1982, concerning NO_x emissions resulting from the conversion:

A. As indicated in Attachment 1, item C, the projected NO_x emission rates for Unit 2 and 3 on coal are 0.52lbs/MTU and 0.49lbs/MBTU, respectively.

B. Based on previous calculations of NO_x emission rates on oil and the above projected NO_x emission rates for coal, it is anticipated that the NO_x emission rates for Units 2 and 3 will increase 53% and 17%, respectively.

4. The controls proposed for NO_x emission control are those as outlined in the recommended BACT for NO_x in Attachment 1, Item C.

ATTACHMENT 3

Response to William Thomas' letter of July 14, 1982, providing the air quality impact analyses required under the PSD regulations:

Based on screening modeling results using worst-case meteorological conditions and results using 5 years of hourly meteorological data, the short-term averaging time TSP and SO_2 concentrations are predicted to be lower when Units 2 & 3 are converted from oil to coal. Also, because the impacts from coal firing are less than from oil firing for downwind distances, at least out to 40 km, the proposed conversion will reduce impacts in the PSD Class I area (i.e., Chassahowitzka National Wilderness); the SO_2 non-attainment area in nortwest Pinellas County; and the TSP non-attainment area in Hillsborough County. For all cases, impacts from the coal conversion are less than the applicable National and Florida AAQS and Class II increments.

The predicted maximum annual average concentrations for SO_2, TSP, and NO_x due to emissions from the proposed conversion are less than the applicable National and Florida AAQS and PSD Class II maximum allowable increments. The maximum increases in SO_2, TSP and NO_x concentrations due to the proposed conversion are generally less than the significant level of $1 ug/m^3$ for these pollutants. As a result, the maximum predicted increase in concentrations do not significantly impact the PSD Class I & II and SO_2, TSP non-attainment areas.

The modeling studies are attached for further review. They were conducted in accordance with the Department's requirements as outlined in meeting and conversations with Mr. Larry George.

AN AIR QUALITY IMPACT EVALUATION FOR FPC BARTOW UNITS 2 AND 3 COAL CONVERSION

Prepared for:

FLORIDA POWER CORPORATION
St. Petersburg, Florida

Prepared by:

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
Gainesville, Florida

November 16, 1982

ESE No. 82-157-100

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1.0 INTRODUCTION

1.1 PURPOSE

Florida Power Corporation (FPC) is an investor-owned company serving the electrical needs in 32 counties located in the west-central portion of the Florida peninsula and the eastern half of the Florida panhandle. To meet the electrical demands in their service area, FPC has 12 generating facilities; 11 of these facilities burn heavy and light oil and natural gas.

During the last 10 years, substantial increases have occurred in the price of fuel oil, with commensurate increases in electricity costs. In response, FPC has changed from burning oil to coal in several generating facilities: Crystal River Units 1 and 2 and Paul L. Bartow Unit 1. FPC, in keeping with efforts to reduce oil consumption, is proposing to install equipment that will allow Bartow Units 2 and 3 to burn coal.

The burning of coal can have potential ambient air quality impacts that are different from those of oil. To evaluate these impacts, FPC contracted ESE to perform state-of-the-art atmospheric dispersion modeling. The purpose of this report is to determine the ambient air quality impacts of burning coal in Bartow Units 2 and 3 and compare the results to promulgated Ambient Air Quality Standards (AAQS) and Prevention of Significant Deterioration (PSD) increments.

1.2 PROJECT DESCRIPTION

The FPC Bartow plant, located in Pinellas County (see Figure 1-1), consists of three fossil steam units with a net winter capability of 437 megawatts (MW); Unit 1 with a capacity of 109 MW, Unit 2 with a capacity of 119 MW, and Unit 3 with a capacity of 209 MW. Currently, Unit 1 burns a mixture of coal and oil. Units 2 and 3 have burned heavy oil and natural gas since their in service dates of August 1961 and July 1963, respectively. A total of four gas turbine peaking units, with a net winter capability of 204 MW, is also located at the Bartow plant.

The steam generators for Units 2 and 3 were designed for coal burning capability. To burn coal in these units, FPC must install coal handling

and storage facilities, coal burning equipment (burners), air pollution control equipment, and ash handling and storage facilities.

The coal handling system will consist of receiving facilities, stackout and reclaim facilities, and crushing and silo facilities.

The receiving facilities will consist of the necessary unloading equipment, conveyor, and associated equipment to unload oceangoing barges or ships and convey the coal to the onsite storage area (see Figure 1-2). The system includes a clamshell bucket unloader and conveyor, which will transport coal from the clamshell unloader hopper to the chutework connecting the receiving and stackout and reclaim facilities.

The stackout and reclaim facilities will consist of the necessary conveyors and equipment to place coal into storage and reclaim. The conveyors (2 through 6) will transport and elevate coal from Transfer Point 1 to the radial stacker and from the reclaim hoppers to the coal crusher building. A radial stacker will receive coal from the clamshell unloader hopper through Transfer Point 2 via Conveyor 3 and place the coal into the active storage piles. The rail stacker will be a rail-mounted mast with the capability of rotating 240 degrees. The boom rotation motion will form the pile, while the telescopic chute will be positioned just above the top of the pile to minimize fugitive dust. Coal will be reclaimed from active storage via reclaim hoppers underneath the storage piles and will be conveyed (Conveyors 4 and 5) to magnetic separators for iron removal. The coal will then be conveyed (Conveyor 6) to the crusher building.

The crushing and silo facilities will consist of the necessary crushers, conveyors, and equipment to deliver the properly sized coal at the required feed rate to the plant silos. The crushers will be the ring-type granulator crushers and will have dust-tight frames. Coal will be conveyed from the magnetic separators to the crushers. From the crusher, the coal will then be conveyed to the coal silos either at

Unit 2 or Unit 3. Unit 2 will have three silos, and Unit 3 will have five silos. These silos will provide each unit with a minimum of 8 hours coal supply at maximum load.

A coal sampling and weighing system will be installed to sample and weigh "as received" and "as fired" coal. A sample cutting system is proposed to provide an unbiased representative sample of coal. The "as fired" sample collector will be arranged to index once every 3 hours, at a minimum. The collector will be an automatic rotary collector with eight station arrangements.

The existing oil burners, along with wind box assemblies, will be replaced on both Units 2 and 3. To fire coal, a combination of coal nozzles, oil burners (for flame stabilization), and air registers will be installed. The steam generators for both Units 2 and 3 were manufactured and constructed by Combustion Engineering and are tangentially fired. Unit 2 will have 12 coal nozzles installed, three for each corner of the furnace. A total of 20 coal nozzles will be installed in Unit 3, five for each corner of the furnace. The number of oil burners has not been determined. Burner and air register arrangements have not been designed.

Nitrogen oxides (NO_x) emission control will be incorporated into the design for both Units 2 and 3 as part of their conversion to coal. The design will allow a provision for overfire air, which is considered state-of-the-art for tangentially fired furnaces. The estimated emission rates for these units, 0.52 pound of NO_x per million British thermal units (lb $NO_x/10^6$ Btu) for Unit 2 and 0.49 lb $NO_x/10^6$ Btu for Unit 3, are below the promulgated New Source Performance Standards for new steam electric power plants of 0.6 lb $NO_x/10^6$ Btu (40CFR Part 60 Appendix Da). In this analysis, an NO_x emission limit of 0.6 lb/10^6 Btu was assumed for the proposed coal-fired Units 2 and 3.

Sulfur dioxide (SO_2) emissions will be limited through the sulfur content in the coal. The average sulfur content, as burned, will not

exceed 1.58 percent for a heat value of 11,500 British thermal units per pound (Btu/lb).

Particulate emissions will be controlled through the installation of electrostatic precipitators. Tables 1-1 and 1-2 present particulate removal design conditions for Units 2 and 3, respectively. Emission limits of 0.1 lb particulate matter (PM)/10^6 Btu were assumed for this analysis.

The fly ash handling will be accomplished by pneumatically conveying the fly ash collected in the precipitator hoppers to the fly ash storage silo. Fly ash will then either be loaded in trucks for removal from the site to purchasers or placed in a temporary onsite storage area for future sale.

The fly ash storage silo will have sufficient volume to accommodate 92 hours of fly ash production of both units at maximum load while firing the design coal. The silo will be equipped with two telescopic discharge chutes and one rotary unloader. A windbreak enclosure will be installed to prevent the release of fugitive dust from the ash silo unloading area.

A bag filter will be installed on the silo to relieve the silo of the air displaced by incoming ash. The filter will remove fly ash carryover from the air stream exiting the fly ash silo.

A temporary fly ash storage area will be installed to accommodate fly ash generated over a 60-day period while operating at 80-percent load. This area is to be used in the event of a disruption of the offsite fly ash transportation system.

Table 1-1. FPC Bartow Unit 2 Particulate Removal System Design Conditions

Parameter	Value
Flue Gas Flow at System Inlet (Total), acfm	464,000 estimated
Temperature--Normal, °F	320
Temperature--Maximum, °F	750 for 30 minutes
Maximum Particulate at Outlet, $lb/10^6$ Btu heat input	0.10
Opacity at Chimney Outlet, percent	20
Approximate Total kVA Rating of Transformer-Rectifiers	640
Maximum Gas Velocity through Precipitator at Design Flow Conditions, fps	4.0
Minimum Specific Collecting Area, square feet per 1,000 acfm (based on design flow conditions)	500
Maximum Pressure Drop, inches H_2O	To be supplied precipitator manufacturer
Design Pressure, inches H_2O at 300°F	±26
Maximum Height of Collecting Surfaces, feet	50
Approximate Aspect Ratio (effective length/effective height)	1.5
Minimum Number of Transformer-Rectifier Sets	10

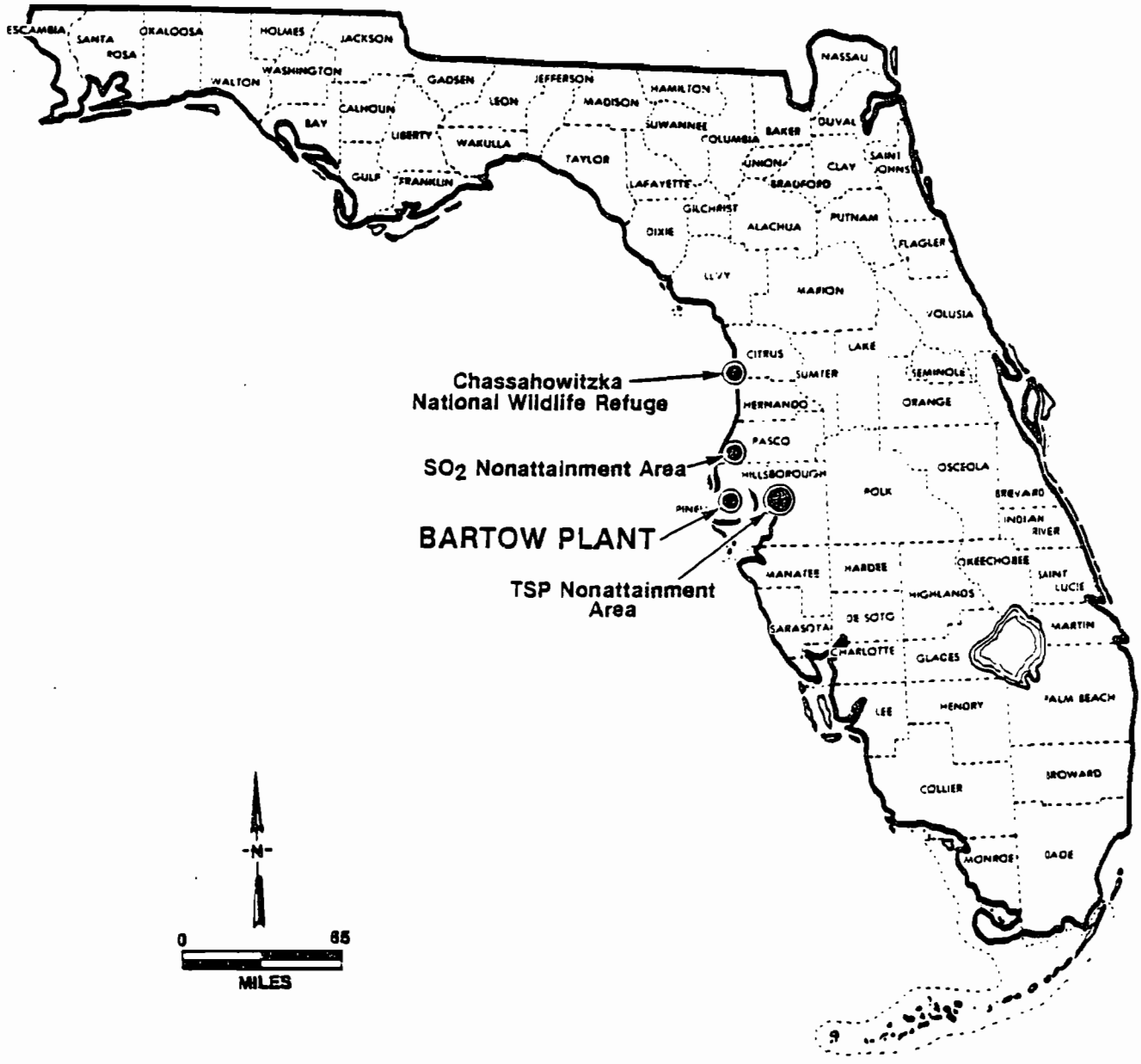
Abbreviations:
acfm = actual cubic feet per minute.
kVA = kilovolt-amperes.
fps = feet per second.

Source: FPC, 1982.

Table 1-2. FPC Bartow Unit 3 Particulate Removal System Design Conditions

Parameter	Value
Flue Gas Flow at System Inlet (Total), acfm	765,000 estimated
Temperature--Normal, °F	320
Temperature--Maximum, °F	750 for 30 minutes
Maximum Particulate at Outlet, lb/10^6 Btu heat input	0.10
Opacity at Chimney Outlet, percent	20
Approximate Total kVA Rating of Transformer-Rectifiers	1,100
Maximum Gas Velocity through Precipitator at Design Flow Conditions, fps	4.0
Minimum Specific Collecting Area, square feet per 1,000 acfm (based on design flow conditions)	500
Maximum Pressure Drop, inches H_2O	To be supplied by precipitator manufacturer
Design Pressure, inches H_2O at 300°F	±26
Maximum Height of Collecting Surfaces, feet	50
Approximate Aspect Ratio (effective length/effective height)	1.5
Minimum Number of Transformer-Rectifier Sets	15

Source: FPC, 1982.



SOURCE: ESE, 1982.

Figure 1-1
LOCATION MAP OF BARTOW PLANT

Florida Power
BARTOW PLANT

2.0 METHODS

2.1 DISPERSION MODELS

The models selected for use in this analysis are the U.S. Environmental Protection Agency (EPA) Industrial Source Complex Short-Term (ISCST) and Long-Term (ISCLT) computer codes (EPA, 1979). The ISC model codes, which are approved by EPA and by the Florida Department of Environmental Regulation (DER) are multivariant Gaussian dispersion models used to simulate effluent diffusion at downwind distances from sources or groups of sources. ISCST uses an hour-by-hour computational scheme to estimate maximum 3-hour and 24-hour concentrations. ISCLT uses statistical wind summaries to calculate seasonal or annual ground-level concentrations. The models have a number of options to allow the user to select parameters such as: area, volume, or point sources, coordinate system (polar or cartesian), deposition or concentration, wake effects, stack tip downwash, source separation, terrain effects, and exponential decay.

For this analysis, ISCST was used to assess the particulate matter and SO_2 impacts for the 3-hour and 24-hour averaging times and to estimate 24-hour particulate matter impacts at the plant property line from fugitive emissions. ISCLT was employed to compare annual emissions with long-term (annual) ambient air quality standards for particulate matter, SO_2, and nitrogen dioxide (NO_2).

Throughout this report, the term "maximum concentration" is used to denote highest, second-highest impacts for short-term averaging times. In comparing predicted concentrations with AAQS and PSD increments (see Table 2-1) for such averaging times, EPA and DER recommend using the second-highest predicted impact at each receptor point modeled (EPA, 1978). The highest of these second-highest concentrations over all receptor points is then compared to the standards. This procedure is consistent with the definition of standards and increments, which can be exceeded once per year at each location.

2.2 METEOROLOGICAL DATA

Meteorological data used in the modeling effort were obtained from two sources. Surface data (containing hourly recorded values of wind speed, wind direction, temperature, and cloud cover and ceiling) were obtained from the National Weather Service (NWS) office at the Tampa International Airport. These data were developed to provide a 5-year data base (1970-1974) commensurate with the EPA requirements of a 5-year meteorological data base when offsite meteorological data are used. Upper air data for the same period were obtained from the NWS station located in Ruskin, Florida. These data were used to produce the mixing heights for the short-term modeling portion of the study. Mixing height data for the long-term model (ISCLT) were developed in accordance with guidance in the ISC user's manual using techniques suggested by Holzworth (1972).

2.3 EMISSIONS AND STACK PARAMETERS

The estimated future emissions and stack parameters for Bartow Units 1, 2, and 3 are presented in Table 2-2. These estimates reflect Unit 1 burning a coal-oil mixture and Units 2 and 3 burning coal. Emissions and stack parameters are presented in this table as a function of load. Maximum estimated air quality impacts were estimated using these data.

To compare the proposed changes from oil to coal to the PSD increments, the evaluation requires comparison of predicted future air quality levels with "baseline" air quality concentrations. Baseline concentrations are those due to sources in existence on the baseline date (December 1977) at their baseline emission levels and stack parameters. For the Bartow plant, baseline emissions and stack parameters were determined by DER (George, 1982) to be:

1. The maximum monthly sulfur content of oil in 1977 (to be used in determining the short-term averaging time SO_2 concentrations);
2. The maximum particulate emission rate measured in 1977 [to be used in determining the short-term averaging time total suspended particulates (TSP) baseline concentration]; and

3. The average SO_2, particulate, and NO_x emissions for the years 1976, 1977, 1978, and 1979 (to be used in determining the annual average baseline concentrations).

Table 2-3 presents the baseline emission and stack parameters for Bartow Units 1, 2, and 3. Thse data are based on burning a 2.75 lb $SO_2/10^6$ Btu equivalent sulfur oil and a particulate emission rate of 0.1 lb/10^6 Btu. The table presents the data as a function of load.

As can be observed from a comparison of Tables 2-2 and 2-3, an increase in maximum short-term SO_2 and particulate emissions is not expected from either Unit 1, 2, or 3.

The annual baseline and future emissions for Bartow Units 1, 2, and 3 are presented in Table 2-4. The future emissions are based on the "worst-case" assumption that all units would operate at 100-percent load for an entire year. This assumption is considered conservative, since the average capacity factors for Units 2 and 3 from 1975 through 1981 were 62 percent and 66 percent, respectively.

Annual baseline and future particulate matter and SO_2 emissions for other sources were determined from the DER Air Permit Inventory System (APIS) Report. The criteria for including sources in the analysis were: (1) greater than 100 tons/year and located within 20 kilometers (km), and (2) greater than 200 tons/year and located greater than 20 km but less than 50 km. Listings of the annual baseline and future particulate matter and SO_2 emissions considered in the modeling are presented in Appendix A.

Particulate emissions from coal and fly ash handling and storage are presented in Tables 2-5 and 2-6. Table 2-5 presents emissions from controlled sources, i.e., air that is collected at various transfer and processing points and passed through a bag filter. Fugitive emissions sources are presented in Table 2-6.

2.4 MODEL SCENARIOS

To compare the air quality effects of the proposed Bartow Units 2 and 3 coal conversion to AAQS and PSD increments, eight different modeling scenarios, listed in Table 2-7, were performed.

The proposed maximum SO_2 and particulate emissions for Units 2 and 3 burning coal is the same as that for oil (refer to Table 2-1). As a result, the maximum predicted TSP and SO_2 short-term (3- and 24-hour, as appropriate) concentrations are not expected to be any greater for coal firing than oil firing. In addition, since the greater flow rate for coal firing will increase plume rise and decrease ground-level concentrations, predicted maximum short-term concentrations for coal burning should be lower than that predicted for oil burning. To evaluate this hypothesis, the ISCST model was run to determine ground-level centerline concentrations for six stability classes and up to six wind speeds. A listing of these meteorological conditions is given in Section 3.1. If the results from this analysis demonstrated, for all stabilities, downwind distance, and wind speeds, that there was a predicted decrease in ground-level concentrations by converting Units 2 and 3 from coal to oil, then all short-term impacts using 5 years of meteorological data would be decreased by burning coal.

Also evaluated in the screening analysis was the influence of load on maximum concentrations. Loads of 50 percent, 75 percent, and 100 percent were executed with the ISCST using the screening meteorology.

Comparison with short-term TSP and SO_2 PSD increments was made by subtracting the predicted impacts of Scenario 2 from 3, on a receptor-by-receptor basis. These scenarios were also used to show spatial resolution of maximum short-term impacts. An applicable background concentration was added to the maximum predicted TSP and SO_2 short-term concentrations for making comparisons to AAQS.

A comparison with annual TSP and SO_2 PSD increments was made by subtracting the predicted impacts of Scenario 5 from that predicted in Scenario 4. Predicted maximum annual impacts were compared to AAQS after the addition of a suitable background value.

Baseline and predicted impacts for NO_x were evaluated from the results of Scenarios 6 and 7. A suitable background was added to the model results.

Impacts from coal and fly ash handling were determined from results of Scenario 8. Since the maximum impact for this source category is extremely close to the source of emissions (i.e., within a few hundred meters), then the TSP impacts from these sources will not be coincident with that of the coal units. The maximum predicted concentrations were compared directly to the PSD increments and to AAQS after the addition of a suitable background.

Special receptors were included in both the ISCST and ISCLT model runs to evaluate the air quality impacts to the Hillsborough County TSP nonattainment area, the Pinellas County SO_2 nonattainment area, and the PSD Class I (Chassahowitzka National Wildlife) area. The locations of these areas relative to the Bartow plant are shown in Figure 1-1.

2.5 BACKGROUND AIR QUALITY

To accurately estimate total air quality concentrations, a background concentration must be added to the modeling results. Background is considered to be the air quality concentration not contributed by the sources under evaluation.

For the annual averaging time, background TSP, SO_2, and NO_2 levels were obtained by using the highest mean concentration observed in 1981 for monitors located close to the FPC Bartow plant. This value

was added to all annual average model results to obtain maximum air quality level predictions.

A statistical approach was used to determine appropriate short-term (24-hour and 3-hour) background concentrations. Using the maximum measured values at the monitoring stations is not justified for two reasons. First, it is highly unlikely that worst-case meteorological conditions for point source emissions will occur in conjunction with a worst-case background level. Second, the impact of the Bartow plant with SO_2 emissions of 2.75 $lb/10^6$ Btu is included in the observed data from which a background is selected. A statistically more valid method for determining 24-hour background concentrations is to choose a level that is exceeded 5 percent of the time, or the 95th-percentile concentration. A level that is exceeded 1 percent of the time, or the 99th-percentile concentration, is used for the 3-hour averaging time. A similar approach has been used in previous modeling studies in Florida (ESE, 1979). The probability that these background levels and worst-case point source model predictions will occur simultaneously is less than 1 day in 5 years.

Analysis of many years of ambient data has shown that such data tend to be lognormally distributed. If the lognormal distribution is assumed, the method of Larsen (1971) can be used to estimate the 95th- and 99th-percentile concentration from the annual average concentration. The conversion equation is:

$$C = MgSg^z$$

where: C = 95th- or 99th-percentile concentration,
Mg = Geometric mean,
Sg = Geometric standard deviation,
z = Number of standard deviations from mean for 95th or 99th percentile (z = 1.64 for the 24-hour averaging time, and z = 2.33 for the 3-hour averaging time).

Table 2-1. Federal and State of Florida AAQS and Allowable PSD Increments (ug/m^3)

Pollutant	Averaging Time	Federal		State of Florida	PSD Increment Class		
		Primary Standard	Secondary Standard		I	II	III
Suspended Particulate Matter	Annual Geometric Mean	75	60	60	5	19	37
	24-Hour Maximum*	260	150	150	10	37	75
Sulfur Dioxide	Annual Arithmetic Mean	80	N/A	60	2	20	40
	24-Hour Maximum*	365	N/A	260	5	91	182
	3-Hour Maximum*	N/A	1,300	1,300	25	512	700
Nitrogen Dioxide	Annual Arithmetic Mean	100	100	100	—	—	—

* Maximum concentration not to be exceeded more than once per year.

Sources: 40 CFR, Parts 50 and 52.
Ch 17-2, Florida Administrative Code.

Table 2-2. Stack and Operating Data for Short-Term Averaging Periods for the Proposed Coal Conversion

	Unit 1			Unit 2			Unit 3		
Stack Data									
Stack height (feet)		300			300			300	
Stack diameter (feet)		9			9			11	
Operating Data									
Load (percent)	100	75	50	100	75	50	100	75	50
Temperature (°F)	311	311	311	301	301	301	294	294	294
Velocity (fps)	119	89.4	59.6	122	91.2	60.8	134	101	67.1
Emission Data									
SO_2* (lb/hr)	3,355	2,516	1,678	3,277	2,458	1,639	5,451	4,088	2,726
PM† (lb/hr)	122	91.5	61	120	90	60	199	149	99.5

* 2.75 lb SO_2 per 10^6 Btu.
† 0.1 lb PM per 10^6 Btu.

Source: ESE, 1982.

Table 2-3. Stack and Operating Data for Short-Term Averaging Periods for Baseline Conditions

	Unit 1			Unit 2			Unit 3		
Stack Data									
Stack height (feet)		300			300			300	
Stack diameter (feet)		9			9			11	
Operating Data									
Load (percent)	100	75	50	100	75	50	100	75	50
Temperature (°F)	310	275	250	300	275	250	300	275	250
Velocity (fps)	92	69	46	92	69	46	110	82	55
Emission Data									
SO_2* (lb/hr)	3,355	2,516	1,678	3,277	2,458	1,639	5,571	4,178	2,786
PM† (lb/hr)	122	91.5	61	120	90	60	203	152	102

* 2.75 lb SO_2 per 10^6 Btu.
† 0.1 lb PM per 10^6 Btu.

Source: ESE, 1982.

Table 2-4. Emission Data for Annual Averaging Periods for Baseline Conditions and Proposed Coal Conversion

	Emissions (tons per year)		
	Unit 1	Unit 2	Unit 3
Baseline Conditions			
SO_2*	7,899	4,467	13,480
PM*	249	135	~~485~~ 400
NO_x†	791	1,163	~~2,921~~ 2745
Proposed Coal Conversion			
SO_2	9,600	14,353	23,876
PM	354	524	871
NO_x	3,206	3,145	5,230

* Average emission rate calculated from fuel burned from 1976 to 1979.
† Average emission rate calculated from fuel burned from 1978 to 1979.

Source: ESE, 1982.

Table 2-5. Coal and Fly Ash Handling Emission Points, FPC Bartow Units 2 and 3 Coal Conversion

Source Name	Process Rate		Estimated Controlled Emissions*			Stack Parameters†	
	Maximum (tons/hr)	Annual (1,000 tons/yr)	Maximum (lb/hr)	Maximum (lb/day)	Annual (tons/yr)	Height (ft)	Flow Rate (scfm)
Clamshell Unloader	1,500	714	8.57	97.2	3.6	46	50,000
Transfer Point 1	1,500	714	1.11	12.7	0.5	46	6,500
Transfer Point 2	1,500	1,428	2.05	49.4	1.7	64	12,000
Reclaim Structure	500	714	0.69	4.56	1.0	54	4,000
Crusher Building	500	714	1.71	11.5	2.5	109	10,000
Transfer Point 3	500	714	2.91	19.4	4.2	144	17,000
Transfer Point 4	500	296	2.91	7.44	1.7	134	17,000
Transfer Point 5	500	418	4.29	17.8	3.6	148	25,000
3 Coal Silos--Unit 2	500	296	2.06	5.28	1.2	110	12,000
3 Coal Silos--Unit 3	500	250.8	2.06	5.28	1.0	155	12,000
2 Coal Silos--Unit 3	500	167.2	1.37	2.28	0.5	155	8,000
2 Fly Ash Vacuum Pumps	40	63	0.86	26.2	2.7	46	5,000
Fly Ash Silo Vent	150	63	3.43	27.6	1.4	46	20,000

* Based on controlled emission rate of 0.02 grain/scf.
† Ambient temperature assumed for each source.

Source: ESE, 1982.

Table 2-6. Coal and Fly Ash Fugitive Emissions, FPC Bartow Units 2 and 3 Coal Conversion

Source Name	Process Rate: Maximum (tons/hr)	Process Rate: Annual (1,000 tons/yr)	Controlled Emission Rates: Maximum (lb/hr)	Controlled Emission Rates: Maximum (lb/day)	Controlled Emission Rates: Annual (tons/yr)	Emission Factor* (kg/tonne)
Radial Stacker†	1,500	714	0.102	1.15	0.024	$0.0009 \frac{\frac{S}{5}\frac{U}{2.2}\frac{H}{3}}{(0.5\ M)^2 \frac{Y}{416}}$
Active Pile Wind Erosion						$0.025 \frac{S}{1.5}\frac{D}{235}\frac{F}{15}\frac{d}{90}$
Low Sulfur	57	500	1.2		5.2	
High Sulfur	24	214	1.2		5.3	
Fly Ash Silo Unloading**	150	62.9	2.25	18.0	0.472	0.15
Conveyors Reserve Pile Wind Erosion Formation Traffic	Various					Emission controls will keep emissions to a minimum

* Assumptions: Silt Content (S) = 5 percent.
Mean Wind Speed (U) = 4.4 m/sec.
Height of Release (H) = 3.1 m.
Moisture Content (M) = 7 percent.
Volume of Material Transferred (Y) = 4.6 m^3.
Number of Days that Material is Stored (d) = 8.4 (low sulfur); 19.8 (high sulfur).
Percent of Time that Wind Speed is Greater than 12 mph (F) = 18.8.
Number of Dry Days (D) = 258.

† Emission control efficiency of 75 percent.

** Emission Control Efficiency of 95 percent.

Source: ESE, 1982.

Table 2-7. Modeling Scenarios for FPC Bartow Units 2 and 3 Coal Conversion

Modeling Scenario	Model	Receptor Grid	Meteorology	Pollutant(s)	Source(s)
1. Screening—Maximum 1 Hour	ISCST	0.4–5 km @ 0.2-km spacing 5–10 km @ 0.5-km spacing 10–40 km @ 5-km spacing	6 hourly stability classes and up to 6 wind speeds	TSP* and SO_2	Bartow Units 1, 2, and 3 1) Oil at 2.75 lb $SO_2/10^6$ Btu 2) Coal at 2.75 lb $SO_2/10^6$ Btu (or coal/oil mixture)
2. Baseline Short Term	ISCST	1–5 km @ 1-km spacing 5 at TSP Nonattainment Area 3 at SO_2 Nonattainment Area 2 at Class I Area	5-year Tampa, Hourly (1970–1974)	TSP* and SO_2	Bartow Units 1, 2, and 3 at 2.75 lb $SO_2/10^6$ Btu on oil
3. Projected Short Term	ISCST	1–5 km @ 1-km spacing 5 at TSP Nonattainment Area 3 at SO_2 Nonattainment Area 2 at Class I Area	5-year Tampa, Hourly (1970–1974)	TSP* and SO_2	Bartow Unit 1 on coal/oil mixture; Bartow Units 2 and 3 at 2.75 lb $SO_2/10^6$ Btu and 1.2 lb $SO_2/10^6$ Btu
4. Annual Baseline	ISCLT	1–7.5 km @ 1 km spacing† 3 at SO_2 Nonattainment Area 2 at Class I Area	5-year Tampa, Average (Star 1970–1974)	TSP and SO_2	Bartow Units 1, 2, and 3 at average for 1976–1977; other sources at 1977 actuals
5. Annual Projected	ISCLT	1–7.5 km @ 1 km spacing† 3 at SO_2 Nonattainment Area 2 at Class I Area	5-year Tampa, Average (Star 1970–1974)	TSP and SO_2	Bartow Unit 1 on coal/oil mixture; Units 2 and 3 at 2.75 lb $SO_2/10^6$ Btu; new sources and baseline sources reflect changes, if any, from 1977 baseline
6. Annual Baseline	ISCLT	1–7.5 km @ 1 km spacing	5-year Tampa, Average (Star 1970–1974)	NO_2	Bartow Units 1, 2, and 3 (1978–1979)
7. Annual Projected	ISCLT	1–7.5 km @ 1 km spacing	5-year Tampa, Average (Star 1970–1974)	NO_2	Bartow Units 1, 2, and 3 at 0.6 lb $NO_2/10^6$ Btu
8. Coal and Fly Ash Handling (Fugitive Emissions)	ISCST	34 receptors on FPC's non-water property	5-year Tampa, Hourly (1970–1974)	TSP	Controlled and fugitive emission sources

* Determined through ratio.
† Receptors include TSP nonattainment area.

Source: ESE, 1982.

3.0 RESULTS

3.1 BACKGROUND AIR QUALITY

Ambient air quality for TSP and SO_2 is measured at a monitoring site located 2.2 km west of the FPC Bartow plant (see Figure 1-1). In 1981 the highest and second-highest 24-hour SO_2 concentrations were 152 and 139 micrograms per cubic meter (ug/m^3), respectively. The highest and second-highest observed 3-hour SO_2 concentrations for the same period were 476 and 380 ug/m^3, respectively. Total suspended particulate matter concentrations were measured in 1981 by two co-located monitors at this site. The highest and second-highest observed TSP concentrations, for both monitors, were 92 and 79 ug/m^3, respectively. Data from this monitoring site were used to develop background concentrations for TSP and SO_2.

NO_2 is measured in Pinellas County at a site located 16 km southwest of the Bartow plant. The NO_2 background concentration was determined to be the 1981 annual average for this site.

Table 3-1 presents the background concentrations developed for TSP, SO_2, and NO_2. These concentrations were added to the predicted impacts with Bartow units firing coal; the total was used for comparison with AAQS.

3.2 SCREENING ANALYSIS

The results of the screening analysis are presented in Tables 3-2 and 3-3. As shown in Table 3-2, for all stabilities and wind speeds evaluated, maximum predicted centerline ground-level SO_2 concentrations with the Bartow plant burning coal were reduced from the predicted concentrations while burning oil. Reductions in SO_2 concentrations from 46 percent to 4.5 percent were calculated. The calculated SO_2 reductions in ground-level concentrations would also be the same for TSP.

The maximum predicted centerline SO_2 concentrations from Bartow Units 2 and 3 burning coal as a function of load is shown in Table 3-3. With the exception of the most unstable meteorological conditions, all maximum SO_2 concentrations were highest at 100-percent load.

The screening analysis has shown that: (1) a refined short-term impact analysis using a 5-year meteorological data base is not necessary since all TSP and SO_2 concentrations are predicted to be lower for coal firing than oil firing, and (2) a 100-percent load condition will produce maximum ground-level concentrations.

3.3 MODELING RESULTS

3.3.1 SO_2 Concentrations

Class II Impacts--A summary of the maximum 3- and 24-hour average SO_2 concentrations that were predicted over a 5-year period due to the emissions from the Bartow plant for baseline conditions and proposed coal conversion is presented in Table 3-4. The predicted concentrations assume that Units 1, 2, and 3 operate at maximum capacity (i.e., 100-percent load) for both the baseline conditions and for the proposed coal conversion.

For the proposed coal conversion, SO_2 emission limits from Units 2 and 3 of 2.75 and 1.2 $lb/10^6$ Btu were considered in the modeling. Background concentrations for the 3- and 24-hour averaging periods were estimated as 121 and 62 ug/m^3, respectively. The background concentrations were added to the predicted plant impacts to provide an estimate of the total air quality impacts. From the results presented in Section 3.2, the impacts from proposed coal-fired units generally will be lower than those for the oil-fired units for all meteorological conditions and downwind distances. As shown in Table 3-4, the maximum concentrations over the 5-year period for both the 3- and 24-hour averaging periods are lower when Units 2 and 3 are converted from oil- to coal-fired units. The spatial distributions of the maximum 3- and

24-hour average concentrations due to proposed coal conversion assuming maximum emissions (i.e., 2.75 lb/10^6 Btu) are presented in Figures 3-1 and 3-2, respectively. In addition, the spatial distributions of the difference between the maximum 3- and 24-hour average concentrations of baseline conditions and proposed coal conversion assuming maximum emissions for Units 2 and 3 are displayed in Figures 3-3 and 3-4, respectively.

For the 3-hour averaging period, the maximum predicted concentrations for the proposed coal conversion, assuming emission limits of 2.75 and 1.2 lb/10^6 Btu, are 607 and 428 ug/m^3, respectively. These concentrations are well below the national and Florida AAQS of 1,300 ug/m^3. Similar to the screening modeling results, the difference in predicted concentrations between the baseline conditions and proposed coal conversion over the 5-year period shows a net decrease for both emission limits. As shown in Figure 3-3, the net decrease in concentrations between baseline conditions and proposed coal conversion, assuming maximum emissions, occurs at all downwind distances. Because these concentrations due to the proposed coal conversion are lower than the baseline concentrations, none of the 3-hour PSD increment would be consumed.

The maximum predicted 24-hour average concentrations for the proposed coal conversion, assuming emission limits of 2.75 and 1.2 lb/10^6 Btu, are 173 and 131 ug/m^3, respectively. These concentrations are well below the Florida AAQS of 260 ug/m^3. Again, the impacts for the proposed coal conversion are predicted to be lower than those for the oil-fired units over the 5 years of meteorological data are at all downwind distances (see Figure 3-4). As a result, none of the 24-hour PSD allowable increment would be consumed.

A summary of the annual average concentrations due to baseline emissions and the proposed coal conversion at the Bartow plant is presented in Table 3-5. The predicted concentrations for baseline conditions include the impacts from sources that were estimated to be operating as of the baseline date (i.e., 1977). The predicted concentrations for the proposed coal conversion (i.e., projected case) include changes in emissions from existing sources that have occurred since the baseline date and emissions from new sources. A more detailed description of the methods used in developing these emission inventories is presented in Section 2.0.

The predicted source concentrations were then added to a background concentration of 25 ug/m^3 to produce a total air quality impact. These total impacts are conservative because the background concentration has been estimated from monitoring data, which would have included impacts from the sources that were modeled. As seen in Table 3-5, the total impacts for the projected case are lower than baseline conditions, indicating that there have been significant emission reductions from the sources considered in the modeling since the baseline date. Because of these emission reductions, total air quality impacts have been reduced, resulting in an expansion of the available PSD increments. All of the total predicted air quality impacts are less than the national and Florida AAQS of 80 ug/m^3. The impacts from Units 1, 2, and 3 alone show that the increase in annual average concentrations due to the coal conversion is about 1.6 ug/m^3 with Units 2 and 3 operating at 2.75 $lb/10^6$ Btu.

Class I and Nonattainment Area--A summary of the predicted 3-hour, 24-hour, and annual average concentrations for the baseline emissions and proposed coal conversion in the Class I and SO_2 nonattainment areas is presented in Table 3-6. For the short-term averaging periods, only the impacts due to the emissions from the Bartow plant are presented. Baseline and projected concentrations for the annual average include impacts from other major sources but not a background concentration. These results show that a net decrease occurs in predicted

concentrations in the Class I and nonattainment areas over the 5-year period when Units 2 and 3 are converted to coal-fired units.

For the annual averaging period, the total air quality impacts in the Class I area due to the projected emissions from all sources shows a net decrease in concentrations from impacts associated with the baseline conditions. Predicted annual average concentrations in the nonattainment area show an increase in concentrations from the baseline condition. The increase in impacts due to the proposed coal conversion at the Bartow plant is not significant (i.e., less than 1 ug/m^3), even assuming an emission limit of 2.75 $lb/10^6$ Btu at 100-percent load.

3.3.2 TSP Concentrations

Class II Impacts--A summary of the maximum 24-hour average TSP concentrations due to the emissions from the Bartow plant for baseline conditions and proposed coal conversion is presented in Table 3-7. The predicted concentrations assume that Units 1, 2, and 3 operate at maximum capacity (i.e., 100-percent load) for both baseline conditions (i.e., oil-fired) and for the proposed coal conversion. The background concentration for the 24-hour averaging period was estimated to be 92 ug/m^3. The background concentration was added to the predicted plant impacts to provide an estimate of the total air quality impacts. From the results presented in Section 3.1, the impacts from the proposed coal-fired units generally will be lower than those for the oil-fired units for all downwind distances and meteorological conditions.

As shown in Table 3-7, the maximum 24-hour concentration over the 5-year period is lower when Units 2 and 3 are converted from oil- to coal-fired units. The maximum concentration of 96.0 ug/m^3 due to the proposed coal conversion is less than the national and Florida AAQS of 150 ug/m^3. Similar to the screening model results, the difference in predicted concentrations between the baseline emissions and proposed coal conversion over the 5-year period shows a net decrease. Because these

concentrations due to the proposed coal conversion are lower than the baseline concentrations, none of the PSD increment would be consumed.

A summary of the annual average concentrations due to the baseline emissions and the proposed coal conversion at the Bartow plant is presented in Table 3-8. The predicted concentrations for baseline conditions include the impacts from sources that were estimated to be operating as of the baseline in 1977. The predicted concentrations for the proposed coal conversion (i.e., projected case) include changes in emissions from existing sources that have occurred since the baseline date and emissions from new sources. A more detailed description of the methods used in developing these emission inventories is presented in Section 2.0. The predicted source concentrations were added to a background concentration of 46 ug/m^3. These total impacts are conservative because the background concentration has been estimated from monitoring data, which would have included impacts from the sources that were modeled. It should be noted that the arithmetic averages calculated for the plant impacts were adjusted to geometric means based on the statistics from the monitoring data. As seen in Table 3-7, the total impacts for the projected case are lower than the baseline conditions, indicating that there has been a reduction in emissions from the sources considered in the modeling since the baseline date. Because of these emission reductions, total air quality impacts have been reduced, resulting in an expansion of the available PSD increment. All of the total air quality predicted impacts are less than the national and Florida AAQS of 60 ug/m^3. The increase in annual average concentrations due to the proposed coal conversion at Units 2 and 3 is less than 1.0 ug/m^3 and, therefore, is not significant.

Class I and Nonattainment Areas—A summary of the predicted 24-hour and annual average concentrations for the baseline emissions and proposed coal conversion in the Class I and PM nonattainment areas is presented in Table 3-9. For the 24-hour average, only the impacts due to the emissions from the Bartow plant are presented. These results show that

a net decrease occurs in predicted concentrations in the Class I and nonattainment area over the 5-year period when Units 2 and 3 are converted to coal-fired units.

For the annual averaging period, the total air quality impacts in the Class I and nonattainment areas remain essentially the same for both the baseline conditions and when Units 2 and 3 are converted to coal-fired units. A background concentration was not added to these results. Also, the impacts due only to the Bartow plant before and after coal conversion are less than 1 ug/m^3 and, therefore, not significant.

Impacts of Fugitive Emissions--Maximum 24-hour and annual average particulate matter concentrations were predicted for the emissions emanating from the proposed coal and fly ash handling systems for Units 2 and 3. In this analysis, concentrations were predicted using 5 years of meteorological data at 34 receptor locations that are the closest distances to public access around the plant. Based on the modeling results, the maximum 24-hour average concentration of 26 ug/m^3 was predicted to occur about 700 m to the southeast of the plant. Because the fugitive emissions are essentially released at ground level, their impacts are not expected to be coincident with the maximum predicted concentrations due to the stack emissions from Units 1, 2, and 3. Also, the maximum concentrations due to the fugitive emissions generally will occur closest to the source of emissions and decrease with increasing downwind distances. Therefore, the maximum concentration due to the highest fugitive emissions would consume less than 75 percent of the 24-hour PSD increment of 37 ug/m^3. When combined with the ambient background concentration of 92 ug/m^3, the total predicted concentration of 118 ug/m^3 is less than the national and Florida AAQS of 150 ug/m^3.

As a conservative estimate of the annual average concentrations, the maximum short-term emissions from the fugitive sources were used in the modeling analyses. The maximum annual average concentration over the

5 years of data was 3.3 ug/m^3, which is less than 20 percent of the annual average PSD increment of 19 ug/m^3. When combined with the ambient background concentration of 46 ug/m^3, the total predicted concentration of 49.3 ug/m^3 is less than the national and Florida AAQS of 60 ug/m^3. Again, the predicted annual average concentrations are conservative because all the coal and fly ash handling activities will not be occurring for all 24-hour periods in the year, as assumed in the modeling analyses.

3.3.3 NO_x Concentrations

A summary of the highest annual average concentrations due to the baseline emissions and the proposed coal conversion at the Bartow plant is presented in Table 3-10. The predicted concentrations for baseline and projected conditions are due only to the emissions from the Bartow plant and a background annual average concentration of 26 ug/m^3. As seen in Table 3-10, the total impacts for the projected case are slightly higher than the baseline case. For both cases, the total concentrations are less than national and Florida AAQS of 100 ug/m^3.

Table 3-1. Background Concentrations for SO_2, TSP, and NO_2

Pollutant	Site Number	Number of Observations	Geometric Mean (ug/m^3)	Geometric Standard Deviation (ug/m^3)	Background (ug/m^3) Annual Average	24-Hour	3-Hour
SO_2	3980-023-G02*	7446	24.5	1.89	25	62	121
TSP	3980-023-G02*	52	49 (arithmetic mean)	1.39	46†	92	NA
NO_2	3980-018-G01**	6857	21	2.13	26 (24)	NA	NA

*10100 San Martin Road, St. Petersburg, (NAMS).
†Geometric Mean.
**7200 22nd Avenue, N. St. Petersburg (SLAMS).
NA = Not applicable.

Source: Florida Department of Environmental Regulation, 1982.
ESE, 1982.

Table 3-2. Comparison of Maximum Hourly Centerline Concentrations Due to the Existing Oil-Fired and Proposed Coal-Fired Units*

Meteorological Conditions			Hourly Concentrations (ug/m^3)		Downwind Distance (km)	Percent Reduction in Concentration from Existing Oil-Fired to Proposed Coal-Fired Units
Stability Class	Stability	Wind Speed (m/s)	Existing Units	Proposed Units		
1	Very Unstable	1.0	1,652	890	1.4	46
		3.0	1,265	1,055	0.8	17
2	Unstable	1.0	535	510	5.5	4.5
			540	503	5.0	6.8
		3.0	672	564	2.2	16
			691	560	2.0	19
		5.0	736	629	1.6	15
			750	610	1.4	19
3	Slightly Unstable	1.0	291	278	15.0	4.5
			325	272	10.0	16
		3.0	530	434	4.0	18
			538	424	3.6	21
		5.0	594	498	2.8	16
			600	492	2.6	18
		7.0	593	513	2.4	13
			604	511	2.2	15
		10.0	566	501	2.0	12
			575	497	1.8	14
4	Neutral	1.0	68	40	40.0	41
		3.0	202	155	15.0	23
		5.0	255	208	9.5	19
			258	205	8.5	21
		7.0	274	228	7.0	17
			276	226	6.5	18
		10.0	274	235	5.5	14
			275	232	5.0	16
		15.0	251	223	4.4	11
			252	222	4.2	12
5	Slightly Stable	1.0	355	303	30.0	15
			357	298	25.0	17
		3.0	225	199	20.0	12
		5.0	167	151	20.0	10
			171	150	15.0	12
6	Stable	1.0	91	65	40.0	29
		3.0	89	73	40.0	18

* Existing case with Units 1, 2, and 3 firing oil; proposed case with Unit 1 firing coal-oil mixture, Units 2 and 3 firing coal.

Source: ESE, 1982.

Table 3-3. Comparison of Maximum Hourly Centerline Concentrations Due to the Proposed Coal-Fired Units 2 and 3 Operating at 100-, 75-, and 50-Percent Loads

Meteorological Conditions			100-Percent Load		75-Percent Load		50-Percent Load	
Stability Class	Stability	Wind Speed (m/s)	Concentration (ug/m^3)	Distance (km)	Concentration (ug/m^3)	Distance (km)	Concentration (ug/m^3)	Distance (km)
1	Very Unstable	1.0	443	1.4	885	1.4	615	1.4
		3.0	709	0.8	668	0.8	556	0.8
2	Unstable	1.0	366	5.5	286	5.0	229	3.8
		3.0	381	2.2	364	2.0	331	1.6
		5.0	428	1.6	395	1.4	341	1.2
3	Slightly Unstable	1.0	199	15	170	10.0	161	7.5
		3.0	291	4.2	282	3.6	262	3.0
		5.0	338	3.0	317	2.6	277	2.2
		7.0	352	2.4	320	2.2	268	2.0
		10.0	347	2.0	305	1.8	245	1.6
4	Neutral	1.0	23	40	34	40	43	40
		3.0	101	15	105	15	106	10
		5.0	139	10	136	8.5	125	7.0
		7.0	155	7.5	145	6.5	127	5.5
		10.0	161	6.0	146	5.0	120	4.4
		15.0	155	4.6	134	4.2	105	3.8
5	Slightly Stable	1.0	206	30	187	25	161	20
		3.0	138	20	119	20	95	15
		5.0	106	20	90	15	72	15
6	Stable	1.0	41	40	46	40	50	40
		3.0	49	40	46	40	41	40

Source: ESE, 1982.

Table 3-4. Summary of Predicted Maximum 3- and 24-Hour SO_2 Concentrations due to Baseline Conditions and Proposed Coal Conversion*

Averaging Period	Baseline Conditions		Proposed Coal Conversion				Minimum Difference Between Baseline and Proposed Coal Conversion	
			2.75 lb/ 10^6 Btu		1.2 lb/ 10^6 Btu			
	Plant	Total	Plant	Total	Plant	Total	2.75 lb/ 10^6 Btu	1.2 lb/ 10^6 Btu
3-Hour								
Concentration (ug/m^3)	601	722	486	607	307	428	-3.8	-31.2
Year	1971		1971		1971		1970	1974
Period (Julian day/hour ending)	178/12		178/12		178/12		NA	NA
Location [Direction (°), Distance (km)]	90-2.0		90-2.0		90-2.0		190-5.0	140-1.0
24-Hour								
Concentration (ug/m^3)	133	195	111	173	69	131	-1.1	-4.3
Year	1971		1974		1974		1972	1972
Period (Julian day)	220		286		286		NA	NA
Location [Direction (°), Distance (km)]	90, 2.0		240, 3.0		240, 3.0		160, 1.0	160, 1.0

* Based on 100-percent load conditions using 5 years of meteorological data.
† 3-hour background estimated as 121 ug/m^3; 24-hour background estimated as 62 ug/m^3.
NA = Not applicable.

Source: ESE, 1982.

Table 3-5. Annual Average SO_2 Concentrations Due to Baseline Conditions and Proposed Coal Conversion

Case	Sources	Concentration* (ug/m^3) Sources	Concentration* (ug/m^3) Total	Location UTM Coordinates (km) East, North
Baseline	All	49	74	350, 3083
	Bartow Units 1, 2, 3	7.3	NA	345, 3083
Projected	All with Units 2 and 3			
	@ 2.75 $lb/10^6$ Btu	24.2	49.2	346, 3083
	@ 1.2 $lb/10^6$ Btu	20.8	45.8	346, 3083
	Bartow Units 1, 2, and 3 with Units 2 and 3			
	@ 2.75 $lb/10^6$ Btu	8.9	NA	346, 3083
	@ 1.2 $lb/10^6$ Btu	5.5	NA	346, 3083

* Background concentration is estimated as 25 ug/m^3.

NA = Not applicable.

Source: ESE, 1982.

Table 3-6. Predicted 3-, 24-Hour, and Annual Average SO_2 Concentrations at the PSD Class I and Nonattainment Areas due to the Baseline Conditions and Proposed Coal Conversion at the Bartow Plant*

Area	Source	Proposed Emission Limits for Units 2 and 3 ($lb/10^6$ Btu)	Concentrations (ug/m^3)† 3-Hour Bartow Plant	24-Hour Bartow Plant	Annual All Sources	Annual Bartow Plant
PSD Class I	Baseline		61.4	10.9	13.6	0.8
	Proposed Coal	2.75	52.3	10.0	3.9	1.4
	Conversion	1.2	32.1	6.0	3.7	1.2
Nonattainment	Baseline		125	34	5.5	0.4
	Proposed Coal	2.75	116	31	9.0	0.6
	Conversion	1.2	69.9	18.7	8.4	0.2

* Composite maximum concentrations assuming maximum plant operation using 5 years of meteorological data.

† Highest second-highest concentration for Class I area; highest concentration for nonattainment area.

Source: ESE, 1982.

Table 3-7. Summary of Predicted Maximum 24-Hour TSP Concentrations due to Baseline Conditions and Proposed Coal Conversion*

Averaging Period	Baseline Conditions		Proposed Coal Conversion		Minimum Difference Between Baseline and Proposed Coal Conversion
	Plant	Total†	Plant	Total†	
24-Hour					
Concentration (ug/m^3)	4.8	96.8	4.0	96.0	-0.04
Year	1971		1974		1972
Period (Julian day)	220		286		NA
Location [Direction (°), Distance (km)]	90, 2.0		240, 3.0		160, 1.0

* Based on 100-percent load conditions using 5 years of meteorological data.
† Background concentration estimated as 92 ug/m^3.
NA = Not applicable.

Source: ESE, 1982.

Table 3-8. Annual Average TSP Concentrations Due to Baseline Conditions and Proposed Coal Conversion

Case	Sources	Concentration* (ug/m^3) Sources	Concentration* (ug/m^3) Total	Location UTM Coordinates (km) East, North
Baseline	All	13.9	59.9	347, 3083
	Bartow Units 1, 2, 3	0.2	NA	345, 3083
Projected	All	13.4	59.4	347, 3083
	Bartow Units 1, 2, 3	0.3	NA	346, 3083

*Background concentration is estimated as 46 ug/m^3.

NA = Not applicable.

Source: ESE, 1982.

Table 3-9. Predicted 24-Hour and Annual Average TSP Concentrations at the PSD Class I and Nonattainment Areas due to the Baseline Conditions and Proposed Coal Conversion at the Bartow Plant*

Area	Source	Concentrations (ug/m^3) 24-Hour Bartow Plant†	Annual All Sources	Annual Bartow Plant
PSD Class I	Baseline	0.4	0.42	0.01
	Proposed Coal Conversion	0.4	0.47	0.02
Nonattainment	Baseline	2.5	5.9	0.03
	Proposed Coal Conversion	2.2	6.1	0.10

* Composite maximum concentrations assuming maximum plant operation using 5 years of meteorological data.

† Highest second-highest concentration for Class I area; highest concentration for nonattainment area.

Source: ESE, 1982.

Table 3-10. Predicted Annual Average NO_2 Concentrations Due to Baseline Conditions and Proposed Coal Conversion

	Baseline Conditions		Proposed Coal Conversion	
	Plant*	Total†	Plant*	Total†
Concentration (ug/m^3)	1.3	27.3	2.0	28
Location UTM Coordinates (km) East, North	345, 3083		346, 3083	

* Bartow Units 1, 2, and 3 only.
† Background concentration is estimated as 26 ug/m^3.

Source: ESE, 1982.

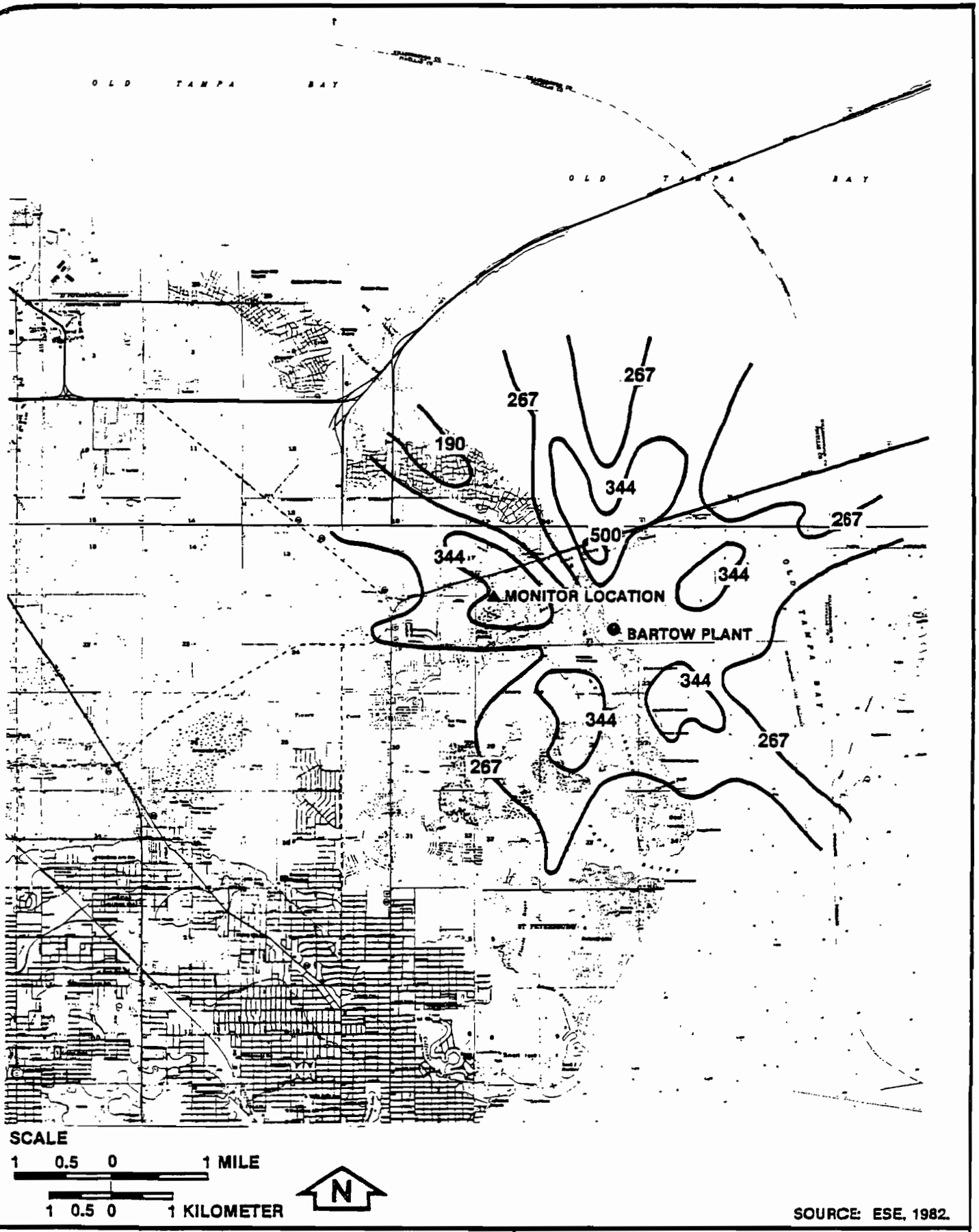


Figure 3-1
FIVE-YEAR COMPOSITE OF MAXIMUM 3-HOUR AVERAGE SO_2 CONCENTRATIONS (ug/m3) DUE TO THE PROPOSED COAL CONVERSION

Florida Power CORPORATION

BARTOW PLANT

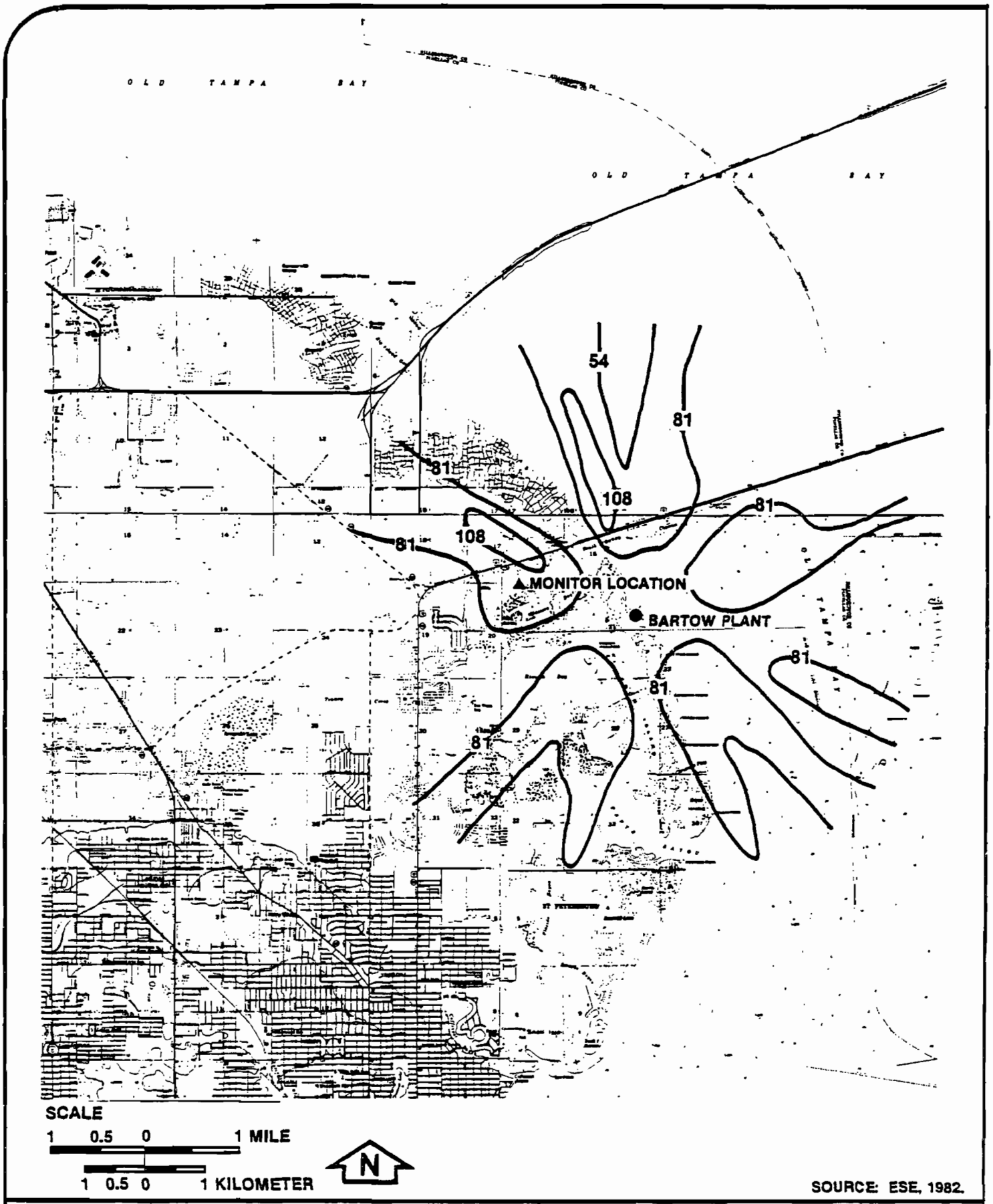
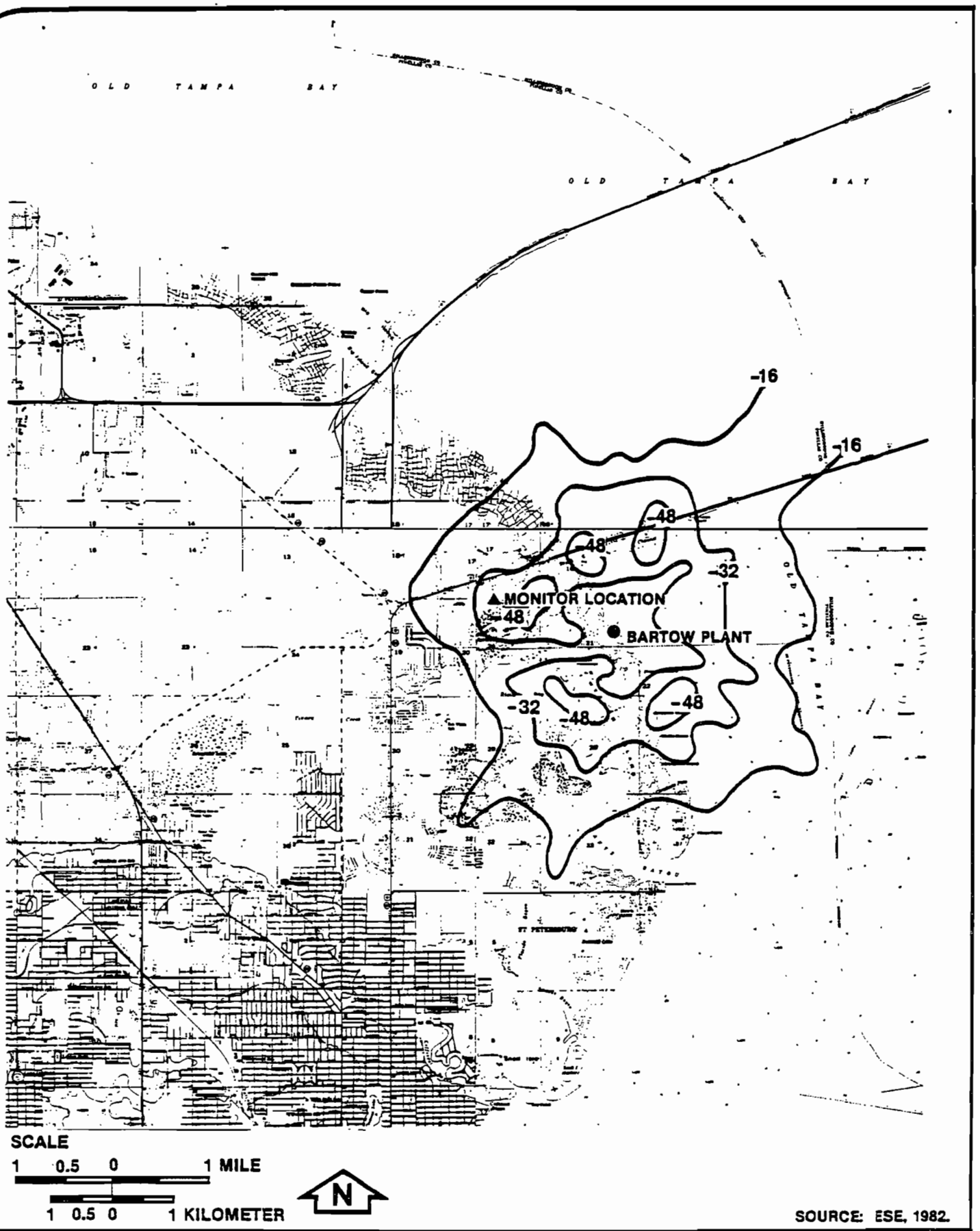


Figure 3-2
FIVE-YEAR COMPOSITE OF MAXIMUM 24-HOUR AVERAGE SO_2 CONCENTRATIONS (ug/m^3) DUE TO THE PROPOSED COAL CONVERSION

Florida Power CORPORATION
BARTOW PLANT

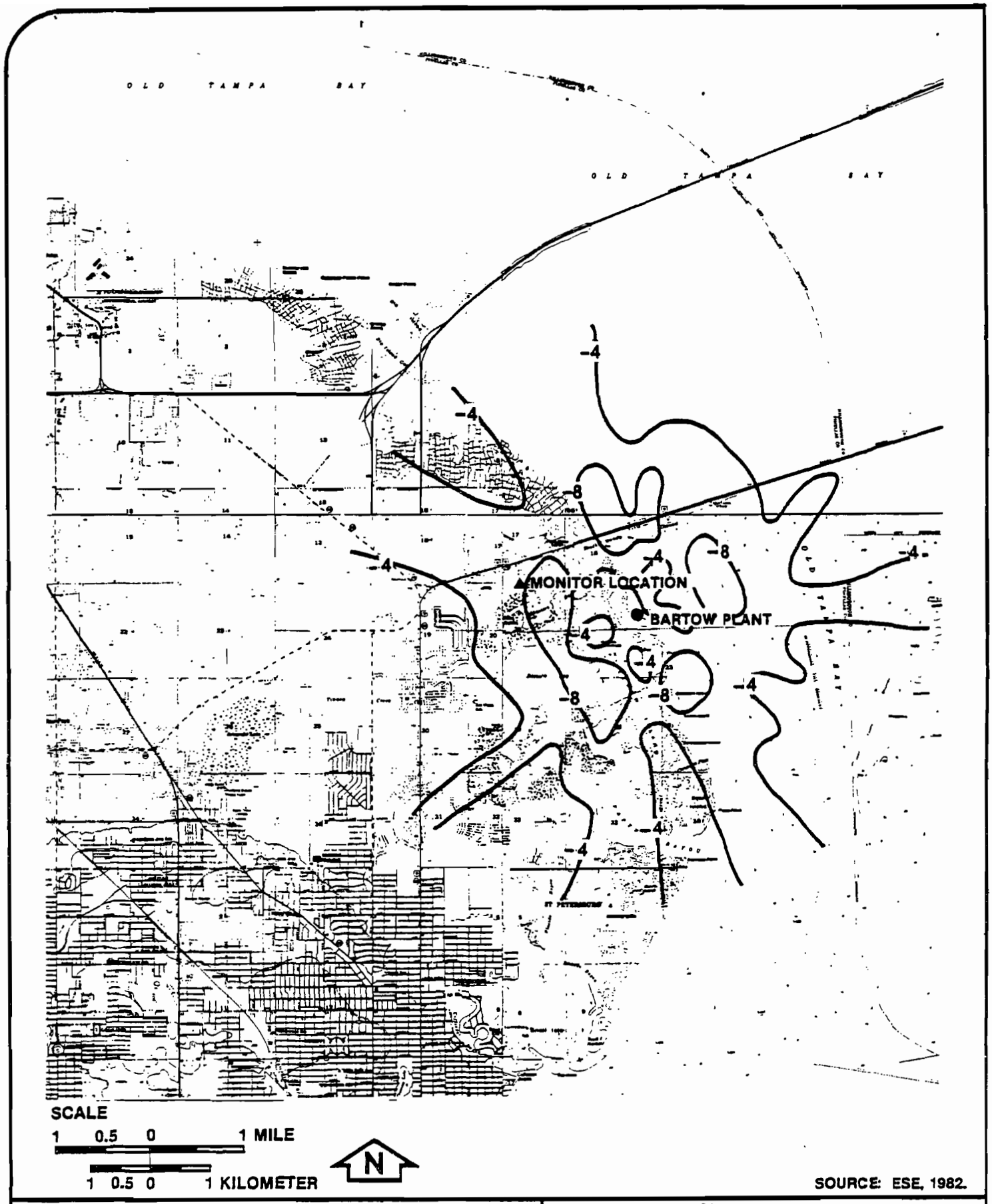


SOURCE: ESE, 1982.

Figure 3-3
FIVE-YEAR COMPOSITE OF DIFFERENCE BETWEEN MAXIMUM 3-HOUR AVERAGE SO_2 CONCENTRATIONS (ug/m^3) OF BASELINE CONDITIONS AND PROPOSED COAL CONVERSION

Florida Power CORPORATION

BARTOW PLANT



SOURCE: ESE, 1982.

Figure 3-4
FIVE-YEAR COMPOSITE OF DIFFERENCE BETWEEN MAXIMUM 24-HOUR AVERAGE SO_2 CONCENTRATIONS (ug/m^3) OF BASELINE CONDITIONS AND PROPOSED COAL CONVERSION

Florida Power CORPORATION

BARTOW PLANT

4.0 CONCLUSIONS

The proposed coal conversion at FPC's Bartow plant Units 2 and 3 will have different potential ambient air quality impacts than those produced with the existing oil-fired units. Based on screening modeling results using worst-case meteorological conditions and results using 5 years of hourly meteorological data, the short-term average TSP and SO_2 concentrations are predicted to be lower when Units 2 and 3 are converted from oil- to coal-fired units. Based on the proposed emission limits of 2.75 lb $SO_2/10^6$ Btu and 0.10 lb PM/10^6 Btu, the maximum TSP and SO_2 emissions for Units 2 and 3 are the same as those for oil. Because the coal-fired units will have greater flow rates than the oil-fired units, the plume rise will be higher for the coal-fired units, resulting in the potential for lower ground-level concentrations than those for the oil-fired units. As a result, the maximum ground-level concentrations for the 3- and 24-hour average SO_2 and 24-hour TSP concentrations due to the proposed coal-fired units are predicted to be lower than the applicable national and Florida AAQS and PSD Class II maximum allowable increments. In addition, because the impacts for the coal-fired units are less than the impacts for the oil-fired units, the proposed coal conversion at Units 2 and 3 will reduce impacts in the PSD Class I area (i.e., Chassahowitzka National Wildlife Refuge) and the SO_2 and TSP nonattainment areas. When the fugitive emissions from the coal and fly ash handling systems are considered in the modeling, their impacts are also predicted to be less than the applicable TSP standards.

The predicted maximum annual average SO_2, TSP, and NO_2 concentrations due to emissions from the proposed coal-fired units are less than the applicable national and Florida AAQS and PSD Class II maximum allowable increments. The maximum increases in SO_2, TSP, and NO_2 concentrations due to the proposed coal conversion are generally less than the significant level of 1 ug/m^3 for these pollutants. As a result, the maximum predicted increases in concentrations due to the proposed coal conversion do not significantly impact the PSD Class I and II areas and SO_2 and TSP nonattainment areas.

REFERENCES

Environmental Science and Engineering, Inc. 1979. Analysis of the Air Quality Impact Resulting from a Particulate Emission Rule Change for Fossil-Fuel Steam Generators in Florida. ESE Report No. 79-123-09. Prepared for the Florida Electric Power Coordinating Group. Gainesville, Florida.

George, L. 1982. Personal Communication. Florida Department of Environmental Regulation. Tallahassee, Florida.

Holzworth, G.C. 1972. Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution throughout the Contiguous United States. Publication No. AP-101. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina.

Larsen, R.I. 1971. A Mathematical Model for Relating Air Quality Measurements to Air Quality Standards. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina.

U.S. Environmental Protection Agency. 1978. Guideline on Air Quality Models. EPA-450/2-78-027.

U.S. Environmental Protection Agency. 1979. Industrial Source Complex (ISC) Dispersion Model User's Guide. Volume I. EPA-450/4-79-030.

APPENDIX A

EMISSIONS INVENTORIES

Table A-1. Baseline Sulfur Dioxide Emissions

NO.	SOURCE DESCRIPTION	SOURCE NO.	DISP.	TYPE	QFLG (G/SEC)	X (M)	Y (M)	HEIGHT (M)	ELEV. (M)	TEMP. (K)	VEL. (M/SEC)	DIAM. (M)
1	FPC MANATEE 10-01,02	1	0	0	1078	367400.00	3055100.00	121.90	0.00	416.00	14.90	7.90
2	FPC HIGGINS 12-01,02,03	2	0	0	569	336500.00	3098300.00	53.00	0.00	419.00	12.00	3.80
3	FPC HIGGINS 12-04,05,06,07	3	0	0	1197	336500.00	3098300.00	16.80	0.00	727.00	61.00	4.60
4	FPC BAYBORO 13-01,02	4	0	0	0.97	338700.00	3071200.00	61.90	0.00	450.00	5.70	3.80
5	FPC BAYBORO 13-03,04,05,06	5	0	0	150.2	338700.00	3071200.00	12.20	0.00	755.00	61.00	2.80
6	FPC ANCLOTE	6	0	0	725.6	324400.00	3118700.00	152.10	0.00	408.00	12.50	7.30
7	GARDINIER 8-01	7	0	0	31.5	363200.00	3082400.00	24.40	0.00	363.00	6.00	1.40
8	GARDINIER 8-02	8	0	0	56.2	363200.00	3082400.00	22.60	0.00	360.00	7.40	1.60
9	GARDINIER 8-03	9	0	0	74.9	363200.00	3082400.00	21.90	0.00	360.00	9.10	1.80
10	GARDINIER 8-04	10	0	0	175.4	363200.00	3082400.00	28.00	0.00	351.00	6.20	2.90
11	GARDINIER 8-05	11	0	0	185.9	363200.00	3082400.00	29.30	0.00	352.00	7.10	3.30
12	GARDINIER 8-06	12	0	0	52.6	363200.00	3082400.00	45.70	0.00	355.00	11.10	2.70
13	GARDINIER 8-07	13	0	0	4.62	363200.00	3082400.00	26.80	0.00	340.00	7.70	0.40
14	GARDINIER 8-32	14	0	0	7.67	362900.00	3082500.00	23.80	0.00	346.00	3.30	1.80
15	GARDINIER 8-36	15	0	0	2.45	362900.00	3082500.00	20.70	0.00	317.00	10.00	1.10
16	GARDINIER 8-38	16	0	0	2.53	362900.00	3082500.00	20.70	0.00	310.00	14.80	1.10
17	GARDINIER 8-42	17	0	0	3.74	362900.00	3082500.00	18.30	0.00	589.00	6.90	2.50
18	TAMPA WATER	18	0	0	11.5	359300.00	3100200.00	38.10	0.00	394.00	1.30	1.50
19	GEN. PORTLAND 18-01,02,03	19	0	0	22.0	357900.00	3090600.00	53.30	0.00	400.00	11.60	3.00
20	GEN. PORTLAND 18-05	20	0	0	6.42	357900.00	3090600.00	36.00	0.00	464.00	15.20	2.70

Table A-1. Baseline Sulfur Dioxide Emissions (Continued, Page 2 of 2)

21	GEN. PORTLAND 18-06	21	0	0	76.7	357900.003090600.00	44.20	0.00	472.00	11.40	4.70
22	NITRAM 29-03	22	0	0	6.40	363100.003089000.00	27.40	0.00	477.00	24.20	0.90
23	NITRAM 29-04	23	0	0	5.00	363100.003089000.00	27.40	0.00	505.00	24.20	0.90
24	TPA INCIN. 42-01,02,03	24	0	0	4.30	360300.003092300.00	27.40	0.00	344.00	9.00	2.10
25	GULF COAST 57-01	25	0	0	10.3	363900.003093800.00	29.60	0.00	344.00	39.40	0.60
26	CHLORIDES 58-01	26	0	0	20.4	361800.003088300.00	29.90	0.00	366.00	22.60	0.60
27	TECO BB 39-01	27	0	0	1796	361600.003075000.00	149.30	0.00	423.00	19.30	7.30
28	TECO BB 39-02	28	0	0	1698	361600.003075000.00	149.30	0.00	423.00	18.40	7.30
29	TECO BB 39-03	29	0	0	1666	361600.003075000.00	149.30	0.00	418.00	8.60	7.60
30	GANNON 40-01	30	0	0	1740	360000.003087500.00	61.00	0.00	427.00	8.30	4.30
31	GANNON 40-02	31	0	0	1740	360000.003087500.00	76.20	0.00	427.00	17.10	3.00
32	GANNON 40-03	32	0	0	1210	360000.003087500.00	76.20	0.00	403.00	14.00	3.20
33	GANNONE 40-04	33	0	0	2590	360000.003087500.00	71.60	0.00	414.00	29.30	2.90
34	GANNON 40-05	34	0	0	6820	360000.003087500.00	70.10	0.00	415.00	14.30	4.50
35	GANNON 40-06	35	0	0	1146	360000.003087500.00	93.30	0.00	417.00	16.00	5.40
36	HOOKER'S PT 01,02	36	0	0	1943	358000.003091000.00	45.70	0.00	400.00	1.60	3.70
37	HOOKER'S PT 03,04	37	0	0	1985	358000.003091000.00	45.70	0.00	397.00	3.40	4.00
38	HOOKER'S PT 05	38	0	0	977.2	358000.003091000.00	52.70	0.00	414.00	4.90	3.70
39	HOOKER'S PT 06	39	0	0	1679	358000.003091000.00	52.70	0.00	436.00	5.90	3.90
40	BARTOW UNIT 1	40	0	0	2272	342380.003082720.00	91.40	0.00	405.00	19.60	2.70
41	BARTOW UNIT 2	41	0	0	1290	342380.003082720.00	91.40	0.00	405.00	19.60	2.70
42	BARTOW UNIT 3	42	0	0	3678	342380.003082720.00	91.40	0.00	405.00	23.50	3.40

Table A-2. Projected Sulfur Dioxide Emissions

NO.	SOURCE DESCRIPTION	SOURCE NO.	DISP.	TYPE	QFLG	X (M)	Y (M)	HEIGHT (M)	FLEV. (M)	TEMP. (K)	VEL. (M/SEC)	DIAM. (M)
1	FPC MARATEE 10-01,02	1	0	0	1078	367400.00	3055100.00	121.90	0.00	416.00	14.90	7.90
2	FPC HIGGINS 12-01,02,03	2	0	0	588	336500.00	3098300.00	55.00	0.00	419.00	12.80	3.80
3	FPC HIGGINS 12-04,05,06,07	3	0	0	119.7	336500.00	3098300.00	16.80	0.00	727.00	61.00	4.60
4	FPC BAYBORO 13-01,02	4	0	0	0.98	338700.00	3071200.00	61.90	0.00	450.00	5.70	3.80
5	FPC BAYBORO 13-03,04,05,06	5	0	0	150.2	338700.00	3071200.00	12.20	0.00	755.00	61.30	2.80
6	FPC ANCLOTE	6	0	0	724.5	324400.00	3118700.00	152.10	0.00	422.00	32.90	7.30
7	GARDINIER 8-04	7	0	0	15.3	363200.00	3082400.00	45.70	0.00	363.00	9.10	2.30
8	GARDINIER 8-05	8	0	0	32.6	363200.00	3082400.00	45.70	0.00	363.00	8.20	2.40
9	GARDINIER 8-06	9	0	0	34.7	363200.00	3082400.00	45.70	0.00	363.00	12.40	2.70
10	GARDINIER 8-07	10	0	0	6.50	363200.00	3082400.00	38.40	0.00	325.00	10.80	2.40
11	GARDINIER 8-32	11	0	0	1.72	362900.00	3082500.00	23.80	0.00	349.00	5.50	1.80
12	GARDINIER 8-36	12	0	0	2.45	362900.00	3082500.00	20.70	0.00	317.00	10.00	1.10
13	GARDINIER 8-38	13	0	0	0.78	362900.00	3082500.00	20.70	0.00	314.00	15.30	1.10
14	GARDINIER 8-42	14	0	0	4.50	362900.00	3082500.00	18.30	0.00	589.00	3.70	2.50
15	TAMPA WATER	15	0	0	11.5	359300.00	3100200.00	38.10	0.00	394.00	1.30	1.50
16	GEN. PORTLAND 18-05	16	0	0	61.0	357900.00	3090600.00	36.00	0.00	505.00	17.70	2.70
17	GEN. PORTLAND 18-06	17	0	0	10.3	357900.00	3090600.00	36.00	0.00	454.00	8.80	2.70
18	NITRAM 29-03	18	0	0	4.4	363100.00	3089000.00	27.40	0.00	477.00	24.20	0.90
19	NITRAM 29-04	19	0	0	5.0	363100.00	3089000.00	27.40	0.00	505.00	24.20	0.90
20	TPA INCIN. 42-01,02,03	20	0	0	4.3	360300.00	3092300.00	27.40	0.00	344.00	9.00	2.10

Table A-2. Projected Sulfur Dioxide Emissions (Continued, Page 2 of 2)

21	[illegible] COAST	21	0	0	10.3	363900.003093200.00	29.60	0.00	344.00	30.40	0.60
22	CHLORIDES 50-01	22	0	0	13.0	361800.003088300.00	30.20	0.00	398.00	22.90	0.60
23	TECO BB 39-01	23	0	0	1454	361600.003075000.00	149.30	0.00	422.00	28.60	7.30
24	TECO BB 39-02	24	0	0	1438	361600.003075000.00	149.30	0.00	422.00	28.60	7.30
25	TECO BB 39-03	25	0	0	1485	361600.003075000.00	149.30	0.00	417.00	14.43	7.30
26	TECO BB 4	26	0	0	465	361600.003075000.00	149.30	0.00	342.00	19.97	7.30
27	GANNON 40-01	27	0	0	174	360000.003087500.00	93.30	0.00	438.00	32.30	3.05
28	GANNON 40-02	28	0	0	174	360000.003087500.00	93.30	0.00	438.00	32.30	3.05
29	GANNON 40-03	29	0	0	221	360000.003087500.00	93.30	0.00	427.00	35.40	3.23
30	GANNON 40-04	30	0	0	259	360000.003087500.00	93.30	0.00	443.00	24.60	2.93
31	GANNON 40-05	31	0	0	489	360000.003087500.00	93.30	0.00	416.00	20.70	4.45
32	GANNON 40-06	32	0	0	1146	360000.003087500.00	93.30	0.00	439.00	23.40	5.36
33	HOOKER'S PT 01,02	33	0	0	111.3	358000.003091000.00	85.30	0.00	403.00	18.20	3.41
34	HOOKER'S PT 03,04	34	0	0	113.8	358000.003091000.00	85.30	0.00	403.00	11.50	3.44
35	HOOKER'S PT 05	35	0	0	55.7	358000.003091000.00	85.30	0.00	403.00	18.20	3.40
36	HOOKER'S PT 06	36	0	0	107.0	358000.003091000.00	85.30	0.00	436.00	17.90	2.90
37	PINELLAS RESOURCE RECOVERY	37	0	0	31.1	335000.003083500.00	49.10	0.00	522.00	38.20	2.74
38	EXXON	38	0	0	0.78	362200.003087200.00	9.40	0.00	340.00	11.00	3.00
39	BARTOW UNIT 1	39	0	0	422.7	342380.003082720.00	91.40	0.00	428.00	36.33	2.70
40	BARTOW UNIT 2	40	0	0	412.9	342380.003082720.00	91.40	0.00	423.00	37.06	2.70
41	BARTOW UNIT 3	41	0	0	606.0	342380.003082720.00	91.40	0.00	419.00	40.90	3.40
42	BARTOW UNIT 2 (1.2)	42	0	0	1608	342380.003082720.00	91.40	0.00	423.00	37.06	2.70
43	BARTOW UNIT 3 (1.2)	43	0	0	900.9	342380.003082720.00	91.40	0.00	419.00	40.90	3.40

Table A-3. Baseline PM Emissions

3083000.000	0.179871	0.221657	0.203543	0.180249	0.160463	0.144368	0.131136
3082000.000	0.045656	0.118921	0.141397	0.140705	0.133599	0.125093	0.116696
3081000.000	0.039379	0.051800	0.056481	0.067991	0.080873	0.085521	0.086071
3080000.000	0.047786	0.050262	0.052889	0.053159	0.051990	0.050711	0.058096
3079000.000	0.051822	0.051135	0.052238	0.051780	0.050421	0.048571	0.046444
3078000.000	0.053479	0.051142	0.050930	0.051174	0.049644	0.047695	0.045600
3077000.000	0.053662	0.050306	0.049510	0.049206	0.048969	0.047084	0.044980
3076000.000	0.053017	0.049215	0.047883	0.047303	0.046855	0.046375	0.044408
3075000.000	0.051903	0.048292	0.046080	0.045403	0.044855	0.044298	0.043590

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) (CONT.) FROM COMBINED SOURCES 56, -58,

0 - DISCRETE RECEPTORS -

X DISTANCE (METERS)	Y DISTANCE (METERS)	CONCENTRATION	X DISTANCE (METERS)	Y DISTANCE (METERS)	CONCENTRATION	X DISTANCE (METERS)	Y DISTANCE (METERS)	CONCENTRATION
325000.0	3112000.0	0.024513	327000.0	3112000.0	0.024931	329000.0	3112000.0	0.025319
341000.0	3165000.0	0.010788	342500.0	3174000.0	0.009749			

1

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1********** END OF ISCLT PROGRAM, 58 SOURCES PROCESSED **********

NO.	SOURCE DESCRIPTION	SOURCE NO.	DISP.	TYPE	QFLG (G/SEC)	X (M)	Y (M)	HEIGHT (M)	ELEV. (M)	TEMP. (K)	VEL. (M/SEC)	DIAM. (M)
1	BORDEN 2-04	1	0	0	1.98	348500.00	3057300.00	38.10	0.00	295.00	19.30	0.60
2	BORDEN 2-05	2	0	0	3.40	348500.00	3057300.00	10.70	0.00	300.00	22.30	1.10
3	BORDEN 2-06,07	3	0	0	3.40	348500.00	3057300.00	61.00	0.00	311.00	20.50	2.10
4	BORDEN 2-08	4	0	0	0.10	348500.00	3057300.00	22.90	0.00	303.00	14.70	0.30
5	BORDEN 2-09	5	0	0	2.50	348500.00	3057300.00	37.50	0.00	317.00	21.00	0.80
6	BORDEN 2-10	6	0	0	0.15	348500.00	3057300.00	9.80	0.00	305.00	23.80	1.00
7	BORDEN 2-11	7	0	0	0.89	348500.00	3057300.00	12.50	0.00	299.00	10.00	1.40
8	FPC MANATEE 12-01,02	8	0	0	134.4	367400.00	3055100.00	121.90	0.00	416.00	14.90	7.90
9	FPC HIGGINS 12-01,02,03	9	0	0	5.67	336500.00	3099300.00	53.00	0.00	419.00	12.00	3.90

Table A-3. Baseline PM Emissions (Continued, Page 2 of 3)

1 ISCLT (VERSION 80340) PAGE 17

10	FPC HIGGINS 12-04,05,06,07	10	0	0	0.42	336500.003098300.00	16.80	0.00	727.00	61.00	4.60
11	FPC BAYBORO 13-03,04,05,06	11	0	0	1.98	338700.003071200.00	12.20	0.00	755.00	61.00	2.80
12	FPC ANCLOTE	12	0	0	2.98	324400.003118700.00	152.10	0.00	408.00	12.50	7.30
13	GARDINIER 8-02	13	0	0	0.66	363200.003082400.00	22.60	0.00	360.00	7.40	1.60
14	GARDINIER 8-03	14	0	0	1.06	363200.003082400.00	21.90	0.00	360.00	9.10	1.80
15	GARDINIER 8-04	15	0	0	2.02	363200.003082400.00	28.00	0.00	351.00	6.20	2.90
16	GARDINIER 8-05	16	0	0	2.53	363200.003082400.00	29.30	0.00	352.00	7.10	3.30
17	GARDINIER 8-06	17	0	0	1.98	363200.003082400.00	45.70	0.00	355.00	11.10	2.70
18	GARDINIER 8-07	18	0	0	4.20	363200.003082400.00	26.80	0.00	340.00	7.70	0.40
19	GARDINIER 8-32	19	0	0	2.64	362900.003082500.00	23.80	0.00	346.00	3.30	1.80
20	GARDINIER 8-36	20	0	0	3.65	362900.003082500.00	20.70	0.00	317.00	10.00	1.10
21	GARDINIER 8-38	21	0	0	2.96	362900.003082500.00	20.70	0.00	310.00	14.80	1.10
22	GARDINIER 8-42	22	0	0	1.79	362900.003082500.00	18.30	0.00	589.00	6.90	2.50
23	GARDINIER 8-31,33-35,37,39-41,43	23	0	0	10.3	362900.003082500.00	25.00	0.00	330.00	15.00	1.00
24	GEN. PORTLAND 18-01,02,03	24	0	0	2.38	357900.003090600.00	53.30	0.00	400.00	11.80	3.00
25	GEN PORTLAND 18-04	25	0	0	2.22	357900.003090600.00	45.00	0.00	391.00	3.10	3.80
26	GEN. PORTLAND 18-05	26	0	0	2.78	357900.003090600.00	36.00	0.00	464.00	15.20	2.70
27	GEN. PORTLAND 18-06	27	0	0	3.36	357900.003090600.00	44.20	0.00	472.00	11.40	4.70
28	GEN. PORTLAND 18-07,08,09,10,11,12	28	0	0	13.7	357900.003090600.00	12.20	0.00	377.00	24.90	1.20
29	IMC TERM 24-01	29	0	0	4.66	360100.003087500.00	10.70	0.00	344.00	9.20	3.00
30	IMC TERM 24-02	30	0	0	1.41	360100.003087500.00	12.20	0.00	297.00	19.20	1.80
31	IMC TERM 24-03	31	0	0	3.28	360100.003087500.00	13.70	0.00	306.00	49.40	0.40
32	NAT. GYP. 28-01	32	0	0	3.34	347400.003082500.00	27.10	0.00	435.00	18.60	0.80
33	NAT. GYP. 28-03	33	0	0	3.78	347400.003082500.00	16.80	0.00	339.00	39.30	0.30
34	NAT. GYP 28-05	34	0	0	4.40	347400.003082500.00	19.50	0.00	349.00	10.20	1.10
35	NAT. GYP 28-07	35	0	0	1.47	347400.003082500.00	9.80	0.00	302.00	23.00	0.40
36	NAT. GYP. 28-09	36	0	0	3.31	347400.003082500.00	19.80	0.00	325.00	18.00	0.20
37	NAT. GYP. 28-14	37	0	0	3.69	347400.003082500.00	23.50	0.00	477.00	24.20	0.40

Table A-3. Baseline PM Emissions (Continued, Page 3 of 3)

38	NITRAM 29-01	38	0	0	2.61	363100.003089000.00	61.00	0.00	305.00	1.90	6.90
39	NITRAM 29-03	39	0	0	0.55	363100.003089000.00	27.40	0.00	477.00	24.20	0.90
40	NITRAM 29-04	40	0	0	0.48	363100.003089000.00	27.40	0.00	505.00	24.20	0.90
41	TPA INCIN. 42-01,02,03	41	0	0	22.0	360300.003092300.00	27.40	0.00	344.00	9.00	2.10
42	SCHILTZ 160-01	42	0	0	13.1	362000.003103200.00	12.20	0.00	639.00	7.40	1.50
43	TECO BB 39-01	43	0	0	34.1	361600.003075000.00	149.30	0.00	423.00	19.30	7.30
44	TECO BB 39-02	44	0	0	32.0	361600.003075000.00	149.30	0.00	423.00	18.40	7.30
45	TECO BB 39-03	45	0	0	31.6	361600.003075000.00	149.30	0.00	418.00	8.60	7.60
46	GANNON 40-01	46	0	0	15.8	360000.003087500.00	61.00	0.00	427.00	8.30	4.30
47	GANNON 40-02	47	0	0	15.8	360000.003087500.00	76.20	0.00	427.00	17.10	3.00
48	GANNON 40-03	48	0	0	24.0	360000.003087500.00	76.20	0.00	403.00	14.80	3.20
49	GANNONE 40-04	49	0	0	23.5	360000.003087500.00	71.60	0.00	414.00	29.30	2.90
50	GANNON 40-05	50	0	0	20.7	360000.003087500.00	70.10	0.00	415.00	14.30	4.50
51	GANNON 40-06	51	0	0	47.0	360000.003087500.00	93.30	0.00	417.00	16.00	5.40
52	HOOKER'S PT 01,02	52	0	0	10.8	358000.003091000.00	45.70	0.00	400.00	1.60	3.70
53	HOOKER'S PT 03,04	53	0	0	10.9	358000.003091000.00	45.70	0.00	397.00	3.40	4.00
54	HOOKER'S PT 05	54	0	0	5.10	358000.003091000.00	52.70	0.00	414.00	4.90	3.70
55	HOOKER'S PT 06	55	0	0	9.00	358000.003091000.00	52.70	0.00	436.00	5.90	3.90
56	BARTOW UNIT 1	56	0	0	7.10	342380.003082720.00	91.40	0.00	405.00	19.60	2.70
57	BARTOW UNIT 2	57	0	0	3.90	342380.003082720.00	91.40	0.00	405.00	19.60	2.70
58	BARTOW UNIT 3	58	0	0	11.0	342380.003082720.00	91.40	0.00	405.00	23.50	3.40

Table A-4. Projected PM Emissions

NO.	SOURCE DESCRIPTION	SOURCE NO.	DISP.	TYPE	QFLG (G/SEC)	X (M)	Y (M)	HEIGHT (M)	ELEV. (M)	TEMP. (K)	VEL. (M/SEC)	DIAM. (M)
1	BORDEN 2-04	1	0	0	1.98	348500.00	3057300.00	38.10	0.00	295.00	19.30	0.60
2	BORDEN 2-05	2	0	0	3.40	348500.00	3057300.00	10.70	0.00	300.00	22.30	1.10
3	BORDEN 2-06,07	3	0	0	3.40	348500.00	3057300.00	61.00	0.00	311.00	20.50	2.10
4	BORDEN 2-08	4	0	0	0.20	348500.00	3057300.00	22.90	0.00	303.00	14.70	0.30
5	BORDEN 2-09	5	0	0	2.50	348500.00	3057300.00	37.50	0.00	317.00	21.00	0.80
6	BORDEN 2-10	6	0	0	0.78	348500.00	3057300.00	9.80	0.00	305.00	23.80	1.00
7	BORDEN 2-11	7	0	0	0.83	348500.00	3057300.00	12.50	0.00	299.00	10.00	1.40
8	FPC MANATEE 10-01,02	8	0	0	1344	367400.00	3055100.00	121.90	0.00	416.00	14.90	7.90
9	FPC HIGGINS 12-01,02,03	9	0	0	5.68	336500.00	3098300.00	53.00	0.00	419.00	12.80	3.80
10	FPC HIGGINS 12-04,05,06,07	10	0	0	0.42	336500.00	3098300.00	16.80	0.00	727.00	61.00	4.60
11	FPC BAYBORO 13-03,04,05,06	11	0	0	1.98	338700.00	3071200.00	12.20	0.00	755.00	61.00	2.80
12	FPC ANCLOTE	12	0	0	2.90	324400.00	3118700.00	152.10	0.00	422.00	32.90	7.30
13	GARDINIER 8-36	13	0	0	3.65	362900.00	3082500.00	20.70	0.00	317.00	10.00	1.10
14	GARDINIER 8-31,33-35,37,39-41,43	14	0	0	14.3	362900.00	3082500.00	25.00	0.00	330.00	15.00	1.00
15	GEN PORTLAND 18-04	15	0	0	0.35	357900.00	3090600.00	36.00	0.00	505.00	17.70	2.70
16	GEN. PORTLAND 18-05	16	0	0	108.0	357900.00	3090600.00	36.00	0.00	454.00	8.80	2.70
17	IMC TERM 24-01	17	0	0	4.68	360100.00	3087500.00	10.70	0.00	344.00	9.20	3.00
18	IMC TERM 24-02	18	0	0	1.40	360100.00	3087500.00	12.20	0.00	297.00	19.20	1.80
19	IMC TERM 24-03	19	0	0	3.28	360100.00	3087500.00	13.70	0.00	306.00	49.40	0.40
20	NAT. GYP. 28-01	20	0	0	3.30	347400.00	3082500.00	27.10	0.00	435.00	18.60	0.80
21	NAT. GYP. 28-03	21	0	0	3.78	347400.00	3082500.00	16.80	0.00	339.00	39.30	0.30
22	NAT. GYP 28-05	22	0	0	4.40	347400.00	3082500.00	19.50	0.00	349.00	10.20	1.10
23	NAT. GYP 28-07	23	0	0	1.47	347400.00	3082500.00	9.80	0.00	302.00	23.00	0.40
24	NAT. GYP. 28-09	24	0	0	3.31	347400.00	3082500.00	19.80	0.00	325.00	18.00	0.20

Table A-4. Projected PM Emissions (Continued, Page 2 of 2)

25	NAT. GYP. 28-14	25	0	0	3.69	347400.003082500.00	23.50	0.00	477.00	24.20	0.40
26	NITRAM 29-01	26	0	0	2.61	363100.003089000.00	61.00	0.00	305.00	1.90	6.90
27	NITRAM 29-03	27	0	0	0.55	363100.003089000.00	27.40	0.00	477.00	24.20	0.90
28	NITRAM 29-04	28	0	0	0.49	363100.003089000.00	27.40	0.00	505.00	24.20	0.90
29	TPA INCIN. 42-01,02,03	29	0	0	22.0	360300.003092300.00	27.40	0.00	344.00	9.00	2.10
30	SCHILTZ 16-01	30	0	0	13.1	362000.003103200.00	12.20	0.00	639.00	7.40	1.50
31	TECO BB 39-01	31	0	0	50.8	361600.003075000.00	149.30	0.00	422.00	28.60	7.30
32	TECO BB 39-02	32	0	0	50.9	361600.003075000.00	149.30	0.00	422.00	28.60	7.30
33	TECO BB 39-03	33	0	0	51.9	361600.003075000.00	149.30	0.00	417.00	14.43	7.30
34	TECO BB	34	0	0	17.8	361600.003075000.00	149.30	0.00	342.00	19.97	7.30
35	GANNON 40-01	35	0	0	15.8	360000.003087500.00	93.30	0.00	438.00	32.30	3.05
36	GANNON 40-02	36	0	0	15.8	360000.003087500.00	93.30	0.00	438.00	32.30	3.05
37	GANNON 40-03	37	0	0	20.1	360000.003087500.00	93.30	0.00	427.00	35.40	3.23
38	GANNONE 40-04	38	0	0	23.8	360000.003087500.00	93.30	0.00	443.00	24.60	2.93
39	GANNON 40-05	39	0	0	20.8	360000.003087500.00	93.30	0.00	416.00	20.70	4.45
40	GANNON 40-06	40	0	0	47.8	360000.003087500.00	93.30	0.00	439.00	23.40	5.36
41	HOOKER'S PT 01,02	41	0	0	10.1	358000.003091000.00	85.30	0.00	403.00	18.20	3.41
42	HOOKER'S PT 03,04	42	0	0	10.3	358000.003091000.00	85.30	0.00	403.00	11.50	3.44
43	HOOKER'S PT 05	43	0	0	5.00	358000.003091000.00	85.30	0.00	403.00	18.20	3.40
44	HOOKER'S PT 06	44	0	0	9.80	358000.003091000.00	85.30	0.00	436.00	17.90	2.90
45	PINELLAS RESOURCE RECOVERY	45	0	0	10.8	335000.003083500.00	49.10	0.00	522.00	38.20	2.70
46	BARTOW UNIT 1	46	0	0	15.4	342380.003082720.00	91.40	0.00	428.00	36.33	2.70
47	BARTOW UNIT 2	47	0	0	15.1	342380.003082720.00	91.40	0.00	423.00	37.06	2.70
48	BARTOW UNIT 3	48	0	0	25.1	342380.003082720.00	91.40	0.00	419.00	40.90	3.49

APPENDIX B

DESCRIPTION OF THE ISC MODEL

APPENDIX B
ISC MODEL DESCRIPTION

The Industrial Source Complex (ISC) Dispersion Model is a Gaussian plume model which can be used to assess the air quality impact of various sources associated with an industrial complex located in either flat or complex terrain. In addition to predicting ambient concentrations, the model can be used to calculate dry deposition resulting from significant particulate gravitational settling velocities. ISC also specifies, upon request, the meteorological period during which the maximum calculated concentrations or depositions occurred.

The ISC short-term model (ISCST), an extended version of the Single Source (CRSTER) model, calculates impacts for each hour of meteorological input data from emission data and stack parameters. The hourly meteorological data include wind direction, wind speed, atmospheric stability, temperature, and mixing heights which have been processed from surface and upper air data recorded at a representation National Weather Service (NWS) station. Various averaging times are available through program options such as specifying a 1- through 24-hour average and an average over the total number of days per year of meteorological input data. Twenty-four-hour averages are calculated from midnight to midnight of each day; shorter-term averages are calculated for nonoverlapping, consecutive time periods.

The ISC long-term model (ISCLT) extends and combines basic features of the Air Quality Display Model (AQDM) and the Climatological Dispersion Model (CDM). The ISCLT model uses the same equations as ISCST model except that the seasonal or annual frequencies of combinations of 16 wind directions, 6 wind speeds, and 6 stability categories are applied to concentration calculations. Also, the horizontal distribution of the plume width is described by sector-averaging concentrations over a

22.5-degree sector that defines the wind direction. The concentration distribution within a sector is modified to account for discontinuities in concentrations that may occur at the boundaries of adjacent sectors.

The ISC programs accept the following source types: stack, volume, and area. The volume source option is also used to simulate line sources. The contributions to ambient ground-level concentrations from each emission point are computed by means of a modified version of the Gaussian plume equation (e.g., Turner, 1970). The modifications include the following: (1) trapping of the plume between the top of the mixing layer and the ground surface, (2) uniform vertical mixing of the plume in the mixing layer beyond a critical distance, and (3) neglect of any ground-level effects from plumes released above the mixing layer.

Trapping is simulated by the method of multiple images (e.g., Turner, 1970), which results in a convergent infinite series of terms representing reflection from the upper and lower boundaries of the trapping layer. Beyond a certain distance, the trapping effects result in a nearly uniform vertical distribution. The computational procedure is simplified by approximating this distance and introducing an appropriate simplification for calculations at more distant points. The modified Gaussian plume equation for the concentration from a single stack is:

$$X\,(x,y) = \frac{Q\,R}{\sigma_y\,u}\ \exp\left[-\frac{1}{2}\left(\frac{y}{\sigma_y}\right)\right]^2$$

Where: $R = 0$, for $H > L$;

$$R = \frac{1}{2.5066L},\ \text{for } H \leq L \text{ and } \frac{\sigma_z}{L} \geq 1.6;$$

$$R = \frac{1}{\pi\sigma_z(x)}\left\{\exp\left[-\frac{1}{2}\left(\frac{H}{\sigma_z}\right)^2\right] + \sum_{i=1}^{\infty}\left[\exp\left[-\frac{1}{2}\left(\frac{2iL - H}{\sigma_z}\right)^2\right] + \exp\left[-\frac{1}{2}\left(\frac{2iL + H}{\sigma_z}\right)^2\right]\right]\right\} \text{for } H \leq L \text{ and } \frac{\sigma_z}{L} < 1.6$$

$X(x,y)$ = Concentration at location x,y (g/m^3);
x = Distance downwind from plant (m);
y = Distance crosswind from plant (m);
Q = Pollutant emission rate (g/sec);
u = Wind speed (m/sec);
σ_y = Horizontal diffusion parameter (m);
σ_z = Vertical diffusion parameter (m);
H = Effective plume height above terrain (m); and
L = Height of the top of the mixing layer (m).

Concentrations computed for each stack are summed to determine a single concentration from all the plant at a receptor.

The area source equation in the ISC model programs is based on the equation for a continuous and finite crosswind Gaussian line source.

The generalized Briggs (1971 and 1975) plume-rise equations, including momentum terms, are used to calculate plume rise as a function of downwind distance. Procedures suggested by Huber and Snyder (1976) and Huber (1977) are used to evaluate the effects on plume dispersion of aerodynamic wakes and eddies formed by buildings and other structures.

The plume rise equation for non-stable stability classes [i.e., very unstable, unstable, slightly unstable, and neutral (categories corresponding to Classes A, B, C, and D, respectively)] is given in the following equation. To determine if downwash is expected to occur, the plume rise due solely to momentum is calculated at a downwind distance equal to two building heights (2Hb) downwind. The equation would then simplify to the first term, since F would equal zero for nonbuoyant plumes.

$$\Delta h = \left[\frac{3\ Fm\ x'}{\beta_j^{\ 2}\ u^2} + \frac{3Fx'^2}{2\beta_1^{\ 2}\ u^3} \right]^{1/3}$$

Where: F = Buoyancy flux, $F = g \frac{Vsd^2}{4} \left(1-\frac{Ta}{Ts}\right)$

F_m = Momentum flux, $F_m = \frac{(Ta/Ts)\ Vs^2 d^2}{4}$

β_j = Jet entrainment coefficient, $\beta_j = \left(\frac{1}{3} + \frac{u}{Vs}\right)$

T_a = Ambient temperature (°K)

T_s = Stack gas temperature (°K)

V_s = Exit velocity (m/s)

d = Stack inside diameter (m)

x' is defined as follows:

Let $\alpha = \frac{4d\ (Vs + 3u)^2}{Vs\ u}$

$$x' = \begin{cases} x\ , & \text{if } x < 3.5x^* \text{ and } F > 0 \\ 3.5\ x^*, & \text{if } x \geq 3.5x^* \text{ and } F > 0 \\ x\ , & \text{if } x < \alpha \text{ and } F = 0 \\ \alpha\ , & \text{if } x \geq \alpha \text{ and } F = 0 \end{cases}$$

Where: $x^* = 14\ F^{5/8}$, $F \leq 55\ m^4/s^3$

$34\ F^{2/5}$, $F > 55\ m^4/s^3$

For stable stability classes (i.e., slightly stable and stable categories corresponding to Classes E and F, respectively), the Briggs (1975) plume rise equation is:

$$h = \left[\frac{3Fm}{\beta_j^{\ 2} u\ S^{1/2}} \sin\left(S^{1/2} \frac{x'}{u}\right) + \frac{3F}{\beta_2^{\ 2} u\ S} \left[1-\cos\left(S^{1/2} \frac{x'}{u}\right)\right] \right]^{1/3}$$

Where: S = Stability parameter, $S = \frac{g}{Ta} \frac{d\theta}{dz}$

$\frac{d\theta}{dz}$ = Potential temperature gradient (0.020 for Class E and 0.035 for Class F)

β_2 = Adiabatic entrainment coefficient, equals 0.6 (Briggs, 1975)

x' = Defined as follows

g = Acceleration due to gravity, 9.8 m/s^2

u = Wind speed at stack height (m/s)

β_1 = Adiabatic entrainment coefficient, equals 0.6 (Briggs, 1975)

x' = Downwind distance, or in the determination of building downwash influence x' is equal to $2H_b$.

For applications when building downwash effects are not considered, the momentum flux term in equation (1) is negligible when compared to the buoyancy flux term. In general, for $B_1 = 0.6$,

$$\Delta h = \frac{1.6\ F^{1/3}\ x'^{2/3}}{u}$$

which is identical to the plume rise formula used in CRSTER for unstable plume rise.

Let $C = \pi\ u\ S^{-1/2}$

$$x' = \begin{cases} x, & \text{if } x < C \text{ and } F > 0 \\ C, & \text{if } x \geq C \text{ and } F > 0 \\ x, & \text{if } x < C/2 \text{ and } F = 0 \\ C/2, & \text{if } x \geq C/2 \text{ and } F = 0 \end{cases}$$

If $F = 0$ and the plume rise, Δh, is greater than $(3V_s d)/u$ then the ISC model sets Δh to $(3V_s d)/u$.

If $F > 0$ and final plume rise is specified (i.e., $x' = C$) in the model application,

$$\Delta h = 2.6 \left(\frac{F}{u\ s} \right)^{1/3}$$

which is identical to the plume rise formula used in CRSTER for stable plume rise.

The effective plume height used in the calculation of concentration is then:

$$H = h + \Delta h$$

Where: h = Stack height (m).

A wind-profile exponent law is used to adjust the observed mean wind speed from the measurement height to the emission height for the plume rise and concentration calculations. The wind profile exponents used in this analysis were 0.1, 0.15, 0.2, 0.25, 0.3, and 0.3 for stability Categories A, B, C, D, E, and F, respectively.

The ISC model is used to account for variations in terrain height over the receptor grid. The Pasquill-Gifford curves (Turner, 1970) are used to calculate horizontal (σy) and vertical (σz) plume spread. The ISC model has one rural and two urban dispersion mode options. In the rural mode, rural mixing heights and the σy and σz values for the indicated stability category are used in the calculations. In one urban mode, the stable E and F categories are redefined as neutral stability. In the other urban mode, the E and F stability categories are combined and the σy and σz values for the stability category [one step less stable than the indicated stability category (except A)] are used in the calculations. Urban mixing heights are used in both urban models.

Various output options can be selected for the ISC models. Tables of the highest and second-highest concentrations or depositions can be requested for each averaging time. A table of the annual arithmetic averages is also available. In addition, the ISC models can provide the

user with tables of the 50 maximum concentrations or depositions, or an average over the period of meteorological input data. Receptor grids of polar, cartesian, or discrete receptor grids can be specified.

ATTACHMENT 4

Response to the question concerning the difference in capacity factors for the units on oil vs. coal.

	BARTOW #2			BARTOW #3		
		Coal			Coal	
Year	Oil	.7%	1.5%	Oil	.7%	1.5%
1982	59	N/A	N/A	34	N/A	N/A
1983	59	N/A	N/A	14	N/A	N/A
1984	56	7	7	15	N/A	N/A
1985	48	80	83	6	82	84
1986	46	77	78	9	79	79
1987	51	77	78	17	78	79
1988	52	78	80	13	80	81
1989	55	77	78	24	78	79
1990	58	79	80	26	80	81
1991	51	77	78	24	79	79
1992	58	78	79	30	79	79
1993	63	78	78	35	79	79
1994	62	77	78	30	79	79

ESE ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.

December 23, 1982
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DER
DEC 27 1982
BAQM

Mr. C. H. Fancy
Florida Department of Environmental
Regulation
2600 Blair Stone Road
Tallahassee, FL

Subject: Bartow Units 2 and 3 Coal Conversion

Dear Mr. Fancy:

The following responses address the comments by Florida DER in a letter dated December 16, 1982, to Mr. W. S. O'Brien of Florida Power Corporation.

ESE Response to Question 1:

Emission factors used to estimate emission rates of the other regulated pollutants in addition to SO2, PM, and NOx for the baseline conditions and proposed coal conversion at the Bartow plant are presented in Tables 1 and 2. The emission rates calculated for the plant were based on the range of emission factors given in these tables. It should be noted that the emission rates of CO for oil and coal fired units were based on the USEPA AP-42 emission factors of 1 lb/ton of coal and 5 $lb/10^3$ gallons of oil, respectively.

A summary of the emission rates calculated for these other regulated pollutants are given in Table 3 which also presents the change in emissions from the baseline conditions to the proposed coal conversion. The emissions for the proposed coal conversion includes the emissions from Unit 1 firing the coal-oil mixture (COM). As shown in this table, the range of emissions generally indicate that the increase in emissions (if any) are less than the significant emission levels for PSD applicability. However, for mercury, beryllium, fluorides, and arsenic, the change in emissions on the upper limit of the range of emissions indicate the potential for significant emission increases due to the proposed coal conversion. Emissions of other regulated pollutants not presented in Table 3 (i.e. asbestos, vinyl chloride, total reduced sulfur, reduced sulfur compounds, hydrogen sulfide, and benzene) were assumed to be zero because there is no evidence or indication in the available literature that these pollutants are emitted from oil or coal-fired utility boiler units.

Based on these results, additional PSD analyses are needed to address air quality impacts and BACT for those pollutants emitted above significant emission rates. As part of the air quality analyses, the predicted impacts of those pollutant concentrations must be compared to the deminimis impact levels to determine if ambient monitoring is required. The deminimis impact levels for mercury, beryllium, and fluorides are 0.25, 0.001, and 0.25 ug/m^3, respectively, for a 24-hour averaging period. At present, there is no deminimis impact level for arsenic because no acceptable measurement method has been approved by EPA and therefore no additional analysis is required for arsenic. Predicted concentrations for the pollutants emitted above significant emission rates, except arsenic, were estimated by scaling the SO2 concentrations calculated in ESE's report based on the ratio of emissions for these pollutants to SO2 emission rates. As a conservative estimate, only the predicted concentrations for the proposed coal conversion were used; the change in emissions from the baseline conditions were not considered. For the 24-hour period, the maximum SO2 concentration of 111 ug/m^3 was predicted for the proposed coal conversion with a total plant emission rate of 12,203 lb/hr. Based on the emission rates given in Table 3, the total plant 24-hour average concentrations for mercury, beryllium, and fluorides are estimated as 0.000627, 0.000484, and 0.31 ug/m^3, respectively.

Based on these results, fluorides is the only non-criteria pollutant whose increase in emissions due to the conversion will cause air quality impacts greater than the deminimis air quality impact levels. Ambient monitoring is not considered necessary to satisfy the Air Quality Analysis requirements of the PSD regulations for the following reasons:

1. The deminimis level is only slightly exceeded due to the increase in emissions from the proposed modification (0.31 ug/m^3 impact versus 0.25 ug/m^3 deminimis level).

2. EPA, in its Ambient Monitoring Guidelines for Prevention of Significant Deterioration (EPA-450/4-80-012, November 1980), states that "an analysis based on modeling of the impact of noncriteria pollutants on the air quality should generally be used in lieu of monitoring data."

3. An ambient air quality standard does not exist for fluorides in Florida.

4. Fluorides is not regulated under the National Emission Standards for Hazardous Air Pollutants, and the emission factor used to derive the emission estimates is considered to be reliable.

5. No other fluoride emission sources are known to exist with 15 km of the FPC Bartow Plant.

6. The air dispersion models used to estimate impacts (ISCST) is applicable to the situation modeled (ie. flat terrain), and therefore the predicted impacts are considered reliable.

For BACT review, emissions of inorganic arsenic and beryllium will be controlled at about 99 percent efficiency by the ESP's to be installed at Units 2 and 3, since these pollutants are emitted as particulates. Considering this control level and the small predicted impacts upon air quality, no further control of these pollutants is warranted. Fluorides and mercury are emitted from coal combustion primarily in the gaseous phase. Therefore, post-combustion control of these pollutants would require the costly addition of wet scrubbers to the units. Such scrubbers could achieve 80 percent or greater removal efficiency. However, considering the small predicted air quality impacts and small increases in emissions for these pollutants, additional controls are considered unnecessary.

Response to Question 2:

Annual operating reports and fuel use records for the years 1976 to 1979 will be sent to DER by Florida Power Corporation in a separate letter.

Response to Question 3:

The correct value for the S factor, presented in Table 2-6 of the ESE report, is 5 percent.

The emission factor used for the radial stacker in Table 2-6 of ESE's report has a typographical error in the denominator which accounts for the discrepancy noted by DER. The term Y/416 in the table should be corrected to Y/4.6. The correct value was used in calculating the emission factors and therefore the results are correct.

The calculated emission rates for the coal and fly ash fugitive emission points presented in Table 2-6 of the report are based on the emission factors presented in the Workbook on Estimation of Emissions and Dispersion Modeling for Fugitive Particulate Sources, prepared by ERT for the Utility Air Regulatory Group (UARG), September 1981. Emission factors for the radial stacker were obtained from the factors for storage pile load-in given in Table 3.2.12-1 of the UARG Workbook, for the active pile based on factors for wind erosion from storage pile given in Table 3.2.16-1 and for fly ash silo unloading based on the factor for fly ash handling given in Section 3.2.28. All of the emission factors used were recommended by EPA.

Response to Questions 4:

The modeling output from the ISCST and ISCLT dispersion model runs are submitted with this letter.

Response to Question 5:

The 3- and 24-hour average background SO2 concentrations correspond to the 93rd and 99.4th percentiles, respectively, based on the monitoring data presented in Table 3-1 of ESE's report. The information provided in Section 2.5 of the report had described the 3- and 24-hour average background concentrations as based on the 95th and 99th percentiles, respectively.

The annual average concentration for NO2 was obtained from the monitoring site described in Table 3-1 of the ESE report and should have been reported as 28 ug/m^3, instead of 26 ug/m^3. This correction will change the predicted annual average NO2 concentrations due to baseline conditions and proposed coal conversion in Table 3-10 of ESE's report to 29.3 and 30 ug/m^3, respectively, but does not change the conclusions of the analyses for NO2 concentrations.

Response to Question 6

A Good Engineering Practice (GEP) stack height (Hg) is calculated from the following formula:

$$Hg = H + 1.5L$$

where H is the building height, and
L is the lesser dimension of the building height or width

Based on information provided for Units 1, 2, and 3, the following building dimensions were used in the preliminary calculation of a GEP stack height: building heights for Units 1, 2, and 3 - 143, 143, and 172 ft, respectively; building lengths (north-south orientation) - 100, 133, and 90 ft, respectively: building widths - 84, 76, and 57 ft, respectively. By applying the GEP stack height formula to Unit 3, for example, Hg = 172 ft + 1.5 (100 ft) = 322 ft. For Units 1 and 2, the calculated Hg are 278 and 343 ft, respectively.

Response to Question 7

The maximum predicted short-term SO2 and TSP concentrations due to the proposed coal conversion are less than those predicted for the baseline conditions. The maximum increases in annual average SO2, TSP, and NO2 concentrations due to the proposed coal conversion are less than the PSD significant impact level of 1 ug/m . As a result, the impacts of these pollutants associated with the proposed coal conversion are not expected to have significant changes in ambient concentrations from the baseline conditions on vegetation and soils, near the Bartow plant. Visible emissions are expected to improve because of the addition of electrostatic precipitators.

The significant increase in emissions of mercury, fluorides, beryllium, and arsenic are also not expected to have a significant change in existing ambient concentrations. The increase in mercury and beryllium concentrations are below the deminimis impact levels for PSD monitoring applicability while no diminis level has been established for arsenic because of the lack of any acceptable monitoring method. The projected maximum fluoride concentration of 0.3 ug/m^3 is not expected to be high enough or persistant enough to damage the vegetation commonly found near the Bartow plant or to contribute significantly to fluoride loading of the soil. As a result, the impacts of mercury, fluorides, beryllium, and aresenic due to the proposed coal conversion are not expected to have a significant effect on vegetation, soils, and visibility near the Bartow plant.

Emissions of other regulated pollutants are less than the PSD significant emission rates and, therefore, their impacts will not significantly effect the vegetation, soils and visibility near the Bartow plant.

The growth-related impacts associated with the proposed coal conversion would be attributable to the increased automotive traffic generated by the fuel ash collection. The impact of the exhaust emissions from the trucks collecting the fuel ash is expected to be minimal because of the few trucks that will be required for delivery and frequency of collection.

If you have any questions or comments about this material, please call me.

Sincerely,

Robert McCann

Robert McCann
Group Leader
Air Permitting and Modeling

RM/ds
cc: K. Kosky, ESE
W. S. O'Brien, FPC

Table 1. Emission Factors for Oil Boilers

Pollutant	Emission Factor ($lb/10^{12}$ Btu)		
	Reference 1	Reference 2	Reference 3
Mercury	2.13*	3.48	--
Beryllium	4.45*	5.57	--
Fluorides	6.40*	6.26	--
Arsenic	--	41.8	--
Lead	--	78.9-185.6	--
Sulfuric Acid Mist	58.8	--	--
Volatile Organic Compounds	--	--	69.6-3,434
Radionuclides	--	--	37.1

* Based on typical trace element content in residual oil given in Reference 2: mercury--0.04 ppm; beryllium--0.08 ppm; fluorides--0.12 ppm.

References:

1. Health Impacts, Emissions, and Emission Factors for Noncriteria Pollutants Subject to De Minimis Guidelines and Emitted from Stationary Conventional Combustion Processes, EPA-450/2-80-074, June 1980.
2. Emissions Assessment of Conventional Stationary Combustion Systems: Volume III, External Combustion Sources for Electricity Generation, EPA-600/7-81-003a, November 1980.
3. Emissions of Reactive Volatile Organic Compounds from Utility Boilers, TRW, Inc., EPA-600/7-80-111, May 1980.

Table 2. Emission Factors for Coal Boilers

Pollutant	Emission Factor ($lb/10^{12}$ Btu) Reference 1	Reference 2	Reference 3	Other
Mercury	18.2*	16.5	3.9-7.0	--
Beryllium	13.4*	4.2-5.1	1.0	--
Fluorides	9,320*	9,419	--	--
Arsenic	--	48.7-58.7	0.2-11.6	--
Lead	--	72-90	11.6-14.4	--
Sulfuric Acid Mist	147.6	--	--	--
Volatile Organic Compounds	--	--	--	1,090-4,292†
Radionuclides	--	--	--	5.8×10^{-5}** lb x ton/yr of coal

* Based on typical maximum trace element content of Appalachian coal given in Reference 2: mercury--0.2 ppm; beryllium--2.5 ppm; fluorides--100 ppm.

† Reference: Emissions of Reactive Volatile Organic Compounds from Utility Boilers, TRW, Inc., EPA-600/7-80-111, May 1980.

** Reference: Radiological Impact of Airborne Effluents of Coal Fired and Nuclear Power Plants, Oak Ridge National Laboratory, 5315, August 1977 and Characterization of Ash from Coal-Fired Power Plants, EPA-600/7-77-010, January 1977.

References:

1. Health Impacts, Emissions, and Emission Factors for Noncriteria Pollutants Subject to De Minimis Guidelines and Emitted from Stationary Conventional Combustion Processes. EPA-450/2-80-074, June 1980.
2. Emissions Assessment of Conventional Stationary Combustion Systems, Volume III, External Combustion Sources for Electricity Generation. EPA-600/7-81-003a, November 1980.
3. Project Summary, Trace Metals and Stationary Conventional Combustion Processes, EPA-600/57-80-155, February 1981.

Table 3. Emission Rates for the Baseline Conditions and Proposed Coal Conversion at the Bartow Plant

Pollutant	Emissions (tons/year)			
	Baseline Conditions	Proposed Coal Conversion	Change	Significant Emission Rate
Mercury	0.041-0.068	0.069-0.302	0.028 to 0.234	0.1
Beryllium	0.087-0.108	0.0308-0.233	-0.056 to +0.125	0.0004
Fluorides	0.122-0.125	149-150	149 to 150	3
Lead	1.54-3.61	0.448-2.06	-1.09 to -1.55	0.6
Sulfuric Acid Mist	1.14	2.55	1.41	7
Volatile Organic Compounds	1.35-66.8	17.6-80	16.3 to 13.2	40
Carbon Monoxide	182	204	22	100
Radionuclides	0.722	0.144	-0.578	0
Arsenic	0.813	0.143-1.08	-0.670 to 0.267	0

* $4,442 \times 10^6$ Btu/hr heat input rate for baseline conditions; $4,406 \times 10^6$ Btu/hr heat input rate for proposed coal conversion accounting for COM at Unit 1 (761×10^6 Btu/hr--oil, $3,645 \times 10^6$ Btu/hr--coal).

Source: ESE, 1982.

Attachment 7

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

March 6, 1979

MEMORANDUM

OFFICE OF ENFORCEMENT

SUBJECT: NSPS Determination - Subpart D

FROM: Director
Division of Stationary Source Enforcement

TO: Enforcement Division Directors, Regions I-X

Air and Hazardous Materials Division Directors
Regions I-X

Surveillance and Analysis Division Directors
Regions I-X

This is a clarification of DSSE's June 29, 1977, memo on including the effect of non-continuous, non-automatic soot blowing when performance testing steam generators that are subject to NSPS.

Units which do not blow soot continuously may have the effect of soot blowing included by performance testing in the normal manner, provided that the following precautions are taken: 1) soot blowing is permitted only during one of the test runs,* and 2) the soot blowing performance test run should include as much of the soot blowing cycle as possible.

When a short duration soot blowing period limits the number of points which will be sampled during the portion of the test run that the soot blowers are on, then all of the sampling points lying on at least one stack or duct diameter should be sampled while the soot blowers are on, if possible. Single point sampling should always be avoided but may be necessitated at sources with very short duration soot blowing periods. Ideally, a point of representative velocity should be selected when single point sampling is required, if possible.

The representative average pounds of particulate emissions per million BTU ($\bar{E}$) must be calculated by the following

*If it is expected that >50% of particulate emissions occur during soot blowing periods, then soot blowing should be required during 2 test runs.

generalized equation rather than by simple averaging as outlined in 40 CFR 60.8(f). This equation insures proper weighting of a soot blowing performance test run regardless of whether the soot blowing lasts the entire time of the test run, and also regardless of the number and duration of the non-soot blowing test runs made while performance testing a steam generator.

$$E = E_{SBR}\frac{(A+B)}{AR}\frac{S}{} + E_{NOSB}\left(\frac{R-S}{R} - \frac{BS}{AR}\right)$$

where:

E = pounds of particulate emissions per million BTU heat input (lb/MM BTU or ng/J)

E = average E for daily operating time

E_{SBR} = average E of sample(s) containing soot blowing

E_{NOSB} = average E of sample(s) with no soot blowing

A = hours soot blowing during sample(s)

B = hours not soot blowing during sample(s) containing soot blowing

R = average hours of operation per 24 hours

S = average hours of soot blowing per 24 hours

For almost all steam generators with intermittent soot blowing practices, the quantity of excess air is not expected to vary significantly between periods of normal operation and periods of soot blowing. However, if a significant variation in the quantity of excess air is expected, then an additional method 3 analysis should be conducted, as outlined in 40 CFR 60. 46(f)(ii) with soot blowers on in order to determine the $\%O_2$ while soot blowing. The $\%O_2$ of the soot blowing run can be determined from the following equation:

$$\%O_{2_{SBR}} = \frac{(\%O_{2_{NOSB}})B + (\%O_{2_{SB}})A}{B+A}$$

where:

$\%O_{2_{SBR}}$ = the $\%O_2$ of the sample(s) containing soot blowing

$\%O_{2_{NOSB}}$ = the $\%O_2$ while not blowing soot

$\%O_{2_{SB}}$ = the $\%O_2$ while blowing soot

A = hours soot blowing during sample(s)

B = hours not soot blowing during sample(s) containing soot blowing

Then the $\%O_{2_{SBR}}$ should be used to calculate E_{SBR} as outlined in 40 CFR 60.46(f)

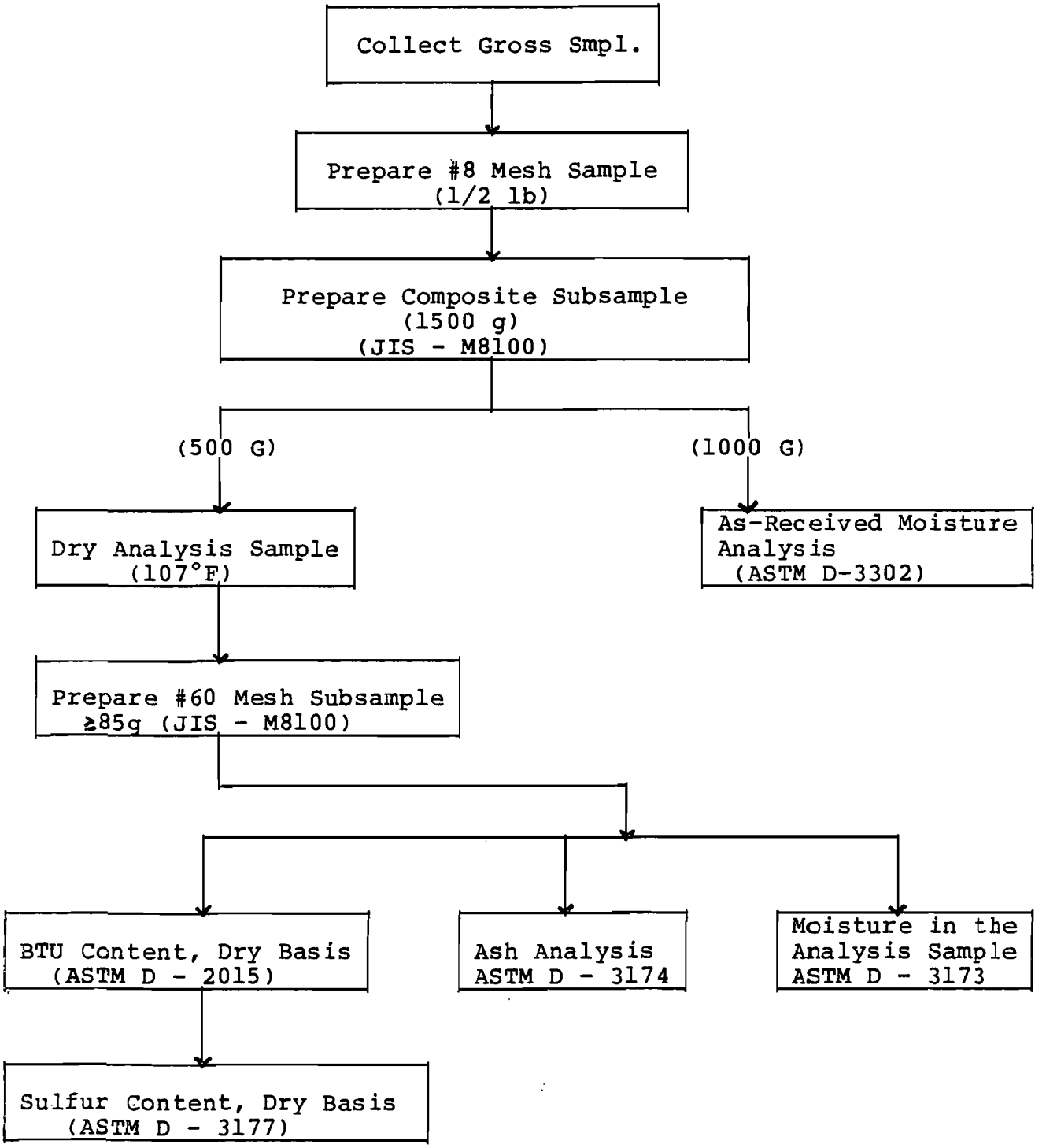
If you should have any further questions on this determination, please contact Craig Cobert (FTS 755-0103) of my staff.

Edward E. Reich

Edward E. Reich

Attachment 8

Fuel Sampling and Analysis Procedures



Proposed Federal Permit

PSD-FL-095

Upon authorization to construct by the U. S. Environmental Protection Agency, the applicant shall comply with the attached General Conditions and with the Specific Conditions of permit number AC 52-54948 issued by the State of Florida.

GENERAL CONDITIONS

1. The permittee shall notify the permitting authority in writing of the beginning of construction of the permitted source within 30 days of such action and the estimated date of start-up of operation.

2. The permittee shall notify the permitting authority in writing of the actual start-up of the permitted source within 30 days of such action and the estimated date of demonstration of compliance as required in the specific conditions.

3. Each emission point for which an emission test method is established in this permit shall be tested in order to determine compliance with the emission limitations contained herein within sixty (60) days of achieving the maximum production rate, but in no event later than 180 days after initial start-up of the permitted source. The permittee shall notify the permitting authority of the scheduled date of compliance testing at least thirty (30) days in advance of such test. Compliance test results shall be submitted to the permitting authority within forty-five (45) days after the complete testing. The permittee shall provide (1) sampling ports adequate for test methods applicable to such facility, (2) safe sampling platforms, (3) safe access to sampling platforms, and (4) utilities for sampling and testing equipment.

4. The permittee shall retain records of all information resulting from monitoring activities and information indicating operating parameters as specified in the specific conditions of this permit for a minimum of two (2) years from the date of recording.

5. If, for any reason, the permittee does not comply with or will not be able to comply with the emission limitations specified in this permit, the permittee shall immediately notify the State District Manager by telephone and provide the District Office and the permitting authority with the following information in writing within four (4) days of such conditions:

   (a) description for noncomplying emission(s),

   (b) cause of noncompliance,

   (c) anticipated time the noncompliance is expected to continue or, if corrected, the duration of the period of noncompliance,

(d) steps taken by the permittee to reduce and eliminate the noncomplying emission,

and

(e) steps taken by the permittee to prevent recurrence of the noncomplying emission.

Failure to provide the above information when appropriate shall constitute a violation of the terms and conditions of this permit. Submittal of this report does not constitute a waiver of the emission limitations contained within this permit.

6. Any change in the information submitted in the application regarding facility emissions or changes in the quantity or quality of materials processed that will result in new or increased emissions must be reported to the permitting authority. If appropriate, modifications to the permit may then be made by the permitting authority to reflect any necessary changes in the permit conditions. In no case are any new or increased emissions allowed that will cause violation of the emission limitations specified herein.

7. In the event of any change in control or ownership of the source described in the permit, the permittee shall notify the succeeding owner of the existence of this permit by letter and forward a copy of such letter to the permitting authority.

8. The permittee shall allow representatives of the State environmental control agency or representatives of the Environmental Protection Agency, upon the presentation of credentials:

(a) to enter upon the permittee's premises, or other premises under the control of the permittee, where an air pollutant source is located or in which any records are required to be kept under the terms and conditions of the permit;

(b) to have access to any copy at reasonable times any records required to be kept under the terms and conditions of this permit, or the Act;

(c) to inspect at reasonable times any monitoring equipment or monitoring method required in this permit;

(d) to sample at reasonable times any emission of pollutants;

and

(e) to perform at reasonable times an operation and maintenance inspection of the permitted source.

9. All correspondence required to be submitted to this permit to the permitting agency shall be mailed to:

Mr. James T. Wilburn
Chief, Air Management Branch
Air & Waste Management Division
U.S. EPA, Region IV
345 Courtland Street, NE
Atlanta, GA 30365

10. The conditions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

The emission of any pollutant more frequently or at a level in excess of that authorized by this permit shall constitute a violation of the terms and conditions of this permit.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

February 25, 1983

Ms. Veronica Akin
Tampa Bay Regional Planning Council
9455 Koger Boulevard
St. Petersburg, Florida 33702

Dear Ms. Akin:

RE: Preliminary Determination - Florida Power Corporation
Bartow Units 2 and 3, PSD-FL-095

I wish to bring to your attention that Florida Power Corporation proposes to modify its existing facilities near St. Petersburg in Pinellas County, Florida, and that emissions of air pollutants will thereby be increased. The Florida Department of Environmental Regulation, under the authority delegated by the U.S. Environmental Protection Agency, has reviewed the proposed construction under Federal Prevention of Significant Deterioration Regulations (40 CFR 52.21) and reached a preliminary determination of approval, with conditions, for this construction.

Please also be aware that the attached Public Notice announcing the preliminary determination, the availability of pertinent information for public scrutiny and the opportunity for public comment will be published in a local newspaper in the near future. This notice has been mailed to you for your information and in accordance with regulatory requirements. You need take no action unless you wish to comment on the proposed construction. If you have any questions, please feel free to call Mr. Bill Thomas or myself at (904)488-1344.

Sincerely,

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/pa

Enclosure

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

February 25, 1983

Mr. Ron Fahs
State A-95 Coordinator
Florida State Planning and
Development Clearinghouse
Office of Planning and Budget
The Capitol
Tallahassee, Florida 32301

Dear Mr. Fahs:

RE: Preliminary Determination - Florida Power Corporation
Bartow Units 2 and 3, PSD-FL-095

I wish to bring to your attention that Florida Power Corporation proposes to modify its existing facilities in Pinellas County, Florida, and that emissions of air pollutants will thereby be increased. The Florida Department of Environmental Regulation, under the authority delegated by the U.S. Environmental Protection Agency, has reviewed the proposed construction under Federal Prevention of Significant Deterioration Regulations (40 CFR 52.21) and reached a preliminary determination of approval, with conditions, for this construction.

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Sincerely,

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/pa
Enclosure

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

February 25, 1983

Honorable Corinne Freeman
Mayor, City of St. Petersburg
Post Office Box 2842
St. Petersburg, Florida 33731

Dear Ms. Freeman:

RE: Preliminary Determination - Florida Power Corporation
Bartow Units 2 and 3, PSD-FL-095

I wish to bring to your attention that Florida Power Corporation proposes to modify its existing facilities near St. Petersburg in Pinellas County, Florida, and that emissions of air pollutants will thereby be increased. The Florida Department of Environmental Regulation, under the authority delegated by the U.S. Environmental Protection Agency, has reviewed the proposed construction under Federal Prevention of Significant Deterioration Regulations (40 CFR 52.21) and reached a preliminary determination of approval, with conditions, for this construction.

Please also be aware that the attached Public Notice announcing the preliminary determination, the availability of pertinent information for public scrutiny and the opportunity for public comment will be published in a local newspaper in the near future. This notice has been mailed to you for your information and in accordance with regulatory requirements. You need take no action unless you wish to comment on the proposed construction. If you have any questions, please feel free to call Mr. Bill Thomas or myself at (904)488-1344.

Sincerely,

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/pa

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STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

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BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

February 25, 1983

Pinellas County Board of County
Commissioners
315 Court Street
Clearwater, Florida 33516

Dear Commissioners:

RE: Preliminary Determination - Florida Power Corporation
Bartow Units 2 and 3, PSD-FL-095

I wish to bring to your attention that Florida Power Corporation proposes to modify its existing facilities near St. Petersburg in Pinellas County, Florida, and that emissions of air pollutants will thereby be increased. The Florida Department of Environmental Regulation, under the authority delegated by the U.S. Environmental Protection Agency, has reviewed the proposed construction under Federal Prevention of Significant Deterioration Regulations (40 CFR 52.21) and reached a preliminary determination of approval, with conditions, for this construction.

Please also be aware that the attached Public Notice announcing the preliminary determination, the availability of pertinent information for public scrutiny and the opportunity for public comment will be published in a local newspaper in the near future. This notice has been mailed to you for your information and in accordance with regulatory requirements. You need take no action unless you wish to comment on the proposed construction. If you have any questions, please feel free to call Mr. Bill Thomas or myself at (904)488-1344.

Sincerely,

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/pa

Enclosure

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
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BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

February 25, 1983

Mr. Edward Collinsworth
Refuge Manager
Chassahowitzka National Wildlife Refuge
Route 2, Box 44
Homosassa, Florida 32646

Dear Mr. Collinsworth:

RE: Preliminary Determination - Florida Power Corporation
Bartow Units 2 and 3, PSD-FL-095

I wish to bring to your attention that Florida Power Corporation proposes to modify its existing facilities near St. Petersburg in Pinellas County, Florida, and that emissions of air pollutants will thereby be increased. The Florida Department of Environmental Regulation, under the authority delegated by the U.S. Environmental Protection Agency, has reviewed the proposed construction under Federal Prevention of Significant Deterioration Regulations (40 CFR 52.21) and reached a preliminary determination of approval, with conditions, for this construction.

Please also be aware that the attached Public Notice announcing the preliminary determination, the availability of pertinent information for public scrutiny and the opportunity for public comment will be published in a local newspaper in the near future. This notice has been mailed to you for your information and in accordance with regulatory requirements. You need take no action unless you wish to comment on the proposed construction. If you have any questions, please feel free to call Mr. Bill Thomas or myself at (904)488-1344.

Sincerely,

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/pa

Enclosure

STATE OF FLORIDA

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BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

February 25, 1983

Mr. James T. Wilburn, Chief
Air Management Branch
Air & Waste Management Division
U.S. EPA, Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Dear Mr. Wilburn:

RE: Preliminary Determination - Florida Power Corporation
Bartow Units 2 and 3, PSD-FL-095

Enclosed for your review and comment are the Public Notice and Preliminary Determination for the above referenced federal application to convert Bartow Units 2 and 3 to coal and install coal and fly ash handling systems.

Please inform my office at (904)488-1344 if you have comments or questions regarding this determination.

Sincerely,

Howard A. George

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/pa

Enclosure