

Same criteria as Debarry in terms  
of hours of operation

**Florida  
Power**  
CORPORATION

December 16, 1991

Mr. C. H. Fancy, P.E., Chief  
Bureau of Air Regulation  
Florida Department of Environmental Regulation  
Twin Towers Office Building  
2600 Blair Stone Road  
Tallahassee, FL 32399-2400

Dear Mr. Fancy:

Re: Osceola County - A.P.  
Florida Power Corporation (FPC)  
Intercession City Expansion  
AC49-203114; PSD-FL-180

This correspondence presents information requested in your October 31, 1991, letter concerning the above-referenced project. The information is presented in the same format requested in your letter.

#### BACT ANALYSIS

Sulfur Content of Oil - Table 1 presents the cost analysis (cost-effectiveness and annualized cost) and ambient impact summary associated with the consumption of distillate fuel oil containing maximum percent sulfur contents of 0.2, 0.3, and 0.5. Cost data for 0.1 percent sulfur fuel oil are not commercially available; therefore, a cost analysis is not presented for that sulfur content fuel oil. The base case for the BACT cost analysis is represented by the 0.5 percent maximum sulfur distillate oil presently specified by FPC. As noted in the BACT analysis (page 4-25), the actual average sulfur content of the No. 2 fuel oil specified by FPC has been less than 0.2 percent. FPC has proposed a BACT level of 0.3 percent sulfur (annual average), to be met by fuel management. Based on the historical data, there would be no air quality benefit (emissions would not be less) by specifying maximum fuel sulfur contents of 0.3 or 0.2 percent. However, as Table 1 illustrates, there would be considerable additional cost.

Existing  
8760 hrs/yr 0.7% S  
51 MW/unit ~ 306 MW

and approximately  
700 MW new

Tripling size of facility

Nitrogen Oxides -- For completeness, the BACT analysis presented various control alternatives (e.g., SCR). These alternatives were eliminated based on technical feasibility that is appropriate based on the Environmental Protection Agency's (EPAs) "top down" BACT process. Of the alternative technologies not selected, none has been applied to simple cycle combustion turbines or to turbines with primary oil firing. Indeed, the operating parameters of the alternative control technologies make their application to the project infeasible. Once a control technology is demonstrated to be technically infeasible, the economic, energy, and environmental impact analyses are not performed. (Refer to Table IV-1 Key Steps in the "Top Down" BACT Process from EPA's draft guidance document.)

The proposed control technology is water injection using improved NO<sub>x</sub> burner design. The proposed control technology must use water injection for two reasons. First, there will be no steam generated for the proposed project for injection purposes. (The use of steam would have no control advantages over water; indeed, more steam (lbs/hr) is needed to control NO<sub>x</sub> to the same degree as water.) Second, since the proposed project will be primarily fuel oil fired, dry low NO<sub>x</sub> combustion technology is not commercially proven and available to control NO<sub>x</sub>. (Combustion turbines using today's dry low NO<sub>x</sub> combustors are fired primarily with natural gas. When firing oil, water or steam must be used to reduce combustion temperatures and NO<sub>x</sub> emissions.) In the GE Frame EA machine, this combustor is referred to as the "quiet combustor" option. The components of this quiet combustor are integral with the design of the advanced GE Frame FA machine (e.g., they are not an option). Therefore, no reference was made to the "quiet combustor" option on the FA machine.

#### GENERAL

Quiet Combustor -- As noted above, the "quiet combustor" technology will be used by the proposed GE Frame EA and FA combustion turbines.

Project Description -- The first paragraph in Page 2-1 is somewhat confusing. The existing facility consists of six units, and each unit consists of two combustion turbines. Each unit has a maximum heat input of 708 million BTU per hour, with 51 MW per hour generating capability. The proposed project will consist of six units, and each unit consists of one combustion turbine.

Turbine Efficiency -- The turbine efficiency at peak load is provided in Tables A-1 and A-21 for the Frame EA and FA, respectively. The efficiency is given in Btu/kWh or otherwise termed "heat rate." The heat rate of the EA machine at 59° F and peak load is 11,080.0 Btu/kWh; the heat rate of the FA machine at 59° F and peak load is 10,168.3 Btu/kWh. Overall, efficiency can be calculated as a measure of electrical output divided by heat input (inverse of heat rate and using 3,413 Btu = kWh). For the EA machine, the efficiency is 30.8 percent, while the efficiency for the FA machine is 33.6 percent.

New Source Performance Standards (NSPS) Manufacturer's Heat Rate (Y) -- The manufacturer's heat rate (Y) that is used in the NSPS calculation is at peak load and ISO conditions (refer to 40 CFR Part 60, 60.335). The heat rate (Y) for the EA machine is 11.69 kilojoules per watt (kJ/W) (11,080 Btu/kWh \* 1,055 joules/Btu \* 1 kJ/1,000 J \* 1 kW/1,000 W = 11.69 kJ/W). The heat rate of the FA machine is 10.73 kJ/W (similar calculation). These heat rates were used to calculate the NSPS emission concentrations of NO<sub>x</sub> stated on page 4-3 of the BACT analysis (i.e., 92 ppmvd and 101 ppmvd corrected to 15 percent oxygen for the EA and FA machines, respectively).

Mr. C. H. Fancy  
December 16, 1991  
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DER FORM 17-1.202(1)

Page 5 of 12 -- The maximum heat input listed under the Fuels Section is for a 20°F condition, which would represent the maximum operating condition (i.e., ambient temperature) for each turbine. The double asterisk (\*\*) listed after the heat input indicated the 20°F condition taken from Tables A-1 and A-21 for the EA and FA machines, respectively. Please note that the average and maximum fuel consumption listed was for the 59°F and 20°F conditions, respectively.

Page 6 of 12 -- Stack locations are identified on the attached updated plot plan for the project.

APPENDIX A

GE Frame FA Turbine at Various Loads -- Because the GE Frame FA turbine with an NO<sub>x</sub> emission concentration of 42 ppmvd (corrected to 15 percent oxygen) when firing fuel oil is a new offering, guaranteed performance specifications at loads of 75, 50, and 25 percent are not available. However, it is expected that the relative performance will be similar to the Frame EA machine.

Emission Calculation in Pounds per Million Btu -- Table 2 attached presents emissions in lbs/million Btu for each criteria pollutant and turbine at 59°F.

Air Quality Analysis

1. The impact of this project on the Class I Chassahowitzka National Wilderness Area will be included in a separate submittal. The submittal will evaluate SO<sub>2</sub> PSD Class I increment analysis and air quality-related values (AQRV).
2. An air toxic modeling analysis was performed to estimate the maximum impacts as a result of toxic pollutants proposed to be emitted by burning fuel oil. A summary of the maximum predicted impacts is presented in Table 3. These results, based on the highest predicted concentrations, show that the proposed project's emissions will produce impacts that are much lower than the appropriate no-threat levels for each pollutant.

Please call if you have any questions.

Sincerely,



W. W. Vierday, Manager  
Environmental Programs - Licensing

Enclosures

**bcc: P. A. Blizzard  
D. A. Sands  
S. H. Osbourn  
J. A. Gridley  
K. D. Hedrick  
K. F. Kosky (KBN)**

**File: Intercession City 1993 CT Addition - Air**

Table 1. Cost Effectiveness and Ambient Impacts of Varying Percent Sulfur Fuel Oils

	Maximum Fuel Sulfur Content		
	0.5%	0.3% <sup>a</sup>	0.2% <sup>b</sup>
SO <sub>2</sub> Emissions (tons/year) <sup>c</sup> (lbs/hour)	NA 4,254 <sup>d</sup>	4,326 <sup>d</sup> 2,552	2,885 1,702
Cost Effectiveness (\$/ton of pollutant removed)	—	\$790	\$1,955
Annualized Cost	—	\$2,280,000	\$8,450,000
Maximum Impact (μg/m <sup>3</sup> )			
3-hour	63.8	38.3	25.5
24-hour	17.1	10.3	6.8
Annual	—	1.1 <sup>d</sup>	0.7 <sup>d</sup>

Note: PSD Class II Increment (μg/m<sup>3</sup>)

3-hour	512
24-hour	91
Annual	20

AAQS for SO<sub>2</sub> Concentrations (μg/m<sup>3</sup>)

3-hour	1,300
24-hour	260
Annual	60

- <sup>a</sup> From DeBary analysis (1991).
- <sup>b</sup> Based on \$0.01/gallon differential from 0.3% to 0.2% sulfur oil.
- <sup>c</sup> Based on 3,390 hours/year operation.
- <sup>d</sup> Proposed for the project at 59°F conditions and peak load.

Table 2. Proposed Emissions (lb/10<sup>6</sup>Btu) for FPC Intercession City Expansion Project; 59°F Conditions and Peak Load

Regulated & Toxic Air Pollutants	GE Frame EA Turbine	GE Frame FA Turbine
Particulate	0.015	0.009
SO <sub>2</sub> <sup>a</sup>	0.54 max. 0.32 avg.	0.54 max. 0.32 avg.
NO <sub>x</sub> <sup>a</sup>	0.18	0.18
CO	0.05	0.04
VOC	0.005	0.005
Lead <sup>a</sup>	8.9x10 <sup>-6</sup>	8.9x10 <sup>-6</sup>
As <sup>a</sup>	4.2x10 <sup>-6</sup>	4.2x10 <sup>-6</sup>
Be <sup>a</sup>	2.5x10 <sup>-6</sup>	2.5x10 <sup>-6</sup>
Hg <sup>a</sup>	3x10 <sup>-6</sup>	3x10 <sup>-6</sup>
F <sup>a</sup>	32.5x10 <sup>-6</sup>	32.5x10 <sup>-6</sup>
H <sub>2</sub> SO <sub>4</sub> <sup>a</sup>	0.067 max. 0.04 avg.	0.067 max. 0.04 avg.

<sup>a</sup> Pollutants where emissions in lbs/10<sup>6</sup>Btu would not change based on operating conditions. For pollutants not footnoted, maximum values are provided and values would decrease with a change from the conditions cited.

*Just the new units*

Table 3. Summary of Air Toxic Emissions and Predicted Impacts for the FPC Intercession City Expansion Project (Page 1 of 2)

Pollutant	Emission Rate (lb/hr)		Averaging Period	Predicted Impact- All Units ( $\mu\text{g}/\text{m}^3$ )	No Threat Level ( $\mu\text{g}/\text{m}^3$ )	Ratio of Total Impact to NTL
	4 EA Units	2 FA Units				
Generic (SO <sub>2</sub> )	2468	2191	8-Hour 24-Hour Annual <sup>b</sup>	47.6 <sup>a</sup> 16.1 <sup>a</sup> 1.03 <sup>a</sup>	—	—
Antimony	0.1	0.0888	8-Hour 24-Hour Annual	0.0019 0.00065 0.00004	5 1.2 0.3	0.00039 0.00054 0.00014
Arsenic	0.019	0.017	8-Hour 24-Hour Annual	0.00037 0.00012 0.000008	2 0.48 0.00023	0.00018 0.00026 0.035
Barium	0.089	0.079	8-Hour 24-Hour Annual	0.0017 0.00058 0.00004	5 1.2 50	0.00034 0.00048 0.00001
Beryllium	0.011	0.01	8-Hour 24-Hour Annual	0.00021 0.00007 0.000005	0.02 0.0048 0.00042	0.011 0.015 0.011
Cadmium	0.048	0.043	8-Hour 24-Hour Annual	0.00093 0.00031 0.00002	0.5 0.12 0.00056	0.0019 0.0026 0.036
Chlorine	0.123	0.11	8-Hour 24-Hour Annual	0.0024 0.00080 0.00005	15 3.6 —	0.00016 0.00022 —
Chromium	0.22	0.19	8-Hour 24-Hour Annual	0.0042 0.0014 0.00009	5 1.2 1000	0.00084 0.0012 0.00001
Cobalt	0.042	0.037	8-Hour 24-Hour Annual	0.00081 0.00027 0.00002	0.5 0.12 —	0.0016 0.0023 —
Copper	1.28	1.14	8-Hour 24-Hour Annual	0.025 0.0084 0.00054	1 0.24 —	0.025 0.035 —
Fluorine	0.15	0.13	8-Hour 24-Hour Annual	0.0029 0.00097 0.00006	2 0.48 50	0.0014 0.0020 0.00001

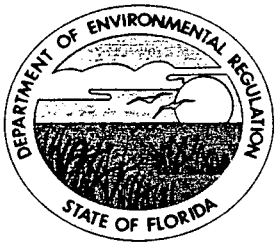
Table 3. Summary of Air Toxic Emissions and Predicted Impacts for the FPC Intercession City Expansion Project (Page 2 of 2)

Pollutant	Emission Rate (lb/hr)		Averaging Period	Predicted Impact- All Units ( $\mu\text{g}/\text{m}^3$ )	No Threat Level ( $\mu\text{g}/\text{m}^3$ )	Ratio of Total Impact to NTL
	4 EA Units	2 FA Units				
Formaldehyde	1.85	1.65	8-Hour	0.036	4.5	0.0079
			24-Hour	0.012	1.08	0.011
			Annual	0.00078	0.077	0.010
Lead	0.041	0.036	8-Hour	0.00079	1.5	0.00053
			24-Hour	0.00027	0.36	0.00074
			Annual	0.00002	0.09	0.00019
Manganese	0.029	0.026	8-Hour	0.00056	50	0.000011
			24-Hour	0.00019	12	0.000016
			Annual	0.00001	—	—
Mercury	0.014	0.012	8-Hour	0.00027	0.5	0.00053
			24-Hour	0.00009	0.12	0.00075
			Annual	0.00001	0.3	0.00019
Nickel	0.78	0.69	8-Hour	0.015	0.5	0.030
			24-Hour	0.0051	0.12	0.042
			Annual	0.00033	0.0042	0.078
Selenium	0.108	0.095	8-Hour	0.0021	2	0.0010
			24-Hour	0.00070	0.48	0.0015
			Annual	0.00005	—	—
Sulfuric Acid Mist <sup>a</sup>	307.2	273.1	8-Hour	5.9	10	0.59
			24-Hour	2.0	2.38	0.84
			Annual	0.13	—	—
	<i>Is this carcinogenic Should value be 4.8</i>					
Vanadium	0.32	0.28	8-Hour	0.0061	0.5	0.012
			24-Hour	0.0021	0.12	0.017
			Annual	0.00013	20	0.00001

Note: — = not applicable.

- <sup>a</sup> Contributions of EA and FA units to total impacts are 31 and 16.6  $\mu\text{g}/\text{m}^3$  (8-hour), 10.8 and 5.3  $\mu\text{g}/\text{m}^3$  (24-hour), and 0.71 and 0.33  $\mu\text{g}/\text{m}^3$  (annual) at 20°F conditions and peak load.
- <sup>b</sup> Annual average impacts based on 8,760 hours of operation although proposed turbines will be limited to 3,390 hours of operation.
- <sup>c</sup> Not in current DER NTL list. NTL in table based on dividing the TWA by 100 and 420 for the 8-hour and 24-hour NTL, respectively.





# Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

Lawton Chiles, Governor

Carol M. Browner, Secretary

June 14, 1991

Ms. Teresa Compton  
Florida Power Corporation  
General Office P. O. Box 14042  
St. Petersburg, Florida 33733

Re: Intercession City Facility - Preconstruction Monitoring  
Review

Dear Ms. Compton:

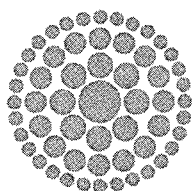
I have reviewed your request to use data from the Winter Park SO<sub>2</sub> monitoring site (4900-002-G01) to satisfy the preconstruction monitoring requirements of the PSD regulations for your proposed project. Based on my review, you may use data collected from this site to satisfy the monitoring requirements. Please use data collected during 1990 and the following values for representing the applicable background concentrations: 53 ug/m<sup>3</sup>, 3-hour average; 28 ug/m<sup>3</sup>, 24-hour average; and 4 ug/m<sup>3</sup>, annual average. If you have any questions, please call me at 904-488-1344.

Sincerely,

Cleve Holladay  
Meteorologist  
Bureau of Air Regulation

CH/plm

c: Ken Kosky, KBN



RECEIVED

MAY 9 1991

Division of Air  
Resources Management

**Florida  
Power**  
CORPORATION

May 6, 1991

Mr. Clair H. Fancy, Chief  
Bureau of Air Regulation  
Division of Air Resources Management  
Department of Environmental Regulation  
Twin Towers Office Building  
2600 Blair Stone Road  
Tallahassee, FL 32301

Dear Mr. Fancy:

Re: Intercession City Facility - Potential Siting of  
450 MW of Simple Cycle Combustion Turbines

As you know from your discussions with Ms. Teresa Compton of Florida Power Corporation (FPC), FPC is planning the addition of 450 megawatts (MW) of simple combustion turbines at the Intercession City facility. Under separate cover we are sending two (2) copies of a report prepared for FPC by KBN Engineering and Applied Sciences, Inc. (KBN), "Preliminary Air Quality Impact Assessment of 450 MW of Simple Cycle Turbines, FPC Intercession City", KBN Report No. 91015B1, January 1991. This report discusses the appropriateness of using existing ambient data to satisfy the Prevention of Significant Deterioration (PSD) preconstruction monitoring requirements for this project. The analysis and approach are similar to those used for the DeBary project which also involved siting 450 MW of simple cycle turbines. For the DeBary project, FPC requested and received from DER a determination that existing ambient air quality data were acceptable for satisfying the preconstruction monitoring requirements.

In section 4.0 of the enclosed report, a review has been performed of the existing air quality monitoring data collected near the Intercession City facility. Based on that review, these data should be appropriate to satisfy the PSD preconstruction monitoring requirement. Therefore, FPC requests that the DER review the enclosed report and determine if the existing monitoring data will be acceptable to the DER as preconstruction monitoring for the air construction permit.

Mr. Clair H. Fancy  
May 6, 1991  
Page 2

If you have any questions concerning the enclosed report, please call Mr. Ken Kosky or Mr. Robert McCann of KBN at your earliest convenience. We hope to discuss this matter with your staff during our meeting scheduled for May 8, 1991.

Sincerely,

*W W Vierday*

W. W. Vierday, Manager  
Environmental Programs-Licensing

cc: Barry Andrews - FDER/Tallahassee  
Preston Lewis - FDER/Tallahassee