Golder Associates Inc.

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April 21, 2004

033-7600-0205

Florida Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Attention: Mr. A. A. Linero, P.E., Program Administrator

RE: FPL TURKEY POINT FOSSIL PLANT-1150MW COMBINED CYCLE UNIT NO. 5
DEP FILE NO. 0250003-006-AC (PSD-FL-338)
NATIONAL PARK SERVICE COMMENTS

Dear Al:

This correspondence is submitted on behalf of FPL to address the technical aspects of the comments provided to the Department on Turkey Point Unit No. 5, which were dated February 26, 2004 by the National Park Service (NPS), Policy, Planning and Permit Review Branch located in Denver, Colorado. The technical information is presented according to those technical areas where comments were provided.

Best Available Control Technology (BACT) Analysis

NOx-As discussed in the Sufficiency Responses, responses to 4FDEP Comment 5 and Comment 6, the proposed BACT for NOx emission limits in the Air Construction/PSD Application for the Project of 2.5 ppmvd corrected to 15 percent oxygen when firing natural gas and 10 ppmvd corrected to 15 percent oxygen when firing distillate fuel oil, 24-hour block averages, are considered appropriate for the project. These limits have been established as BACT on very recent projects and are of the lowest in EPA Region IV. It is recognized that lower NOx emission limits have been established, but as discussed in the sufficiency responses, the majority of these limits have been established as LAER, a more stringent standard. However, recognizing the close proximity of the Project to the Everglades National Park (ENP) PSD Class I Area, as well as the Biscayne National Park (BNP), FPL proposed at the April 5, 2004 meeting with the Department revised NO_x emission limits of 2.0 ppmvd corrected to 15 percent oxygen when firing natural gas and 8 ppmvd corrected to 15 percent oxygen when firing distillate fuel oil, 24-hour block averages. The consequences of these lower limits are discussed in the technical information provided in response to the NPS comments on the AQRV analysis section, below.

Air Quality Related Values (AQRV) Analysis

Distillate Oil Firing-The emissions and speciation used to determine impacts to AQRVs in the ENP PSD Class I Area of the Project when firing distillate oil are discussed in the text to Appendix A to the Air Construction/PSD Permit Application. For light oil firing, the filterable particulate from the CT was based on the manufacturer guarantee with the "elemental carbon" component being the average emission rates from tests and the "soil" component being the remainder. We feel that this is supported by information from the CT manufacturer, GE which stated that PM emissions are essentially zero from the combustion process and that any PM is a result of other factors. GE's letter was included in the appendix. We feel this is also supported from a combustion standpoint since combustion temperatures are 2,600°F and the combustion temperature of carbon is about 1,200°F. Filterable particulate was also added from the SCR system. This filterable particulate was assumed to be soil. These assumptions are clearly conservative. The condensable emissions from the CT and duct burners are based on the average emission tests from GE and subtracting out

components associated with fuel sulfur. In the GE letter the average condensable emissions are 14 lb/hr with a contribution of 10 lb/hr from fuel sulfur content (0.05 percent). Unit 5 will use ultra low sulfur content light oil (i.e., 0.0015 percent) that will contribute virtually no sulfur components to condensable particulate. The sulfuric acid mist was based on the maximum amount of sulfur in the light oil. It should be noted that emissions of sulfur dioxide, SCR filterable particulate and sulfuric acid mist were determined independently and not adjusted for the total amount of sulfur in the fuel. Therefore, these emissions are overstated and conservative for the analysis. In addition, the ultra low sulfur content light oil will be comparable in quality to natural gas. For example, the maximum SO_2 emissions from burning natural gas at 2 grains/100 scf is about 9 lb/hr per CT, while the SO_2 emissions firing light oil with a sulfur content of 0.0015 percent is about 3 lb/hr. It is likely that the assumed amount of filterable particulate is high since this guarantee is based on 0.05-percent sulfur fuel currently available. This is also supported by tests conducted on four GE Frame 7FA turbines at FPL facilities using 0.05 percent sulfur distillate oil. The median value for 11 test runs was 3.6 lb filterable particulate with an average of 6.5 lb/hr. The 4.8 lb/hr assumed as elemental carbon is conservative for ultra low sulfur content light oil. Moreover, the organic component of the PM emissions was based on the GE information for condensable PM emissions and is much higher than the GE guarantee of organic emissions. Based on the tests performed for Martin Units 8A and 8B, there are virtually no organic emissions when firing distillate oil in a GE Frame 7FA turbine. The organic emissions were only 0.1 ppmvw compared to a guarantee of 3.5 ppmvw and would produce emissions of about 0.02 lb/hr. The organic condensable PM emission rate used in the modeling was 4 lb/hr. Taking together the conservative assumptions of filterable and condensable PM emissions when firing ultra clean distillate oil, we believe the AQRV analysis was very conservative and based on the latest information.

Natural Gas Firing- Regional haze modeling was performed for power augmentation with duct firing at 360 MMBtu/hr and a turbine inlet of 80°F. This mode of operation, although limited to 400 hours per year, produces the highest combination of particulate matter, sulfur dioxide and nitrogen oxide emissions that will result from operation on natural gas. This information was presented in Tables A-19 and A-20 of Appendix A to the Air Construction/PSD Application. Operating conditions and emissions in Tables A-1 and A-2 of Appendix A to the Air Construction/PSD Application are based on base load operation including duct firing at 550 MMBtu/hr. While a single combustion turbine/heat recovery steam generator (CT/HRSG) train could operate under this condition, all 4 CT/HRSG trains cannot. This is because the 550 MMBtu duct firing reflects the operation of the Project with one CT/HRSG train inoperable. Operating in this condition with only 3 CT/HRSG trains will have lower overall emissions than 4 CT/HRSG trains operating under power augmentation and duct firing at 360 MMBtu/hr.

PM_{10} Emissions- The speciation of particulate matter used in the Regional Haze modeling is shown in Tables A-19 and A-20 of Appendix A to the Air Construction/PSD Application for natural gas and light oil firing and we believe it reflects the best technical information related to the GE Frame 7FA CT in combined cycle mode and is conservative. For natural gas firing, the filterable particulate from the CT was based on "soil". This is supported by information from the CT manufacturer, General Electric (GE) which stated that PM emissions are essentially zero from the combustion process and that any PM is a result of other factors. GE's letter was included in Appendix A to the Air Construction/PSD Application.. From a combustion standpoint the DLN combustion process pre-mixes the natural gas and air. The pre-mixing of the fuel and air, along with combustion temperatures of 2,600°F, suggests that combustion components such as "elemental carbon" would not occur. Indeed, the combustion temperature of carbon is about 1,200°F. For emissions from the duct burner, it was assumed that all filterable particulate was elemental carbon. Filterable particulate was also added from the SCR system. This filterable particulate was assumed to be soil. The condensable emissions from the CT and duct burners are based on manufacturer

guarantees. The sulfuric acid mist was based on the maximum amount of sulfur in the natural gas. It should be noted that emissions of sulfur dioxide, SCR filterable particulate and sulfuric acid mist were determined independently and not adjusted for the total amount of sulfur in the fuel. Therefore, these emissions are overstated and conservative for the analysis. In addition, the organic component of the PM emissions was based on the GE guarantee for condensable PM emissions, which we believe is very conservative. Based on the tests performed for Martin Units 8A and 8B, there are virtually no organic emissions when firing natural gas in a GE Frame 7FA turbine. The organic emissions were below the detection limit of the method (0.1 ppmvw) and would produce emissions of less than 0.01 lb/hr. The organic condensable PM emission rate used in the modeling was 2.38 lb/hr. Taking together the conservative assumptions of filterable and condensable PM emissions when firing natural gas, we believe the AQRV analysis was very conservative and based on the latest information. Technical information was provided above for distillate oil firing.

Natural Gas Firing Peak Load-See information related to natural gas firing.

Cumulative Source Modeling- The detailed stack, operating, and emission data for the facilities with SO_2 and PM10 sources presented in Tables 6-3 and 6-4 are provided in Tables D-1 and D-2 of Appendix D to the Air Construction Permit/PSD Application, Appendix 10.1.5. These data were based on information provided from FDEP, available from recent PSD permit applications, Title V permits, and supplemented with current and historical information available within Golder. The air modeling data were obtained from several recently submitted and reviewed air permit applications in which PSD Class I increment or significant impact analyses were performed at the Everglades National Park. These applications include the modifications to U.S. Sugar Corporation's Clewiston Mill (proposed Boiler No. 8, March 2003; Boiler No. 4 and Sugar Refinery, October 2000); Palm Beach Power Corporation's Cogeneration Facility (April 2002); and FPL's Martin Power Plant Expansion Project, Unit No. 8 (February 2002).

The major source baseline date for Florida is January 6, 1975 for both SO_2 and PM10 (adopted and incorporated by reference in Rule 62-204.800, F.A.C.). The minor source baseline date for SO_2 and PM10 has been set as December 27, 1977 for the entire State of Florida (Rule 62-204.360(1) and (2), F.A.C.).

Based on these baseline dates, the baseline and PSD-increment consuming sources of SO_2 and PM10 emissions for the sources in the inventory were developed from the available information discussed previously. The baseline and PSD increment consuming sources are identified in Tables D-1 and D-2 of Appendix A to the Air Construction/PSD Application.

It should be noted that, although the highest 24-hour average SO2 concentrations were predicted to exceed 24-hour SO_2 PSD Class I increment for 1990 and 1992, there were no predicted violations of the increment based on the highest, second highest values. Rule 62-272.500 F.A.C. and 40 CFR 52.21(c) support the use of the highest, second highest values when determining compliance with the 24-hour SO_2 PSD Class I increment.

Haze and Coherent Modeling-As discussed above, FPL proposed to the Department NOx emission limits of 2.0 ppmvd corrected to 15 percent oxygen when firing natural gas and 8 ppmvd corrected to 15 percent oxygen when firing distillate fuel oil, 24-hour block averages. A revised regional haze analysis was performed based on these NOx emission limits. The basis for the revised analysis is presented in the attached Tables A-19a, 19b and 20a. Please note that an additional scenario was performed for natural gas to reflect the Project under conditions closer to normal operation (i.e., base load with 210 MMBtu/hr duct firing). The results of the revised regional haze analysis are presented in the attached Table ENP-1. Table ENP-1 also presents the previous regional haze

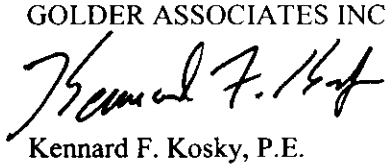
results. As shown in this table, the maximum predicted visibility impacts for the Project were reduced from those previously provided to the Department in the Air Construction/PSD Application. In addition, lowering the NOx emissions for light oil firing has resulted in only one valid value in the three year period that was above 5 percent (i.e., 5.46). The other value, 6.01 percent, was the same period producing the highest regional haze impact in the original analysis. As discussed in the response to 4FDEP Comment 18 in Sufficiency Responses, the value for this period was an artifact of determining relative humidity using Fort Myers and Miami meteorological data. This produced a discontinuity in the northwest corner of the ENP, resulting in the predicted regional haze impacts. Given the updated regional haze impacts and the statistical probability of using light oil during the same periods associated with predicted high regional haze impacts (see response to 4FDEP Comment 18 in Sufficiency Responses); we believe that no significant impacts will occur in the ENP due to the Project.

We believe that the use of VISCREEN for determining plume impacts in the BNP is inappropriate for use at these distances and type of source. VISCREEN is a screening technique that only takes into account emissions of a source, such as PM and NOx, and not other factors that can affect near-field visibility, such as the exhaust gas volume flow from a source. The emissions from the Project will not only be extremely low in quantity but, due to the high volume flow, the emissions will be very dispersed in the high volume exhaust gases. These combined factors result in virtually no visible plume when firing distillate oil. This has been verified through numerous visible emission tests at similar facilities. Moreover, the use of ultra low sulfur light oil, with fuel quality similar to natural gas, would be expected to have even a lower potential for visible emissions. In addition, light oil will only be used as a backup fuel in the event that natural gas is not available for a limited period resulting in an even lower potential for any plume visibility impacts in the BNP.

The opportunity to provide this information is appreciated. We have transmitted the modeling results by e-mail to Ms. Deborah Nelson of your staff including a FTP link to the modeling files. Please call if there are any questions on this technical information.

Sincerely,

GOLDER ASSOCIATES INC.



Kennard F. Kosky, P.E.
Principal

KFK/

Enclosures

cc: Barbara Linkiewicz, FPL
John Gnecco, FPL
H. O. Nunez, Turkey Point Plant

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Table 19a. GAS FIRING - COMBINED CYCLE (Emissions are per CT; 4-CT/HRSG in Project)
CALPUFF Emissions 80 °F Inlet Fogged Power Augmentation (360 MMBtu/hr)

PM	Source	Rate (lb/hr)	Soil	Elemental Carbon (EC)	H_2SO_4	Organic
Filterable	CT	9	9	0		
	DB	1.8	0	1.8		
	SCR	2.03	2.03			
Condensible	CT	3.5			1.01	2.49
	DB	1.8			0.20	1.60
Total PM_{10}		18 13	11.03	1.8	1.21	4.09
		100.00%	60.83%	9.93%	6.68%	22.56%
Extinction Factor			1.00	10.00	6.00	4.00
Total Relative Extinction Factor		52.65	11.03	18.00	7.26	16.36
		100.00%	20.94%	34.19%	13.79%	31.08%

Notes: DB emissions based on 0.005 lb/MMBtu for both filterable and condensible.
CT filterable is soil based on GE data and information; GE stated that no PM from combustion process (i.e., no EC).
DB filterable assumed to be EC.
H_2SO_4 based on direct calculation and apportioned based on heat input.
GE emission estimates:

	Average Rate (lb/hr)
Filterable (Front Half)	4 8
Condensible (Back Half)	2.8
Total (Front and Back Half)	7.6

	Rate (lb/hr)	
Other Pollutants Modeled	1 CT	4 CTs
SO_2:	12.1	48.4
NO_x:	19.3	77.2

Stack Parameters for Modeling		
Temperature	°F	188
Velocity	ft/s	56.8
Diameter	ft	19
Height	ft	131

Particle Size Distribution (NPS Nov. 2002)

Species Name	Geometric Mass (microns)	Cumulative Size Distribution (%)	Distribution by Category (%)	Emission Rate (lb/hr) 1 CT	Emission Rate (lb/hr) 4 CTs
PM (Total PM_{10}- H_2SO_4)			100	16.9	67.7
PM0005	0.05	15	15	2.54	10.15
PM0010	0.10	40	25	4.23	16.92
PM0015	0.15	63	23	3.89	15.56
PM0020	0.20	78	15	2.54	10.15
PM0025	0.25	89	11	1.86	7.44
PM0100	1.00	100	11	1.86	7.44

Table 19b. GAS FIRING - COMBINED CYCLE (Emissions are per CT; 4-CT/HRSG in Project)
CALPUFF Emissions Base Load 59 °F with Duct Firing 210 MMBtu/hr

PM	Source	Rate (lb/hr)	Soil	Elemental Carbon (EC)	H_2SO_4	Organic
Filterable	CT	9	9	0		
	DB	1.8	0	1.8		
	SCR	1.84	1.84			
Condensible	CT	3.5			0.92	2.58
	DB	1.8			0.18	1.62
Total PM_{10}		17.94	10.84	1.8	1.1	4.2
		100.00%	60.43%	10.03%	6.13%	23.41%
Extinction Factor			1.00	10.00	6.00	4.00
Total Relative Extinction Factor		52.24	10.84	18.00	6.60	16.80
		100.00%	20.75%	34.45%	12.63%	32.16%

Notes: DB emissions based on 0.005 lb/MMBtu for both filterable and condensible.
CT filterable is soil based on GE data and information; GE stated that no PM from combustion process (i.e., no EC).
DB filterable assumed to be EC.
H_2SO_4 based on direct calculation and apportioned based on heat input.
GE emission estimates:

	Average Rate (lb/hr)
Filterable (Front Half)	4.8
Condensible (Back Half)	2.8
Total (Front and Back Half)	7.6

Other Pollutants Modeled	Rate (lb/hr) 1 CT	4 CTs
SO_2:	11.0	44.0
NO_x:	15.9	63.6

Stack Parameters for Modeling

Temperature	°F	188
Velocity	ft/s	59.2
Diameter	ft	19
Height	ft	131

Particle Size Distribution (NPS Nov. 2002)

Species Name	Geometric Mass (microns)	Cumulative Size Distribution (%)	Distribution by Category (%)	Emission Rate (lb/hr) 1 CT	4 CTs
PM (Total PM_{10}- H_2SO_4)			100	16.8	67.4
PM0005	0.05	15	15	2.53	10.11
PM0010	0.10	40	25	4.21	16.84
PM0015	0.15	63	23	3.87	15.50
PM0020	0.20	78	15	2.53	10.11
PM0025	0.25	89	11	1.85	7.41
PM0100	1.00	100	11	1.85	7.41

Table 20a. OIL FIRING - COMBINED CYCLE (Emissions are per CT; 4 CT/HRSG in Project)
CALPUFF Emissions 35 °F Inlet Baseload

PM	Source	Rate (lb/hr)	Soil	Elemental Carbon (EC)	H_2SO_4	Organic
Filterable	CT	17	12.2	4.8		
	DB	0	0	0		
	SCR	0.63	0.63			
Condensible	CT	4.62			0.62	4.00
	DB	0				0.00
Total PM_{10}		22.25	12.83	4.8	0.62	4
		100.00%	57.66%	21.57%	2.79%	17.98%
Extinction Factor			1.00	10.00	6.00	4.00
Total Relative Extinction Factor		80.55	12.83	48.00	3.72	16.00
		100.00%	15.93%	59.59%	4.62%	19.86%

Notes: CT filterable is soil based on GE data and information; 4.8 lb/hr is 50% of average front-half test data.
Condensable based on GE average rate and subtracting the effect of 0.05% sulfur fuel.
H_2SO_4 based on direct calculation and apportioned based on heat input.
GE emission estimates:

	Average Rate (lb/hr)	
Filterable (Front Half)	9.5	
Condensible (Back Half)	4	14 lb/hr minus sulfate of 10 lb/hr
Total (Front and Back Half)	13.5	

	Rate (lb/hr)	
Other Pollutants Modeled	1 CT	4 CTs
SO_2:	3.1	12.4
NO_x:	64.6	258.4

Stack Parameters for Modeling

Temperature	°F	297
Velocity	ft/s	75.5
Diameter	ft	19
Height	ft	131

Particle Size Distribution

Species Name	Geometric Mass (microns)	Cumulative Size Distribution (%)	Distribution by Category (%)	Emission Rate (lb/hr) 1 CT	Emission Rate (lb/hr) 4 CTs
PM (Total PM_{10}- H_2SO_4)			100	21.63	86.5
PM0005	0.05	16	16	3.46	13.84
PM0010	0.10	48	32	6.92	27.69
PM0015	0.15	72	24	5.19	20.76
PM0020	0.20	85	13	2.81	11.25
PM0025	0.25	93	8	1.73	6.92
PM0100	1.00	100	7	1.51	6.06

Table ENP-1. Maximum Predicted 24-Hour Visibility Impairment[a] at the Everglades National Park for FPL Turkey Point Emission Scenarios (04/04)

Emission Case	Duct Firing (MMBtu/Hr)	Visibility Impairment (percent) for Year 1990	1992	1996	Visibility Criteria (percent)
Natural Gas Firing					
Power Augmentation 80 °F	360	3.32 (3.75)	3.74 (4.02)	3.85 (3.88)	5
Base Load, 59 °F	210	3.26	3.53	3.51	5
Fuel Oil Firing					
Base Load, 35 °F	none	4.42 (5.01)	4.81 (5.26)	6.01[b] (7.1)	5

[a] Predicted with Calpuff Model and south Florida CALMET Domain for 1990, 1992, and 1996. Based on NO_x emissions of 2 ppmvd corrected to 15% oxygen when firing natural gas and 8 ppmvd corrected to 15% oxygen when firing light oil.

[b] Next highest value was 5.64.

Notes: Value within ( ) indicates previous results in PSD analysis submitted 11/03.

United States Department of the Interior

NATIONAL PARK SERVICE
Air Resources Division
P.O. Box 25287
Denver, CO 80225

IN REPLY REFER TO:

February 27, 2004

N3615 (2350)

A.A. Linero, P.E., Administrator
Department for Environmental Protection
New Source Review Section
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Mr. Linero:

We have reviewed the Florida Power & Light's (FP&L) Turkey Point Power Plant Prevention of Significant Deterioration (PSD) permit application. FP&L proposes to construct and operate a 1,150 MW combined cycle unit at the existing Turkey Point Power Plant located 21 kilometers east of Everglades National Park (NP) and adjacent to Biscayne NP. Everglades NP is a Class I air quality area and Biscayne NP is a Class II air quality area, both areas are administered by the National Park Service (NPS). The combined cycle unit (called Unit 5) will consist of four General Electric (GE) 7FA combustion turbines and associated electric generators, four heat recovery steam generators and a single steam turbine with associated electric generator and a cooling tower. Emissions from the proposed facility will be 387 tons per year (TPY) of nitrogen oxides (NO_x), 419 TPY of particulate matter (PM), 218 TPY of particulate matter less than 10 microns in size (PM_{10}), 191 TPY of sulfur dioxide (SO_2), 57 TPY of volatile organic compounds, and 19 TPY of sulfuric acid mist.

Based on our review of the permit application, we find that the proposed emissions from the Turkey Point facility may significantly impact visibility at Everglades NP and Biscayne NP. FP&L conducted a haze analysis for areas in Everglades NP greater than 50 kilometers (km) from the proposed facility and a coherent plume analysis for distances less than 50 km. Generally for Class I areas, NPS considers haze impacts from a proposed source as significant if the impacts exceed a 5% change in extinction. If a proposed source has significant haze impacts (i.e., greater than 5% change) on a Class I area, the NPS then determines whether or not those impacts are adverse, based on the frequency, magnitude, and duration of the impacts. The FP&L modeling results provided in its application show, when using fuel oil, there will be four days over three years with impacts over 5% change in extinction, with a maximum impact of 7.1% change in extinction, at Everglades NP. There will be no days over the haze threshold at the park when the facility burns natural gas. The coherent plume analysis did not show any

significant impacts at Everglades NP. FP&L did not conduct a coherent plume analysis for Biscayne NP because it is a Class II area, however our analysis shows there will be plume impacts at Biscayne NP when the proposed facility is burning fuel oil. Because there are impacts above our significant haze impact threshold at Everglades NP and plume impacts at Biscayne NP, we ask that FP&L look at mitigating measures to reduce emissions. In this regard, we have the following comments regarding the Best Available Control Technology (BACT) analysis and air quality related value (AQRV) analysis conducted by FP&L.

BACT Analysis

We continue to support the concept of generating electricity using clean and efficient combined cycle gas turbine technology as proposed by FP&L. Nonetheless, the proximity of the project to Everglades NP and Biscayne NP and potential significant impacts at these parks dictates a rigorous approach to minimizing emissions.

NO_x: FP&L proposes to use Selective Catalytic Reduction with a limit of 2.5 ppm NO_x, when burning natural gas, and 10.0 ppm NO_x when burning fuel oil. We would appreciate having the proposed averaging times explicitly defined. While we applaud FP&L for proposing such relatively low limits, we are aware that other similar combustion turbines have proposed, or been permitted at lower limits. For example, the enclosed Table 1 shows seventeen combustion turbines with NO_x limits at 2.0 ppm or less while burning natural gas, while Table 2 shows seven combustion turbines with less than 10.0 ppm NO_x when burning fuel oil. We are also aware of actual test results showing NO_x emissions of less than 1.0 ppm when firing natural gas in a combustion turbine.[1] FPL should demonstrate why it cannot meet the same lower limits as its competitors.

SO_2: We are pleased that FP&L proposes to burn gas and ultra-low sulfur oil (0.015%) and consider this BACT for SO_2.

AQRV Analysis

FP&L did not explain how the single-source stack parameters were developed. Based on what we reviewed, it appears that Case 28, Distillate Oil, Base Load at 35° F produces the greatest emissions of PM_{10}, SO_2, NO_x, and sulfates (SO_4) when burning fuel oil. However, the method used by FP&L to speciate particulate does not follow the guidance we have posted on our website and is not adequately explained. Our best estimate of emissions from oil firing is contained in the enclosed Table 3.

Natural Gas Firing–Base Load: It appears that Case 7, Natural Gas, Base Load at 35° F produces the greatest emissions of PM_{10}, SO_2, NO_x, and SO_4 when operating in a base load mode, and was the basis for the emission entries on the application forms for normal

[1] "Test Report, Compliance Emissions Testing, Lake Road Generating Company, L.P.," Killingly, CT, by TRC Environmental Corporation February 2002.

operation. However, the emission rates presented for this case in FP&L's Tables A-1 and A-18 do not match, and it is not clear if this case was modeled.

PM_{10} Emissions: With regard to the PM_{10} emissions, FP&L presents a June 17, 2003, letter from GE. In the letter the turbine vendor argues that "PM_{10} emissions from its 7FA natural gas-fired units are essentially zero (no emissions from the combustion process itself). Therefore it is impractical to speciate PM_{10} emissions from the combustion process." GE goes on to suggest that airborne PM_{10}, inert solids in natural gas, construction debris, rust, and measurement artifacts are all sources of the turbine PM_{10} filterable emissions. Sources of condensable PM_{10} consist of formation of ammonia sulfates from the SCR system, sulfates, unburned hydrocarbons, and other undefined condensibles. GE's argument could be true if these turbines could achieve complete combustion, and the resulting emission products were carbon dioxide and water. However, the GE letter appears internally inconsistent because, while arguing that its turbines have zero PM_{10} emissions from the combustion process, it cites "unburned hydrocarbons" as a source of condensable emissions. Furthermore, the Turkey Point facility will emit substantial amounts of carbon monoxide, volatile organic compounds, and formaldehyde, all of which are products of incomplete combustion. Finally, FP&L's assumption that most filterable PM_{10} is due to airborne soils would require airborne dust concentration in excess of the National Ambient Air Quality Standards (NAAQS). For example, if the ambient PM_{10} levels are just at the 24-hour NAAQS, at the flow rate given for these turbines, PM_{10} emissions due to airborne PM_{10} would be less than 0.5 lb/hr. While it is likely that much of the condensable PM_{10} attributed to gas-fired turbines is an artifact of the measurement process, the same would not hold for the filterable component. For these reasons, we suggest that FP&L model the emissions shown in Table 3.b. for this operating scenario.

Natural Gas Firing Peak Load: With regard to natural gas firing during peak load or during power augmentation or high power mode, FP&L presents one or more operating scenarios described as:

- Power Augmentation in Tables A-1 and A-2 (titled "Base Load"), and A-19;
- described as Peak in Tables A-7, A-8 (both titled "Peak Load"), and in Table A-18 (also titled "Base Load"); and
- described as "High Power Mode" (HPM) on the application form page pertaining to NO_x.

However, the emission rates in Tables A-2 and A-19 do not match, nor do the emission rates in Tables A-7 and A-8 match those in A-18. The only match was a pairing of SO_2 and NO_x emission rates in Tables A-18 Peak and A-19 Power Augmentation. Table A-19 appears to be an attempt at speciating the PM_{10} emissions during power augmentation, but has the same problems as noted above. Since the high peak mode may have NO_x emission of over 105 lb/hr, FP&L should explain how these emissions were modeled.

Case 28 represents the maximum emissions from oil firing and the high power mode represents the maximum emissions from gas firing, both of these cases should be modeled. However, it appears from the application (p. 6-7) that only the scenarios contained in Tables 2-1 and 2-2 were modeled. While this would capture emissions from

Cases 7 and 28 it does not include emissions form the High Power Mode and underestimates from those impacts. Furthermore, the errors in particle speciation may also be significant.

Cumulative Source Modeling: Regarding the cumulative-source modeling parameters, FP&L provides no description of how the emission inventories presented in Tables 6-3 and 6-4 were prepared, nor are any emission rates given. FP&L should provide all applicable baseline dates for Everglades NP, a description of its methodology for compiling the inventory, and the emission rates used in its analyses. Without this information, we cannot draw any conclusions regarding the completeness of the cumulative source analyses. However based on what we reviewed in the FP&L application, we are concerned with the results from the cumulative 24-hour SO_2 Class I increment analysis. Both the 1990 and 1992 cumulative analyses indicate the 24-hour Class I increment was exceeded with values greater than 5.0 $\mu g/m^3$, and the 1996 analysis highest impact was 4.8 $\mu g/m^3$. Therefore, we ask FP&L to provide more information regarding their SO_2 Class I inventory.

Haze and Coherent Plume Modeling: The haze analysis indicates that the Turkey Point project will impact Everglades NP with impacts of greater than a 5% change once each year using the 1990 and 1992 meteorological data and twice using the 1996 meteorological data. Based on the frequency and magnitude of the haze impacts, we do not request that a cumulative haze analysis be performed.

The coherent plume analysis was conducted with the Environmental Protection Agency VISCREEN model at Level 2. We do not believe that the oil firing scenario was modeled correctly with respect to the speciation of the PM emissions and lack of a "soot" component. The NPS re-modeled the oil fired scenario for impacts to Everglades NP with a corrected PM emission rate and included the "soot" particulate. This analysis indicates that the Turkey Point project will not have a coherent plume impact under the same "worst case" 1% meteorological condition of "D" atmospheric stability and a wind speed of 4.4 meters per second (m/sec). With regard to Biscayne NP, which is adjacent to the proposed Turkey Point facility, we performed a VISCREEN analysis for the oil fired scenario and the corrected PM speciation. This analysis indicates visible plume impacts to Biscayne NP beyond the "worst case" 1% meteorological conditions used in the Everglades analysis. Based on these calculations, there could be plume impacts at Biscayne NP when winds are from the south and the FP&L facility is burning fuel oil.

Conclusions

In conclusion, we request that FP&L show why it cannot meet a 2.0ppm NO_x limit on a one-hour average basis as is required in the Ivanpah permit. Averaging times for the proposed emission limits should also be specified. FP&L should clarify the nature of the operating scenarios modeled and rationalize the inconsistencies noted above. They should either provide a better justification of their approach to particle speciation or use the default approach provided by NPS. We also ask that FP&L describe the High Power Mode and justify its exclusion from the modeling analysis. Finally, because FP&L's

cumulative SO_2 impact analysis shows Class I increment exceedences, FP&L should provide all applicable baseline dates for Everglades NP, a description of its methodology for compiling the cumulative emissions inventories, and the emission rates used in its analyses. We also ask FP&L to send us all of the CALMET input files used in its modeling analysis.

Given the proximity of the Turkey Point facility to Everglades NP and Biscayne NP, we ask that FP&L look at mitigating measures to reduce emissions and the corresponding impacts in these parks. Thank you for involving us in the review of the PSD permit application for the Turkey Point facility. Please do not hesitate to contact me at (303) 969-2817 if you have questions concerning our comments.

Sincerely,

Darwin W. Morse
Environmental Protection Specialist
Policy, Planning and Permit Review Branch

Enclosures

Table 1. Combined Cycle Turbines <2.5ppm on

State	*Facility Name*	*Type*	*Total MW*	*Gas (ppm)*	*NOx Control*
AZ	Toltec Power Station	GE Frame 7 FA	1200	2	SCR
CA	Sunlaw Cogen	GE LM2500-M-2	28	2	Dry Low NOx
CA	Calpine-Inland Empire Energy	GE Frame 7 FB	670	2	SCR
CA	Mountain View Power	GE Frame 7 FA	1991	2	SCR
CA	Nueva Azalea		550	1	SCONOx
CA	Intergen-Ocotillo	GE Frame 7 FA		2	SCR
CA	Magnolia Power	GE Frame 7 FA	250	2	SCR
CA	Magnolia Power	Westinghouse 501F	250	2	SCR
CT	Lake Road Generating			2	SCR
EPA	Teayawa		600	2	SCR
MA	ANP Blackstone	ABB GT-24		2	SCR
NV	Diamond Gen-Ivanpah	Westinghouse 501FD	500	2	SCR
NV	Las Vegas Cogen	GE LM 6000 Aero PC	240	2	SCR
VA	Tractebel--Loudoun Energy Center	SW 501G	1400	2	SCR
VA	CPV-Warren Co.	GE Frame 7 FA	520	2	SCR
WA	Goldendale Energy		249	2	SCR
WA	Sumas	Siemens-Westinghouse	669	2	SCR

Table 2.Combined Cycle Turbines <10ppm on Oil

Facility Name/Location	*State*	*Simple/Combined Cycle*	*Total MW*	*NOx Control*	*Type*	*Oil (ppm)*
ANP Blackstone	MA	Combined Cycle		SCR	ABB GT-24	6
Duke Energy-Fayette	PA	Combined Cycle	620	SCR	Ge Frame 7 FA	9
James City Energy	VA	Combined Cycle	580	SCR	GE Frame 7 FA	9
Lake Road Generating	CT	Combined Cycle		SCR		5.9
Santa Rosa Energy LLC	FL	Combined Cycle	241	Dry Low NOx	GE Frame 7 FA	9.8
Sumas	WA	Combined Cycle	669	SCR	Siemens-Westinghouse	6
Tenaska-Buckingham Co.	VA	Combined Cycle	900	SCR	GE Frame 7 FA	6

Table 3

Table 3.a. Each Turbine — Combined Cycle — Oil Firing — Steady-State Emissions

	Filterable PM (NPS Estimate)			Condensible PM (NPS Estimate)			SO2 (Applicant)			SO4 (Applicant)			NOx (Applicant)		
	(lb/mmBtu)	(lb/hr)	(gm/sec)	(lb/mmBtu)	(lb/hr)	(gm/sec)	(lb/mmBtu)	(lb/hr)	(gm/sec)	(lb/mmBtu)	(lb/hr)	(gm/sec)	(lb/mmBtu)	(lb/hr)	(gm/sec)
Soils		3.78	0.48					3.1	0.39094		0.62	0.078189		79.5	10.02583
EC		3.16	0.40												
OC					10.71	1.35									
		6.92	0.87		10.71	1.35									

Turbine Stack Parameters

			Height		Diameter		Temperature		Flow		Velocity	
Unit	Mode	Fuel	ft	m	ft	m	F	K	ft3/min	m3/min	ft/sec	m/sec
#1 - #4	CC	#2	131	39.9	19.0	5.8	295	419	#######	33,832	70.2	21.4

Table 3.b. Each Turbine — Combined Cycle — Gas Firing — Steady-State Emissions — Base Load Case 7

	Filterable PM (NPS Estimate)			Condensible PM (NPS Estimate)			SO2 (Applicant)			SO4 (Applicant)			NOx (Applicant)		
	(lb/mmBtu)	(lb/hr)	(gm/sec)	(lb/mmBtu)	(lb/hr)	(gm/sec)	(lb/mmBtu)	(lb/hr)	(gm/sec)	(lb/mmBtu)	(lb/hr)	(gm/sec)	(lb/mmBtu)	(lb/hr)	(gm/sec)
Soils								13.30	1.68		1.33	0.17		24.20	3.06
EC		3.60	0.45												
OC					10.80	1.36									
		3.60	0.45		10.80	1.36									

Turbine Stack Parameters

			Height		Diameter		Temperature		Flow		Velocity	
Unit	Mode	Fuel	ft	m	ft	m	F	K	ft3/min	m3/min	ft/sec	m/sec
#1 - #4	CC	NG	131	39.9	19.0	5.8	202	367	#######	28,456	59.0	18.0

Table 3.c. Each Turbine — Combined Cycle — Gas Firing — Steady-State Emissions — High Power Mode

	Filterable PM (NPS Estimate)			Condensible PM (NPS Estimate)			SO2 (Applicant)			SO4 (Applicant)			NOx (Applicant)		
	(lb/mmBtu)	(lb/hr)	(gm/sec)	(lb/mmBtu)	(lb/hr)	(gm/sec)	(lb/mmBtu)	(lb/hr)	(gm/sec)	(lb/mmBtu)	(lb/hr)	(gm/sec)	(lb/mmBtu)	(lb/hr)	(gm/sec)
Soils								13.30	1.68		1.33	0.17		105.10	13.26
EC		3.60	0.45												
OC					10.80	1.36									
		3.60	0.45		10.80	1.36									

Turbine Stack Parameters

			Height		Diameter		Temperature		Flow		Velocity	
Unit	Mode	Fuel	ft	m	ft	m	F	K	ft3/min	m3/min	ft/sec	m/sec
#1 - #4	CC	NG	131	39.9	19.0	5.8	205	369	#######	28,757	59.7	18.2

Golder Associates Inc.

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

Golder Associates

TRANSMITTAL LETTER

To: Mr. Al Linero
FDEP

Date: February 27, 2004
Project No.: 0337600-0105

Sent by: **nav**

- ☐ Mail
- ☐ Air Freight
- ☐ Hand Carried
- ☐ UPS
- ☒ Federal Express

Per: **Ken Kosky**

Quantity	Item	Description
2	**Final Bound Copies**	**FPL Turkey Point Expansion Project SCA Sufficiency Responses**

Remarks:

Please find enclosed 2 copies of the Sufficiency Responses for FPL Turkey Point Expansion Project (Unit 5). The Sufficiency Responses address questions and comments from several offices within the Florida Department of Environmental protection, the Florida fish and Wildlife Conservation Commissions, the South Florida Regional Planning Council, and the South Florida Water Management District. Contact Mr. Steven Palmer of the FDEP Siting Office [(850) 245-8002] for further information or questions.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

JAN 15 2004

4APT-APB

Mr. A. A. Linero, P.E.
Florida Department of Environmental Protection
Mail Station 5500
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Mr. Linero:

Thank you for sending the prevention of significant deterioration (PSD) permit application for Florida Power & Light (FPL) Turkey Point, dated November 19, 2003. The PSD permit application is for the proposed construction and operation of four combined cycle combustion turbines (CTs) with a total nominal generating capacity of 1,150 MW to be located near Homstead, FL. The combustion turbines proposed for the facility are General Electric (GE), frame 7FA units. The CTs will primarily combust pipeline quality natural gas with ultra low sulfur fuel oil (0.0015% S) combusted as backup fuel. As proposed, the CTs will be allowed to fire natural gas up to 8,760 hours per year and fire fuel oil a maximum of 500 hours per year. The CTs will be allowed to operate natural gas-fired duct burners for a maximum of 2,880 hours/year. Total emissions from the proposed project are above the thresholds requiring PSD review for nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter (PM/PM_{10}), and volatile organic compounds (VOC).

Based on our review of the PSD permit application we have the following comments:

1. The applicant proposed the use of good combustion practices as best available control technology (BACT) for CO and requested the following CO limits (page 4-2): 9 ppmvd while burning natural gas, 17 ppmvd while burning natural gas and duct firing, 22.6 ppmvd while burning natural gas and in high power mode with duct firing, and 20 ppmvd when burning fuel oil. However, Table 4-1 (page 4-16) of the application references the following CO limits: 7.3 ppmvd while burning natural gas, 10.2 ppmvd while burning natural gas and duct firing, 14.7 ppmvd while burning natural gas and in high power mode with duct firing, and 20 ppmvd when burning fuel oil. According to the vendor test data in Appendix B, the latter set of emission limits seem to be the correct ones.

   Regardless of which set of emission limits are the correct ones, these CO limits are much higher than those recently seen as a result of BACT analyses throughout the country, including here in Region 4. For instance, we are seeing CO limits for both natural gas and fuel oil combustion in the low single digits (i.e., 2.0 ppmvd) in several recent permits in Georgia. According to the application, the CO emissions test data range from 0.0 ppmvd to 1.01 ppmvd when firing natural gas during load ranges from 50 to 100

percent. Irrespective of the exact control technology used, we would expect to see BACT CO limits near 2 ppmvd in the draft PSD permit for FPL Turkey Point.

2. Table 2-4 is a summary of the maximum potential annual emissions. In several of the scenarios, including the scenario generating maximum CO emissions, it is assumed that there will be a maximum of 400 hours/year of operation with power augmentation. In order for the BACT analysis to remain valid, this limit on power augmentation should be included as an enforceable requirement of the draft PSD permit. Additionally, any other underlying assumptions used in the BACT or air quality analyses, such as the 2,880 hours/year limit on duct burning, should also be included in the draft PSD permit. Finally, any operating limits (including the ones mentioned above) which were used in the analyses on a per CT basis should be included in the draft PSD permit on a per CT basis.

3. The applicant rejected catalytic oxidation as an economically infeasible control technology for reducing CO emissions from the CTs. According to the application, the resulting cost effectiveness was found to be $4,240/ton of CO removed. The annual operating costs included $214,193 for a heat rate penalty (0.2 percent of the megawatt (MW) output.) It is unclear if this value is based on a set dollar per kW of lost sales or based on the cost of additional natural gas to make up for the 0.2 percent loss in MW output. The applicant should provide a better explanation of how this number was calculated. Please note that we do not consider it appropriate to calculate a heat rate penalty based on lost sales. It should be calculated based on the cost of enough natural gas to make up for any loss in MW output. The annual heat rate penalty contributes $1,462/ton of CO removed to the total cost effectiveness. Consequently, any reduction in the heat rate penalty will make a significant difference in the cost effectiveness of catalytic oxidation. Finally, it should be noted that catalytic oxidation has the added advantage of controlling VOC emissions, including volatile organic hazardous air pollutants.

If you have any questions regarding these comments or need additional information, please contact Katy Forney at 404-562-9130.

Sincerely,

Gregg M. Worley,
Chief
Air Permits Section

cc: D. Nelson
J. Settle, SED
P. Wong, DERM
B. Caron, DEP
G. Bennyd, NPS
K. Kanby, Golder

Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

November 19, 2003

Mr. John Bunyak, Chief
Air Quality Division
U.S. National Park Service
Post Office Box 25287
Denver, Colorado 80225

Re: FPL Turkey Point Plant
1150 MW Combined Cycle Project
PSD-FL-338

Dear Mr. Bunyak:

Enclosed for your review and comment is an application for the Florida Power & Light (FPL) Turkey Point Unit 5 Project. The site is near the extreme southeast of the peninsula near Florida City, Miami-Dade County. The nearest boundary of the Everglades National Park is approximately 21 kilometers west of the plant. This project will be comprised of four dual fuel GE 7FA combustion turbines with supplementary-fired heat recovery steam generators and a single steam electrical generator. The project will have a nominal generating capacity of 1,150 megawatts (MW net).

Dry Low NO_X (DLN) combustion, Selective Catalytic Reduction (SCR) and use of inherently clean natural gas are the main pollution control measures. Water injection, SCR and use of the new *ultra low* sulfur (0.0015% sulfur) are the main measures when using backup fuel oil.

The applicant proposes NO_X emissions of 2.5 ppmvd while burning natural gas delivered by the interstate pipeline network. For reference the New Source Performance Standard is approximately 108 ppmvd of NO_X. They propose 10 ppmvd of NO_X while burning the new diesel fuel for 500 hours or less per year.

The applicant's estimates of annual emissions of pollutants subject to PSD review are listed in the following table:

Pollutant	Proposed Project Emissions (tons per year)
NO_X	387
SO_2	191
CO	681
H_2SO_4 Mist	19
PM/PM_{10}	23
VOC	7

Emissions of the key pollutants with respect to Air Quality Related Values are expected to be approximately 625 tons per year. The pollutant loading will be much less than the some of the new, but smaller, projects near Class I areas in other states that have been reported to be of concern to the Park Service and EPA. The applicant's conclusion is that the project is "unlikely to cause adverse visibility impairment in the Everglades National Park." Their finding is premised on the very low probability of occurrence of the meteorological factors that give rise to any meaningful effects, coupled with the low probability of using the backup *ultra low* sulfur fuel oil at the same time those factors would occur.

We have already had two teleconferences with FPL and the Park Service air experts about the project and discussed some of the scenarios and preliminary findings. We look forward to continuing those discussions now that a specific scenario has been proposed in an application. Please let us know of any information requests as soon as possible and we will quickly pass them on to the applicant.

I will be the general contact as well as the contact on air pollution control. Our other contacts are Cleve Holladay (850/921-8986) on matters related to visibility and Debbie Nelson (850/921-9537) on matters related to the ambient standards and increments. If you have any questions, please call me at 850/921-9523.

Sincerely,

Patty Adams

for A. A. Linero, P.E. Administrator
New Source Review Section

AAL/al

Enclosure

Cc: Maureen Finnerty, Everglades Superintendent w/o Enclosure

Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

November 19, 2003

Mr. Gregg Worley, Chief
Air Permitting Section
U.S. EPA Region 4
61 Forsyth Street
Atlanta, Georgia 30303

Re: FPL Turkey Point Plant
1150 MW Combined Cycle Project
PSD-FL-338

Dear Mr. Bunyak:

Enclosed for your review and comment is an application for the Florida Power & Light (FPL) Turkey Point Unit 5 Project. The site is near the extreme southeast of the peninsula near Florida City, Miami-Dade County. The nearest boundary of the Everglades National Park is approximately 21 kilometers west of the plant. This project will be comprised of four dual fuel GE 7FA combustion turbines with supplementary-fired heat recovery steam generators and a single steam electrical generator. The project will have a total nominal generating capacity of 1,150 megawatts (MW net).

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The applicant proposes NO_X emissions of 2.5 ppmvd while burning natural gas delivered by the interstate pipeline network. For reference the New Source Performance Standard is 108 ppmvd of NO_X. They propose 10 ppmvd of NO_X while burning the new diesel fuel for 500 hours or less per year.

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CO	681
H_2SO_4 Mist	19
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VOC	7

Emissions of the key pollutants with respect to Air Quality Related Values are expected to be approximately 625 tons per year. The pollutant loading will be much lower than some of the recent new, but smaller, projects near Class I areas that have been reported to be of concern to the Park Service and EPA. Please send your comments to my attention at the letterhead address (fax: 850/922-6979). If you have any questions, please call me at 850/921-9523.

Sincerely,

Patty Adams

for A. A. Linero, P.E. Administrator
New Source Review Section

AAL/al

Enclosure

Florida Power & Light Company, Environmental Services Dept., P.O. Box 14000, Juno Beach, FL 33408

FPL

November 14, 2003

Hamilton S. Oven, P.E., Administrator
Office of Siting Coordination
Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Turkey Point Expansion Project
Application for Site Certification

Dear Mr. Oven:

Florida Power & Light Company (FPL) is pleased to submit to the Department its Application for Site Certification (SCA) for the Turkey Point Expansion Project, pursuant to the Florida Electrical Power Plant Siting Act and Florida Administrative Code Rule 62-17.051(1)(d). Also enclosed is FPL Check No. 0660495 made payable to the Department in the amount of $125,000.00 and provided as the application fee pursuant to Florida Administrative Code 62-17.051(2). At this time, we are providing 14 copies of the Application, with 4 of those copies being sent by copy of this letter to the Department's Southeast District Office in West Palm Beach. Upon the Department's determination that the Application is complete, FPL will distribute the Application to the other required recipients.

The SCA addresses the environmental and socioeconomic aspects of the Turkey Point Expansion Project by presenting information in accordance with the Department's "Instruction Guide for Certification Application", DEP Form 62-1.211(1).

FPL looks forward to working with the Department and other interested agencies in the certification process. If you should have any questions regarding our Application, please do not hesitate to call me at 561-691-2216.

Sincerely,

Barbara P. Linkiewicz

Barbara P. Linkiewicz
Environmental Licensing Manager

cc: Mr. Timothy Gray, FDEP Southeast District Office (4 copies)