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April 9, 2007

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Bureau of Air Regulation, South Permitting Section
Florida Department of Environmental Protection
111 South Magnolia Street
Tallahassee, Florida 32399

Attn: Mr. A. A. Linero, Program Administrator

RE: FPL Glades Power Park
DEP File No. 0430017-001-AC, PSD-FL-385
April 4, 2007 NPS Comments

Dear Mr. Linero:

On behalf of Florida Power & Light Co. (FPL) and as the engineer-of-record for the Air Construction/Prevention of Significant Deterioration (PSD) Permit Application, this correspondence provides information to further address the points listed in the April 4, 2007 cover letter from the National Park Service (NPS). In the full context of the NPS comments, the information requested is not necessarily related to completeness of the Air Construction/PSD Permit Application. Rather, the NPS letter and attachment are actually comments that would be related to the permit conditions that the Florida Department of Environmental Protection (FDEP) would ultimately issue as a draft Air Construction/PSD Permit. Nonetheless, additional information is being provided for the items listed in the cover letter that further supports information submitted previously.

NPS 1) PM_{10} emission issues:

- **Emission limit for use in air quality modeling analyses, including both filterable and condensable portion of PM_{10} emissions.**
- **Explanation of why the facility cannot meet a filterable PM_{10} limit of 0.010 lb/MMBtu on a 24-hour basis.**

The filterable and condensable PM from FGPP was properly accounted for in the air modeling analyses submitted to FDEP. The filterable PM emission limit proposed by FPL for FGPP is 0.013 lb/MMBtu. The PM and PM_{10} emission limit for filterable material from FGPP is proposed on a 3-hour stack test basis. For sulfuric acid mist (SAM), which is the primary condensable that is emitted from the FPL Glades Power Park (FGPP), an emission limit of 0.004 lb/MMBtu is proposed. The air modeling analyses performed for FGPP included filterable PM and SAM as a condensable PM. In addition, an emission rate of 0.001 lb/MMBtu was used to account for potential organic condensable PM. Therefore, the total PM, which would include filterable and condensable PM, used in the air quality modeling analyses was equivalent to an emission rate of 0.018 lb/MMBtu.

The April 4, 2007 letter from the NPS suggests that the speciation should be developed using information posted on the NPS website: http://www2.nature.nps.gov/air/permits/ect/ectCoalFiredBoiler.cfm.

The information referenced and contained in the website was developed using U.S. Environmental Protection Agency (EPA) AP-42 emission factors, which are used when no specific information is

available. In addition, information in the NPS AP-42 emission factors spreadsheet does not include the suite of air quality control systems proposed for FGPP. The technical comparison of air quality control systems closest to that proposed for FGPP that could be used for developing particulate speciation is the NPS AP-42 emission factors spreadsheet for a pulverized coal fired unit with a fabric filter and wet flue gas desulfurization (FGD). In contrast, FGPP will also include both sorbent injection and a wet electrostatic precipitator (WESP) specifically designed to reduce both filterable and condensable PM. The difference in controls from that listed in the NPS AP-42 emission factors spreadsheet and those proposed for FGPP was acknowledged by both the NPS and FDEP during recent discussions on April 2, 2007. Indeed, sorbent injection and WESP are designed to achieve an emission rate of SAM of 0.004 lb/MMBtu, which is an order of magnitude lower than that calculated in the AP-42 emission factors spreadsheet for using only a fabric filter and wet FGD. The overall removal of condensable PM using sorbent injection and WESP will be 90 percent or greater. Using the NPS AP-42 emission factors spreadsheet and inputting FGPP information, the condensable PM emission rate after considering the additional controls of sorbent injection and WESP compares favorably with the 0.004 lb/MMBtu emission rate proposed for SAM and the 0.001 lb/MMBtu emission rate used for organic condensable PM. The use of a 0.001 lb/MMBtu emission rate for organic condensable PM is also supported by the NPS AP-42 emission factors spreadsheet based on the expected ratio between inorganic and organic condensable PM. The NPS AP-42 emission factors spreadsheet indicates that 80 percent of the condensable PM will be inorganic and 20 percent organic. The use of 0.004 lb/MMBtu for the primary condensable PM and 0.001 lb/MMBtu for organic condensable PM is in the same ratio (i.e., 80/20).

The PM and PM_{10} emission limit for filterable material proposed for FGPP is 0.013 lb/MMBtu and is consistent with recent FDEP determinations. This is the same emission limit proposed as best available control technology (BACT) by FDEP in 2006 for the recent Seminole Generating Station Unit 3 Project (PSD-FL-375; FDEP File 1070025-005-AC).

A limit of 0.013 lb/MMBtu on a 3-hour stack test was used as the emission rate in the air modeling for the 24-hour averaging time. This assumption results in conservative modeling predictions. In addition, a slightly higher value for a 3-hour stack test is considered equivalent to a slightly lower emission limit on a 24-hour basis. Therefore, a 24-hour emission limit is not necessary.

NPS 2) Cumulative Class I increment analysis issues:

- **Rationale for sources included in the analysis.**
- **Rationale for the method used to determine changes in emissions from existing sources.**
- **Rationale for determination of baseline emissions.**

The emissions inventory for FGPP was developed based on the June 20, 2006, air modeling protocol submitted to FDEP to address PSD Class I modeling and the comments received from the NPS in July 2006. It should be noted that the April 4, 2007, letter from the NPS addresses many more items than previously commented on by the NPS in July 2006 regarding the protocol and in their January 18, 2007 comment letter on the PSD application.

The emissions inventory used in the modeling was based on an inventory of sulfur dioxide (SO_2), nitrogen oxides (NO_x), and PM-emitting facilities obtained from the FDEP in September 2006. First, a list of all SO_2 emitting facilities was compiled. Facilities were included or excluded from the inventory based on the following criteria:

(1) An approximate central location of the Everglades National Park (NP) was chosen, which is almost 50 kilometers (km) from the northeast and the east edges of the park and 75 km from the northwest edge. The distances of all the sources were measured from this approximate center location, and all PSD increment-consuming sources located 275 km or less from the center were included. Since the farthest edge of the park is 75 km from the center, a source located more than 275 km from the center is more than 200 km from the edge of the park.

(2) PSD increment sources that were found to be located between 200 and 275 km from the approximate center were checked for their exact distance from the nearest park boundary and were included if they were found to be located 200 km or less from the boundary. The exact distances from the nearest boundary were measured graphically after plotting all the sources and the Everglades NP.

(3) Next, the PSD increment-consuming sources located beyond 50 km from the Everglades NP boundary, but with potential emissions of less than 10 tons per year (TPY), were excluded.

(4) Finally, PSD increment-consuming sources located within 50 km of the Everglades NP boundary but with potential emissions of less than 1 TPY were excluded.

The remaining list had 70 sources with more than 200 stacks. From this list, sources that were included in other inventories developed over the last 15 years for other PSD permit applications that addressed PSD Class I increment consumption were included in the modeling analysis.

Once a list of sources to be included in modeling was finalized, detailed stack parameters were compiled from other project inventories, the FDEP inventory, and in some cases, from recent permit applications. Potential emission rates, obtained from the current Title V permits, were used for all PSD increment-consuming sources. For SO_2 emission rates, only hourly (24-hour average) emission rates were used. If the emissions unit had no permit emission limit, emission rates were calculated using AP-42 emission factors. If available, emission rates were taken from the recent PSD permit applications.

Some examples are provided below.

Examples of Emission Rates Used in Modeling

Source: FPL Turkey Point Unit 5

This is a PSD increment-consuming source and the potential emissions were used in the modeling analysis. Emission rate was taken from PSD permit application for FPL Turkey Point expansion project dated November 2003.

> **Emission scenario:** Baseload, natural gas-fired, 35 F, duct-firing case.
>
> **Emission rate of 1 combustion turbine (CT):** 13.2 pounds per hour (lb/hr) or 1.67 gallons per second (g/s).
>
> **Emission rate of 4 CTs:** 1.67 g/s x 4 = 6.68 g/s

Source: Lake Worth Utilities

This source has both baseline and PSD increment-consuming emissions units. Unit Nos. 3 and 4 are baseline units with commercial operation dates of 1966 and 1970, respectively. Unit No. 5 and CT No. 1 are increment-consuming units with commercial operation dates in 1978 and 1976, respectively. An example for CT No. 1 follows.

> **Emission rates for CT No. 1:** Emission rate calculated using AP-42 Tab 1.3-1 and 0.35 %S No. 2 fuel oil. Heating value of No. 2 fuel oil assumed as 140 MMBtu/thousand gallons. CT No. 1 is limited to a heat input rate of 435 MMBtu/hr. Emission rate = 435 MMBtu/hr x 157 x 0.35 x 1/140 = 170.7 lb/hr.

The emission inventory used for FGPP was based on previous inventories that were used for numerous projects where the SO_2 impacts in the Everglades NP exceeded the Class I significant impact levels and a cumulative impact analysis was required. These projects were reviewed by the FDEP and NPS in determining if the specific project would comply with the PSD Class I Increments. This review included the recent Turkey Point Unit 5 Project, which was located within 21 km of the Everglades NP and received approval from FDEP. In fact, the maximum impacts from FGPP are not substantially different that those of Turkey Point Unit 5 as shown below. The maximum SO_2 impacts for Turkey Point Unit 5 were based on gas firing.

- **Maximum SO_2 Impacts of Turkey Point Unit 5:** 0.037 micrograms per cubic meter ($\mu g/m^3$) (annual) 0.38 µg/m3 (maximum 24-hour) and 1.76 $\mu g/m^3$ (maximum 3-hour)
- **Maximum SO_2 Impacts of FGPP:** 0.015 $\mu g/m^3$ (annual) 0.42 $\mu g/m^3$ (maximum 24-hour) and 2.61 $\mu g/m^3$ (maximum 3-hour)

Changes in actual emissions from the baseline date to present for existing sources was previously evaluated in other modeling studies conducted by Golder Associates Inc. staff from the early 1980s to present. The major existing SO_2 sources in the southern Florida region are the FPL power plants. These existing plants include Turkey Point (Units 1 and 2), Port Everglades (Units 1-4), Riviera (Units 3 and 4), Martin (Units 1 and 2), and Cutler (Units 5 and 6). These plants have primarily used the same sulfur content residual fuels since the baseline date due to New Source Performance Standards (NSPS) requirements in the case of the Martin Plant or requirements or agreements with the local governments (e.g., Broward and Miami-Dade Counties) as is the case with the Turkey Point and Port Everglades plants. In the mid-1970s, the Turkey Point, Port Everglades, and Riviera plants were primarily operated as baseload plants. Currently, all of these plants are operated as cycling

plants with much lower residual oil usage and capacity factors. This is demonstrated in Table Baseline-Present that shows the fuel usage and capacity factors for these plants in 1975 and 2006. As shown in this table, the residual fuel usage and capacity factors have reduced significantly since the baseline date. These reductions were not included in the modeling in order to provide conservative modeling analyses. In addition, there are several increment expanding units that have not been accounted for in the inventory used in the modeling, also in an effort to keep the predicted impacts analysis conservative. Riviera Plant Units 1 and 2 and Cutler Plant Units 3 and 4 are now retired; but, in 1975, these units used considerable quantities of residual oil. Cutler Plant Units 5 and 6 are operated only for system stability using natural gas. These units used over 200,000 barrels of residual oil in 1975. Martin Plant Units 1 and 2 are residual oil and natural gas fired units that were under construction during the baseline date, and the potential emissions from these units are included in the PSD baseline. Currently, these units are operated at only a 34.83 percent capacity factor and would expand the PSD increment. The FPL Fort Myers and Lauderdale plants were the only plants where increment-expanding emissions were considered. Lauderdale Plant Units 4 and 5 and Fort Myers Plant Units 1 and 2 were repowered with natural gas-fired combustion turbines and heat recovery steam generators. The emissions reductions from the steam generating existing units were accounted for in the emissions inventory.

To further support the emissions inventory utilized, air quality data in the vicinity of and within the Everglades NP was reviewed from the baseline date to the latest data available. The data from nearby monitoring stations in Miami-Dade County are shown in Figures NPS 2-1, 2-2, and 2-3 that present maximum (2^{nd} highest) measured 3-hour, maximum (2^{nd} highest) measured 24-hour, and annual average SO_2 concentrations, respectively. Figures NPS 2-4 and 2-5 present the measured 24-hour and annual average SO_2 concentrations, respectively. These data suggest that there were no significant changes in the maximum SO_2 concentrations in Miami-Dade County and within the Everglades NP since the PSD baseline dates.

To evaluate potential increases in SO_2 from mobile sources, information on fuel usage from the minor source baseline date (December 27, 1977) to the present were reviewed using data from Florida Statistical Abstract 2005 (Bureau of Economic and Business research, Warring College of Business, University of Florida). During this period, there was a 62-percent increase in the use of motor fuels. During the same period, there was a substantial decrease in sulfur content of diesel fuel, the primary fuel with relatively high-sulfur content. Prior to the early 1990s and the baseline date, the sulfur content in diesel fuel was 0.5 percent. In the early 1990s, the sulfur content was reduced by EPA regulation to 0.05 percent. Starting in 2007, the sulfur content of diesel fuel was reduced to 0.0015 percent, which is comparable to gasoline. This makes possible the use of particulate filters and catalysts to reduce NO_x, carbon monoxide (CO), and VOC from new diesel trucks starting with the 2007 model year. The reduction in the sulfur content from the baseline date to present suggests over a 3-fold reduction in SO_2 emissions from mobile diesel sources, despite the increased utilization.

The decrease in SO_2 from mobile and area sources is supported by the recent VISTAS emissions inventory. Tables SO2-2002 and SO2-2009 present the SO_2 emissions for industrial, commercial, and institutional sources, highway and off-highway sources, and miscellaneous sources in southern Florida counties. As shown, the estimated SO_2 emissions from these sources in 2002 is 280,155 TPY; while in 2009, the SO_2 emissions are estimated as 94,188 TPY. This is a decrease of about 186,000 TPY. The decrease in highway and off-highway sources is about 17,000 TPY. The SO_2 emissions decrease in Miami-Dade and Monroe Counties (the location of the Everglades NP) is about 12,700 TPY. In contrast, the maximum potential SO_2 emissions from FGPP are 3,048 TPY and located over 100 km from FGPP. These data clearly suggest a decrease in minor and mobile sources that would expand the increment from the baseline date.

The maximum SO_2 impacts of FGPP within the Everglades NP are low compared to the PSD Class I increments. While the PSD Class I significant impact levels (SILs) are exceeded by FGPP as shown in the Air Construction/PSD Permit Application and PSD Completeness Responses, the frequency of impacts above the PSD Class I SILs are low. A review of the modeling analysis over the 3 years evaluated indicates that the PSD Class I SILs are exceeded only between 4 to 13 days (24-hour periods) per year. Therefore, from 96 to 99 percent of the time the maximum SO_2 24-hour impacts of FGPP in the Everglades NP are below the SILs.

As explained above, the inventory was based on the use of potential emissions from PSD Increment sources. This assumption provides conservative modeling estimates since actual emissions would be expected to be lower. Minor sources were also included as shown on the inventory listing. Sources with emissions as low as several tons/year were included. The FGPP emissions inventory was built on information submitted for previously approved projects where the impacts are not substantially different from FGPP. SO_2 emissions from industrial, commercial, and institutional sources, highway and off-highway sources, and miscellaneous sources suggest decreases from the baseline data, thus expanding the increment. These reductions were not included in the modeling analysis, indicating the conservative nature of the analysis. The air quality monitoring data support emission inventory used in the PSD Class I Increment analysis, since it demonstrates that there are no significant changes of SO_2 concentrations near the Everglades NP.

Your consideration of this information is greatly appreciated. Please call me or Barbara Linkiewicz of FPL (561-691-7518), if you have any questions on this supplemental information.

Sincerely,

GOLDER ASSOCIATES INC.

Kennard F. Kosky, P.E.
Principal

Robert C. McCann
Principal

KFK/all

Cc: Ms. Barbara Linkiewicz, Director of Environmental Licensing, FPL
Mr. Dan Kimball, Superintendent Everglades National Park
Mr. Dee Morse, NPS Air Resources Division

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TABLE SO2-2002
SO2 EMISSIONS ESTIMATED FOR 2002
FOR REGION AROUND GLADES COUNTY
VISTAS DATA

County	SO2 Emissions (TPY)			
	Industrial, Commercial, Institutional	Highway, Off-Highway	Misc.	Total
Brevard	15,532	1,283	123	16,938
Broward	27,761	3,809	97	31,667
Charlotte	87	456	95	638
Collier	341	613	185	1,139
DeSoto	46	76	0	122
Glades	3	68	32	103
Hardee	52	75	2	129
Hendry	348	94	37	479
Highlands	1,209	193	50	1,452
Hillsborough	67,661	5,130	5	72,796
Indian River	123	326	8	457
Lee	606	1,320	10	1,936
Manatee	29,371	931	16	30,318
Martin	16,328	465	15	16,808
Miami-Dade	22,378	3,150	151	25,679
Monroe	166	327	108	601
Okeechobee	19	104	64	187
Osceola	331	586	173	1,090
Palm Beach	13,346	2,356	26	15,728
Pinellas	24,849	1,417	0	26,266
Polk	32,817	931	116	33,864
Sarasota	362	743	38	1,143
St. Lucie	110	501	4	615
Total	253,846	24,954	1,355	280,155

Source: FDEP 2007

TABLE SO2-2009
SO2 EMISSIONS ESTIMATED FOR 2009
FOR REGION AROUND GLADES COUNTY
VISTAS DATA

County	SO2 Emissions (TPY)			
	Industrial, Commercial, Institutional	Highway, Off-Highway	Misc.	Total
Brevard	416	344	124	884
Broward	7,673	1,525	153	9,351
Charlotte	88	120	98	306
Collier	343	92	188	623
DeSoto	24	11	2	37
Glades	3	11	49	63
Hardee	14	9	7	30
Hendry	312	15	45	372
Highlands	89	27	50	166
Hillsborough	28,472	2,940	11	31,423
Indian River	98	48	18	164
Lee	380	226	21	627
Manatee	353	302	40	695
Martin	1,955	70	40	2,065
Miami-Dade	11,924	1,138	216	13,278
Monroe	157	52	65	274
Okeechobee	19	16	210	245
Osceola	95	84	146	325
Palm Beach	4,207	346	67	4,620
Pinellas	641	272	1	914
Polk	26,758	128	115	27,001
Sarasota	360	108	57	525
St. Lucie	113	73	14	200
Total	84,494	7,957	1,737	94,188

Source: FDEP 2007

TABLE BASELINE-PRESENT
FUEL USAGE AND CAPACITY FACTORS FOR FPL
KEY POINT, PORT EVERGLADES, AND RIVIERA PLANTS; 1975 AND

	Turkey Point	Port Everglades	Riviera
1975			
Heat Input			
Oil (MMBtu/hr)	31,977,365	40,314,352	19,244,213
Gas (MMBtu/hr)	12,239,620	25,737,648	16,439,321
Total	44,216,985	66,052,000	35,683,534
Capacity Factor	69.70%	65.70%	59.80%
2006			
Heat Input			
Oil (MMBtu/hr)	9,729,974	17,813,705	10,855,960
Gas (MMBtu/hr)	15,399,663	16,932,864	9,877,375
Total	25,129,637	34,746,569	20,733,335
Capacity Factor	35.31%	31.94%	40.97%

FIGURE NPS 2-1
MEASURED 3-HOUR AVERAGE SO_2 CONCENTRATIONS
(2nd Highest Values)
Miami-Dade County

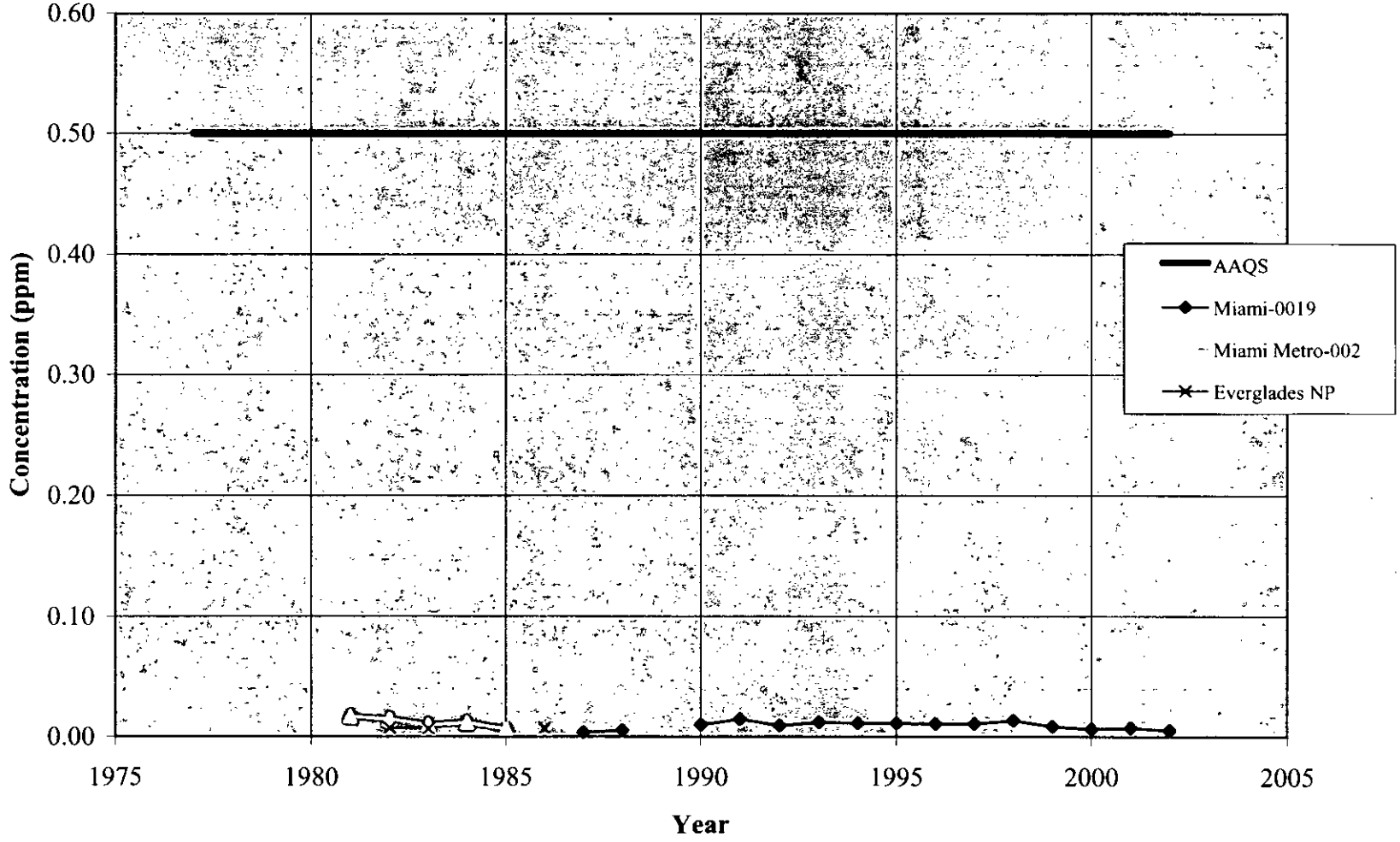

FIGURE NPS 2-2
MEASURED 24-HOUR AVERAGE SO_2 CONCENTRATIONS
(2nd Highest Values)
Miami-Dade County

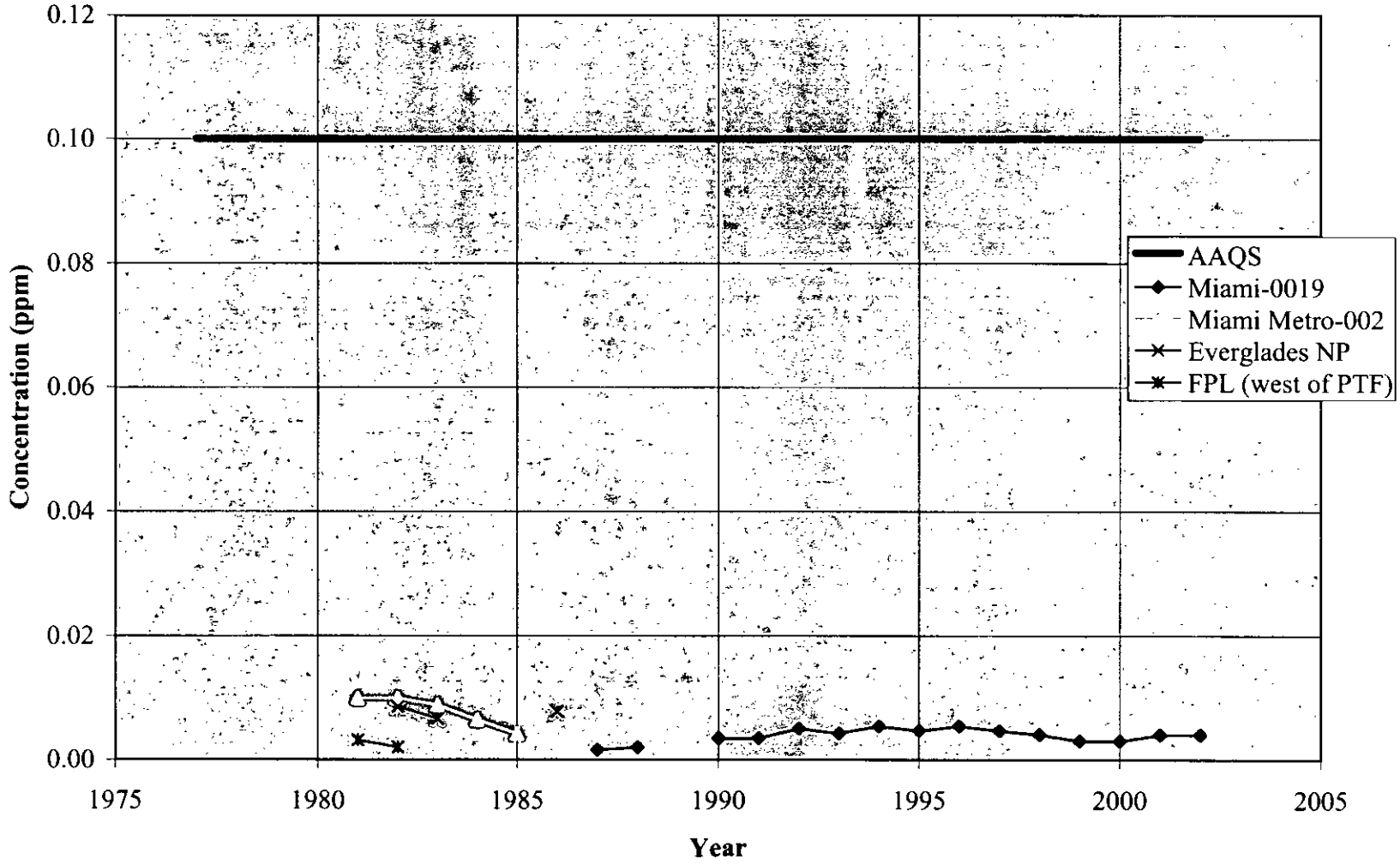

FIGURE NPS 2-3
MEASURED ANNUAL AVERAGE SO_2 CONCENTRATIONS
Miami-Dade County

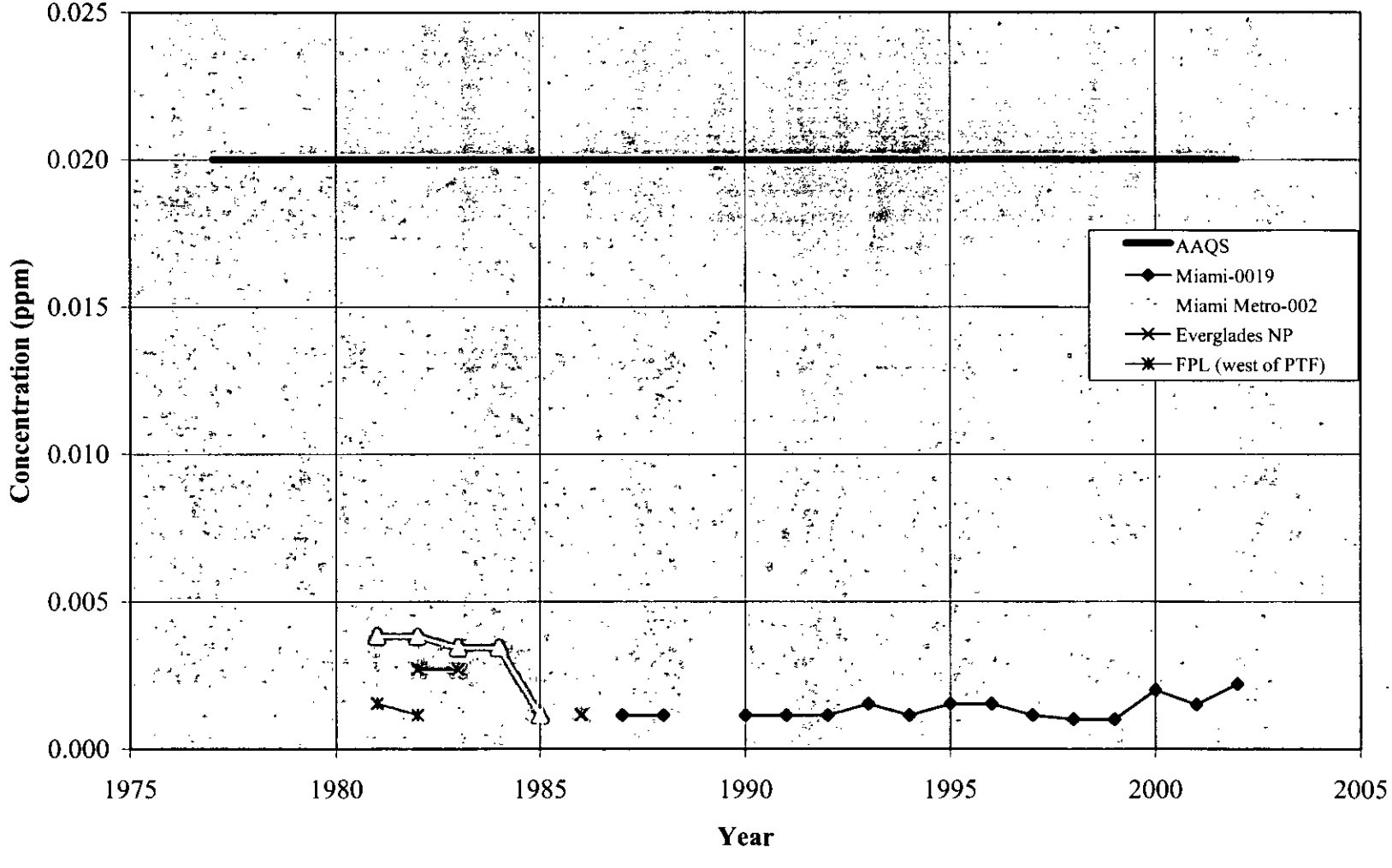

FIGURE NPS 2-4
MEASURED 24-HOUR AVERAGE SO_2 CONCENTRATIONS
(2nd Highest Values)
Everglades National Park

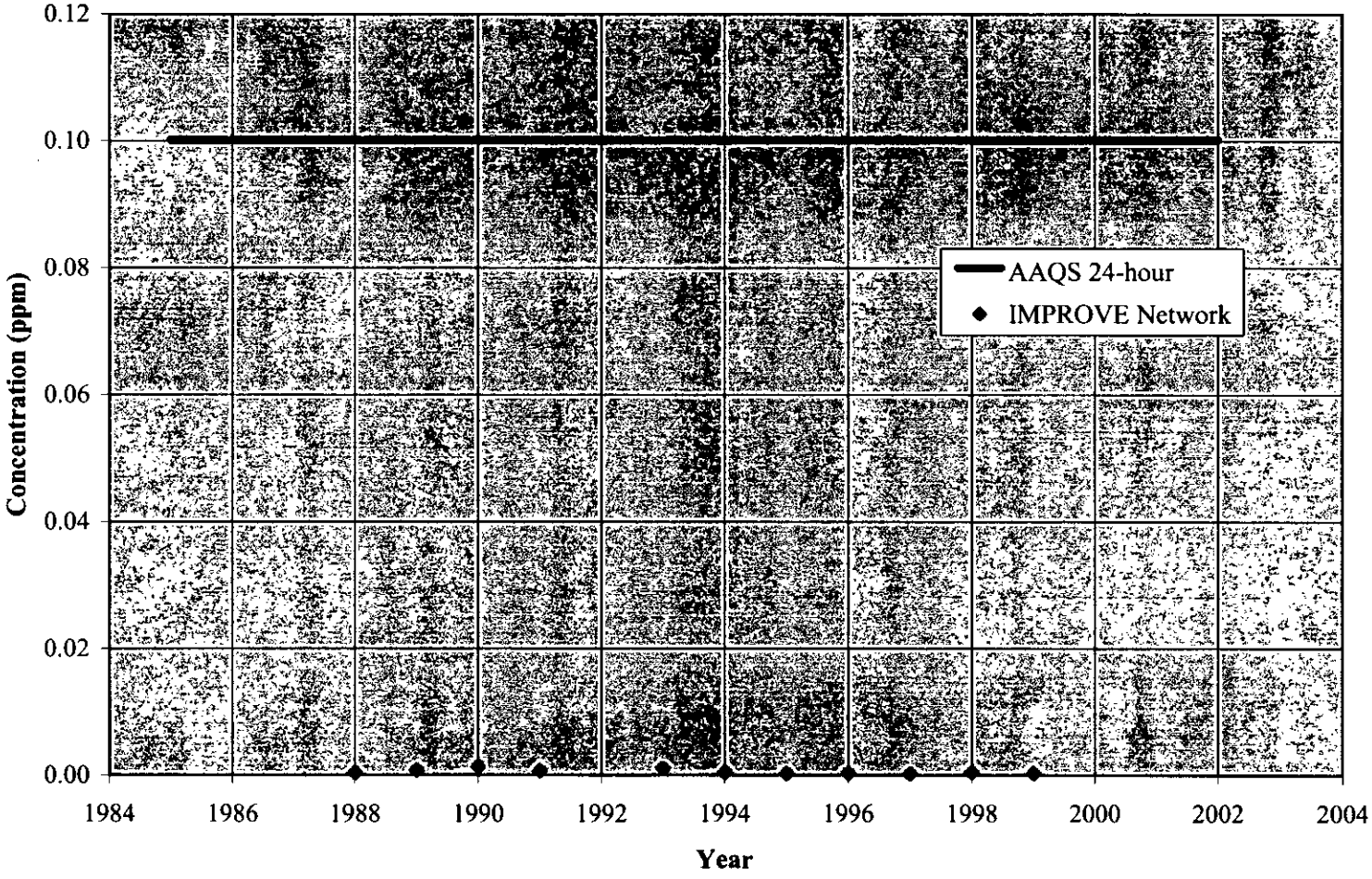

FIGURE NPS 2-5
MEASURED ANNUAL AVERAGE SO_2 CONCENTRATIONS
Everglades National Park