FPL

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

RECEIVED
NOV 25 1996
BUREAU OF
AIR REGULATION

November 18, 1996

Mr. Tom Tittle
Environmental Manager
State of Florida
Department of Environmental Protection Southeast District
P.O. Box 15425
West Palm Beach, FL 33416

Re: FPL Lauderdale Plant
<u>Operation below Steam Injection Curve</u>

Dear Mr Tittle:

This correspondence is to follow up our recent telephone conversations regarding the steam injection system at the Lauderdale facility. As we discussed, the plant experienced an unavoidable malfunction of a valve associated with the feedwater system on unit 5. The result of this malfunction was that the unit is unable to maintain the steam-to-fuel ratio established during the initial startup testing. However, the unit is still able to comply with the NOx emission rate of 264 lb/hour (@75°F). Plant personnel have informed me that they expect to have the failed component replaced by Sunday, November 24th; at that time they will resume using their normal steam-to-fuel curve. The plant will adhere to Best Operational Practices during this time, and as always.

Please note that this equipment failure is not associated with poor operational or maintenance practices.

As always, if you have any questions, please do not hesitate to call me at (561) 625-7661.

Sincerely,

Richard Piper

Richard Piper
Senior Environmental Specialist
Florida Power & Light Company

cc:

Robert Wong Broward County DNRP
Al Linero FDEP / DARM

B. File

Department of
Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

July 10, 1996

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Richard Piper
Environmental Specialist
Florida Power and Light Company
Post Office Box 088801
North Palm Beach, Florida 33408-8801

Dear Mr. Piper:

Re: FPL Lauderdale Plant - PSD Permit Amendment
Rate of Operation During Compliance Testing
0110037-001-AC, PSD-FL-145

The Department has reviewed your request of March 28 to incorporate Guidance DARM-EM-05, "Rate of Operation During Compliance Testing for Combustion Turbines (attached)," into the PSD permit applicable to the FPL Lauderdale Power Plant. The permit is amended as follows:

Condition 23 (New)

23. Testing of emissions shall be conducted with the source operating at capacity. Capacity is defined as 95-100 percent of the manufacturer's rated heat input achievable for the average ambient (or conditioned) air temperature during the test. If it is impracticable to test at capacity, then sources may be tested at less than capacity. In such cases, the entire heat input vs. inlet temperature curve will be adjusted by the increment equal to the difference between the design heat input value and 105 percent of the value reached during the test. Data, curves, and calculations necessary to demonstrate the heat input rate correction at both design and test conditions shall be submitted to the Department with the compliance test report.

A copy of this amendment letter shall be attached to and shall become a part of Permit PSD-FL-145.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

for Howard L. Rhodes, Director
Division Air Resources Management

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this **PERMIT AMENDMENT** was mailed by certified mail to the addressee and that all copies were mailed by non-certified mail to the listed persons before the close of business on July 16, 1996.

FILING AND ACKNOWLEDGMENT
FILED, on this date, pursuant to Chapter 120.52(11), Florida Statutes, with the designated Deputy Clerk, receipt of which is hereby acknowledged.

Clerk 7-16-96 Date

Copies furnished to:

J. Harper, EPA
J. Bunyak, NPS
B. Oven, DEP
I. Goldman, SED
D. Banu, BCDNRP

10-28-93

Alex,

I need the stack parameters for FPL Lauderdale project (PSD-FL-145).

No. of stacks, stack height, diameter, acfm, dcfm, temperature.

I understand you did the modeling check for this application.

Do you have this information?

AIR030 50 BR0060007735

Willard

Unit 4 & 5, each consists of two CTs and HRSGs. Each CT is served by a single HRSG, exausting to an individual stack. Therefore, there are 4 stacks serve unit 4 & 5. The CTs are capable of firing either natural gas or No. 2 distillate fuel oil.

There are 24 GTs. No information was given about the # of stacks and capacity.

Unit	Stack height (ft)	Stack diam (ft)	Exit vel (ft/sec)	Exit Temp.	acfm	dcfm
CT/HRSG	150	18	78.3*/69.7**	280	1,195,331* / 1,064,768**	N/A
GT	43.5'	18	70	860	N/A	N/A

* No. 2 oil at 40°F

** No. 2 oil at 95°F

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

FPL

RECEIVED
AUG 20 1993
DEPT. OF ENV. PROTECTION
WEST PALM BEACH

RECEIVED
OCT 22 1993
Division of Air
Resources Management

August 18, 1993

Mr. Thomas Tittle, Environmental Manager
State of Florida
Department of Environmental Protection
Southeast Florida District
P. O. Box 15425
West Palm Beach, Florida 33416

RE: FPL Lauderdale Project
<u>PSD Permit FL-145 PA 89-26</u>

Dear Mr. Tittle:

On March 12, 1993, FPL requested modifications to both the Power Plant Site Certification and the PSD Permit for the Lauderdale Plant (Lauderdale Repowering Project). The modifications addressed two items. The first item was to reallocate fuel (MMBtu) from the duct burners to the CT's until such time as the duct burners were installed. The second item was to revise the SO_2 emissions based upon new data on the sulfur content of the natural gas. Also FPL requested that the Site Certification be conformed to match the 25 percent limit on oil that was in the PSD Permit.

On June 2, 1993, the Department completed its technical review of the modifications and sent its recommendations to EPA for final issuance of The PSD permit revision. This was necessary since EPA has not returned delegation to the Department to issue/modify PSD Permits associated with certified sites under the Power Plant Siting Act (Chapter 403 FS). On July 19, 1993, EPA issued the revision of the PSD Permit as proposed by FPL. On August 2, 1993, the Secretary of the Department issued the final order modifying the Site Certification.

In accordance with the customized fuel monitoring schedule which was approved by EPA on April 8, 1993, FPL is required to obtain data on the sulfur content of the natural gas twice a month. FPL started collecting the data on April 27, 1993. A summary of the data collected to date is shown on Attachment A. There are 3 values which when calculated to SO_2 indicate a slight exceedance from the original permit limit but are well below the current permitted limit. The worst case SO_2 value was 1.71 lb/hr. It should noted that only one exceedance occurred prior to the date the Department issued its technical review of the proposed conditions.

If you have any questions please call me at 625-7661.

Sincerely,

Daniel M. MacDougall
Florida Power & Light Company

DMM:jm
Enclosure

cc: Broward County Office of Natural Resource Protection
081293.pfl

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RECEIVED
AUG 20 1993
DEPT. OF ENV. PROTECTION

ATTACHMENT "A"

DATE	Sulfur (grains/1000cf)	lb/hour
4/27/93	1.9	0.88
5/11/93	2.3 15%	1.06
5/19/93	1.4	0.65
6/1/93	1.6	0.74
6/2/93	DEP technical review issued	
6/15/93	2.6	1.20
6/29/93	2.8	1.29
7/6/93	1.8	0.83
7/19/93	EPA approved changes	
7/27/93	3.7	1.71
8/2/933	DEP approved changes	

NOTE[1]: The permitted value of 0.97 lb/hr SO_2 was based on 2 grains sulfur per 1000 of gas when the CT is firing at 1685 MMBtu/hr. The current permit limit of 4.9 lb/hr SO_2 is based on 10 grains sulfur per 1000 of gas.

D.E.P. TEL:407 Oct 22 93 8:51 No.004 P.01

Florida Department of
Environmental Protection

BEST AVAILABLE COPY

Lawton Chiles
Governor

Southeast District
P.O. Box 15425
West Palm Beach, Florida 33416

Virginia B. Wetherell
Secretary

FAX TRANSMITTAL LETTER

DATE 10/22/93 # OF PAGES 3
Including this one

FROM: SEFD

TO: Dianne Spangler

PERSON SENDING FAX:
LOU VALCARENGHI

FAX NUMBER: 904-922-6979

TRANSMITTAL ON A HITACHI/HIFAX/35

AGENCY: DARM

FAX NUMBER: 407/433-2666

IF ANY OF THE PAGES ARE NOT CLEARLY RECEIVED PLEASE CALL: 407/433-2650

COMMENTS: FPL Data requested

50BR0060037

Willard, 10/22
Tom Little couldn't find this source in APIS. Do you know anything about it?

Willard 10/26/93
Remember the Mirage Boiy we use to have here. He was asked to do Barry's projects and mine and I thought he did. Can you input the data? Sorry
Preston

10-26-93
Preston,
I don't think this permit was entered in APIS (PSD-FL-145). I was unable to update it when the permit was modified.
APIS UPDATED 11/5/93 FOR PSD-FL-145

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

4APT-AEB

JUL 19 1993

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

RECEIVED
JUL 26 1993
Division of Air
Resources Management

Mr. Charles D. Henderson
Environmental Licensing Project Manager
Environmental Affairs Department
Florida Power & Light Company
P. O. Box 088801
North Palm Beach, Florida 33408-8801

RE: Lauderdale Repowering Project (PSD-FL-145)

Dear Mr. Henderson:

The review of Mr. Daniel MacDougall's March 12, May 18, and May 26, 1993, letters requesting administrative changes to the conditions of the Prevention of Significant Deterioration permit (PSD-FL-145) issued to Florida Power & Light Company (FPL) on March 14, 1991, for the Lauderdale Repowering project has been completed. You requested that Specific Conditions 1 and 5 of the permit be revised to account for a higher sulfur content in the natural gas and to authorize the burning of all natural gas fuel permitted for this facility in the combustion turbines. The basis of your request is that the natural gas contains more sulfur than was originally estimated, that there is a delay in installing the duct burners, and that the combustion turbines can burn the natural gas permitted for the duct burners without any increase in emissions.

Based on the foregoing, it is determined that the proposed revision to the Specific Conditions 1 and 5 of PSD-FL-145 is acceptable and will not result in the increase in permitted annual emissions of any pollutant subject to the PSD regulations. As an administrative change, this revision will not require additional public participation procedures.

Authority to construct a stationary source was granted for the Florida Power & Light Company, Lauderdale Repowering Project, subject to the conditions contained in the permit to construct on March 14, 1991. This administrative change to PSD-FL-145 does not alter the commence construction deadline for the Lauderdale Repowering Project. This authority to construct is based solely on the requirements of 40 CFR §52.21, the federal regulations governing significant deterioration of air quality, and in no way affects the approvals under other federal or State regulatory authorities. Please be advised that a violation of any condition issued as part of this approval, as well as any construction which proceeds in material variance with information submitted in your application, may subject Florida Power & Light Company to an enforcement action.

Any questions concerning this administrative permit revision may be directed to Mr. Winston A. Smith, Director; Air, Pesticides, and Toxics Management Division at (404) 347-3043.

Sincerely,

Patrick M Tobin

Patrick M. Tobin
Acting Regional Administrator

Enclosure

cc: C. H. Fancy, FDER
T. Hanks,
G. Smallridge, OGC
B. Oven
D. Tittle, SE Dist.
A. Tinero, Broward Co.
P. Cunningham, HBG&S
CHF/PL

PSD-FL-145

PERMIT TO CONSTRUCT UNDER THE RULES FOR THE PREVENTION OF SIGNIFICANT DETERIORATION OF AIR QUALITY

Pursuant to and in accordance with the provisions of Part C, Subpart 1 of the Clean Air Act, as amended, 42 U.S.C. §7470 et seq., and the regulations promulgated thereunder at 40 C.F.R. §52.21, as amended at 45 Fed. Reg. 52676, 52735-41 (August 7, 1980),

Florida Power & Light Company
P. O. Box 088801
North Palm Beach, Florida 33408-8801

is hereby authorized to construct/modify a stationary source, specifically the Lauderdale Repowering Project, at the following location:

Florida Power & Light Company
Lauderdale Electric Utility Plant
Griffin Road
Dania, Florida

UTM Coordinates: Zone 17 580.1 km E, 2883.3 km N

Upon completion of this authorized construction and commencement of operation/production, this stationary source shall be operated in accordance with the emission limitations, sampling requirements, monitoring requirements and other conditions set forth in the attached Specific Conditions (Part I) and General Conditions (Part II).

The revisions to this permit shall become effective on the date signed below.

If construction does not commence within 18 months after March 14, 1991, or if construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable time, this permit shall expire and authorization to construct shall become invalid.

This authorization to construct/modify shall not relieve the owner or operator of the responsibility to comply fully with all applicable provisions of Federal, State, and Local law.

Patrick M Tobin

Patrick M. Tobin
Acting Regional Administrator

JUL 19 1993

Date Signed

The Specific Conditions of federal permit PSD-FL-145 shall be modified as follows:

FROM:

Specific Condition No. 1

The maximum heat input to each combustion turbine (CT) shall neither exceed 1,685.0 mmBTU/hr while firing natural gas, nor 1,646.9 mmBTU/hr while firing fuel oil (@ 75°F). Each CT's fuel consumption shall be continuously measured and recorded. The maximum heat input to each duct burner shall not exceed 90.62 mmBTU/hr. Each duct burner's fuel consumption shall be continuously measured and recorded.

Specific Condition No. 5

The maximum allowable emissions from each CT in accordance with the BACT determination shall not exceed the following emission limitations at 75°F:

Pollutant	Basis	Fuel	Emission Limitations			
			lbs/hr/CT	lbs/hr/DB	4 CT* (TPY)	4 DB+ (TPY)
NO_x	42 ppmvd	Gas	264	10.0		152
	65 ppmvd	Oil	422		4,716	
VOC	1 ppmvd	Gas	1.3	2.0		30.5
	6 ppmvd	Oil	7.8		48.3	
CO	30 ppmvd	Gas	89	17.6	1,405	268
	33 ppmvd	Oil	100			
PM/PM_{10}		Gas	14.7	0.7		10.7
		Oil	58.0		414	
SO_2		Gas	0.97	0.05		0.8
		Oil	538		1,582	

CT - Combustion Turbine
DB - Duct Burner

NOTES: * Refers to the maximum facility emissions (four CTs).
With capacity factor limitations of 25 percent on oil and 87 percent for the facility.
+ Refers to maximum duct burner emissions at 87 percent capacity factor.

NO_x emissions from duct burners are based on an as-fired emission limitation of 0.11 lbs/mmBTU.

Sulfur dioxide emission assume a maximum of 0.3 percent sulfur in fuel oil for hourly emissions and an average sulfur content of 0.2 percent for annual emissions.

TO:

Specific Condition No. 1

When the duct burners are installed, the maximum heat input to each combustion turbine (CT) shall neither exceed 1,685.0 mmBTU/hr while firing natural gas, nor 1,646.9 mmBTU/hr while firing fuel oil (@ 75°F). Each CT's fuel consumption shall be continuously measured and recorded. The maximum heat input to each duct burner shall not exceed 90.62 mmBTU/hr. Each duct burner's fuel consumption shall be continuously measured and recorded.

Until the duct burners are installed, the maximum heat input to each CT shall not exceed 1,775.62 mmBTU/hr while firing natural gas nor 1,646.9 mmBTU/hr while firing fuel oil (@ 75°F). Each CTs fuel consumption shall be continuously measured and recorded.

Specific Condition No. 5

The maximum allowable sulfur (total) content of the natural gas burned at this facility shall not exceed 10 grains per 1,000 cubic feet (gr/1000 CF). The permittee shall monitor the sulfur content of the natural gas by the customized fuel monitoring schedule approved by EPA. The sulfur content of the fuel oil shall not exceed a maximum of 0.3 percent and shall not exceed an average of 0.2 percent during any 12-month period.

The maximum allowable emissions from each CT in accordance with the BACT determination shall not exceed the following emission limitations at 75°F:

MAXIMUM ALLOWABLE EMISSION PRIOR TO THE INSTALLATION OF THE DUCT BURNERS

Pollutant	Basis	Fuel	Emission Limitations** lbs/hr/CT	4 CT* (TPY)
NO_x***	42 ppmvd	Gas	264	4,868
	65 ppmvd	Oil	422	
VOC	1 ppmvd	Gas	1.3	50
	6 ppmvd	Oil	7.8	
CO	30 ppmvd	Gas	89	1,489
	33 ppmvd	Oil	100	
PM/PM_{10}		Gas	14.7	
		Oil	58.0	424.7
SO_2		Gas	4.9	
		Oil	538	1,582.8

CT - Combustion Turbine
DB - Duct Burner

NOTES * Refers to the maximum facility emissions (four CTs). With capacity factor limitations of 25 percent on oil.

** Table revised to reflect removal of the duct burners and reallocation of the annual emissions to the CTs.

*** ppm NO_x, dry, corrected to ISO standard ambient air conditions and 15 percent oxygen.

MAXIMUM ALLOWABLE EMISSION LIMITS WITH THE DUCT BURNERS INSTALLED

Pollutant	Basis	Fuel	Emission Limitations*			
			lbs/hr/CT	lbs/hr/DB	4 CT* (TPY)	4 DB* (TPY)
NO_x**	42 ppmvd	Gas	264	10.0		152
	65 ppmvd	Oil	422		4,716	
VOC	1 ppmvd	Gas	1.3	2.0		30.5
	6 ppmvd	Oil	7.8		48.3	
CO	30 ppmvd	Gas	89	17.6	1,405	268
	33 ppmvd	Oil	100			
PM/PM_{10}		Gas	14.7	0.7		10.7
		Oil	58.0		414	
SO_2		Gas	**4.9**	**0.25**		**4.0**
		Oil	538		1,582	

CT - Combustion Turbine
DB - Duct Burner

NOTES: * Refers to the maximum facility emissions (four CTs).
With capacity factor limitations of 25 percent on oil.

**** ppm NO_x, dry, corrected to ISO standard ambient air conditions at 15 percent oxygen.**

NO_x emissions from duct burners are based on an as-fired emission limitation of 0.11 lbs/mmBTU.

The permittee shall calculate an appropriate lbs/mmBTU emission factor for each pollutant based on the compliance tests heat input rates/steam injection rate/emission measurements. After submittal to and approval by the Department, the permittee shall program the on site computer system to calculated and record the emissions of each pollutant for each CT. Results shall be reported as lbs/hr and TPY.

FPL

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

July 19, 1993

Mr Tom Tittle
Department of Environmental Regulation-SED
1900 S. Congress Avenue, Suite A
West Palm Beach, FL 33406

RE: Lauderdale Plant
Steam Injection Curve CT 4B
PSD-FL-145, PA89-26

Dear Mr. Tittle:

Enclosed is a copy of the curves for CT 4B as required by special condition 20 of PSD-FL-145. The Curves entitled "Ambient Temperature vs Heat Input" illustrates the effect of the ambient temperature on the heat input at the permitted NO_x (42 ppm gas and 65 ppm oil) limit. The other Curves entitled "Steam Injection Control Curve" illustrate the steam injection rate necessary to maintain the permitted NO_x limit across the load range.

If you have any questions or comments, please call me at (407) 625-7661.

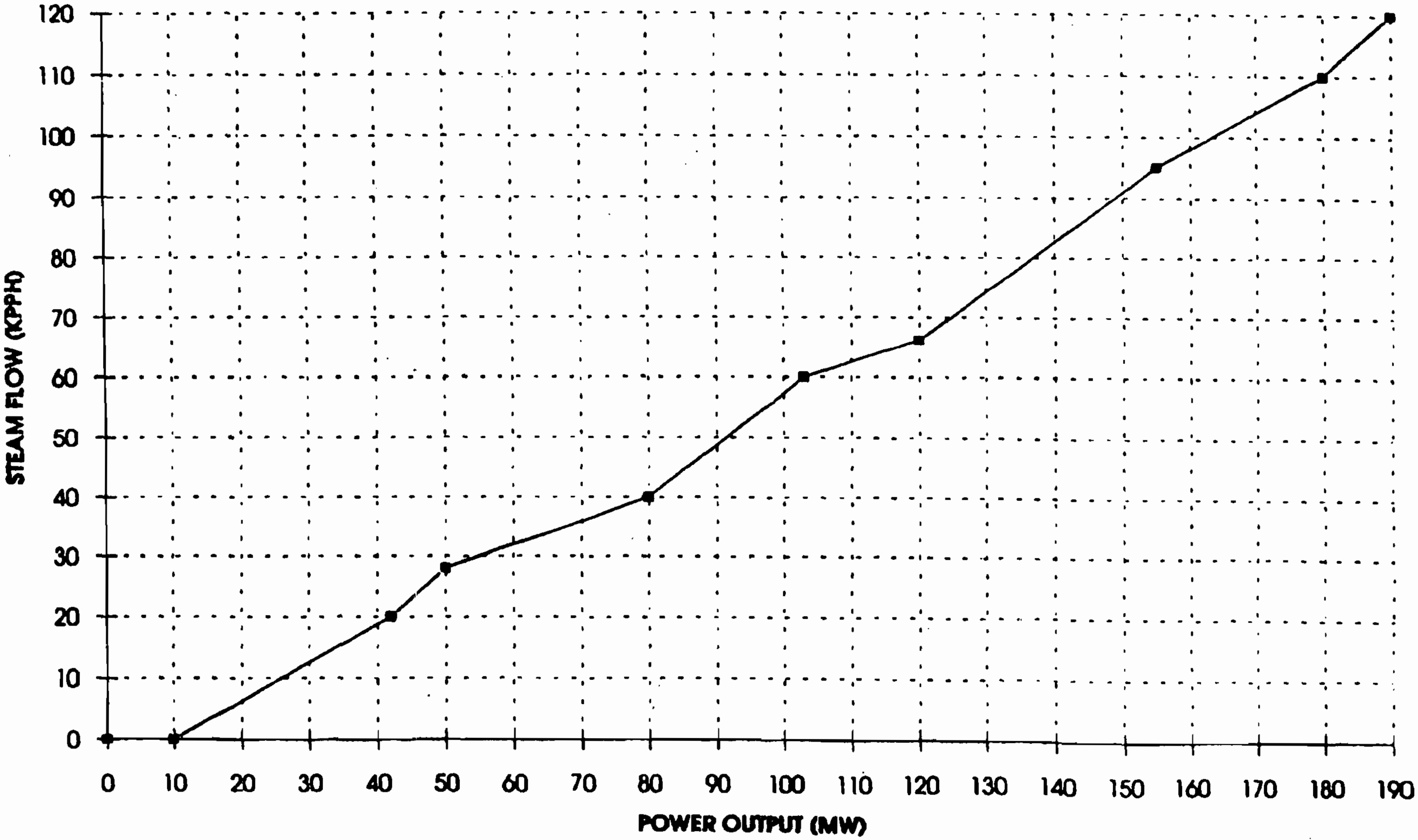
Sincerely,

D. M. MacDougall

Daniel M. MacDougall
Environmental Specialist
Florida Power & Light

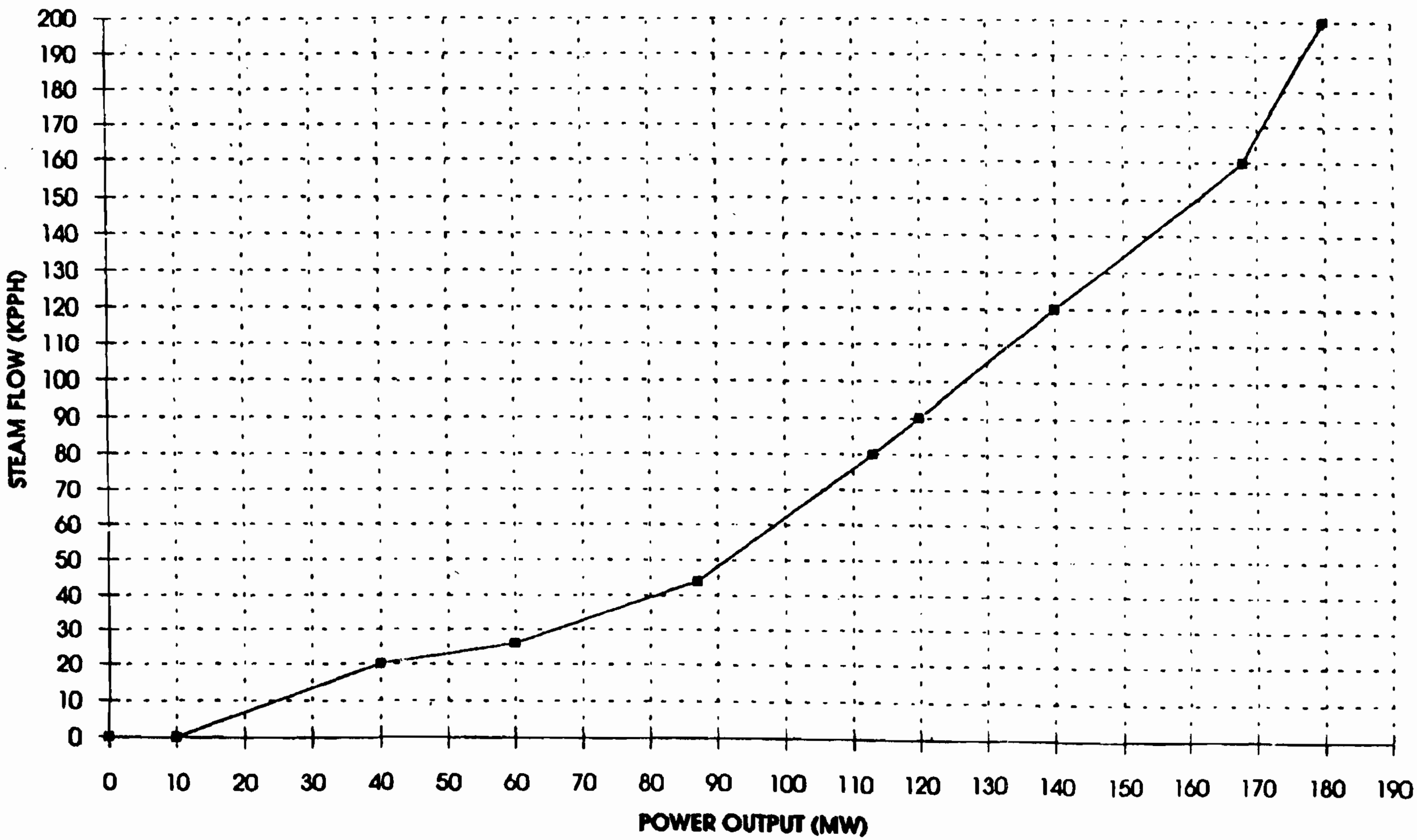
cc: Clair Fancy DER/TAL
B. Oven

STEAM INJECTION CONTROL CURVE--CT 4B GAS



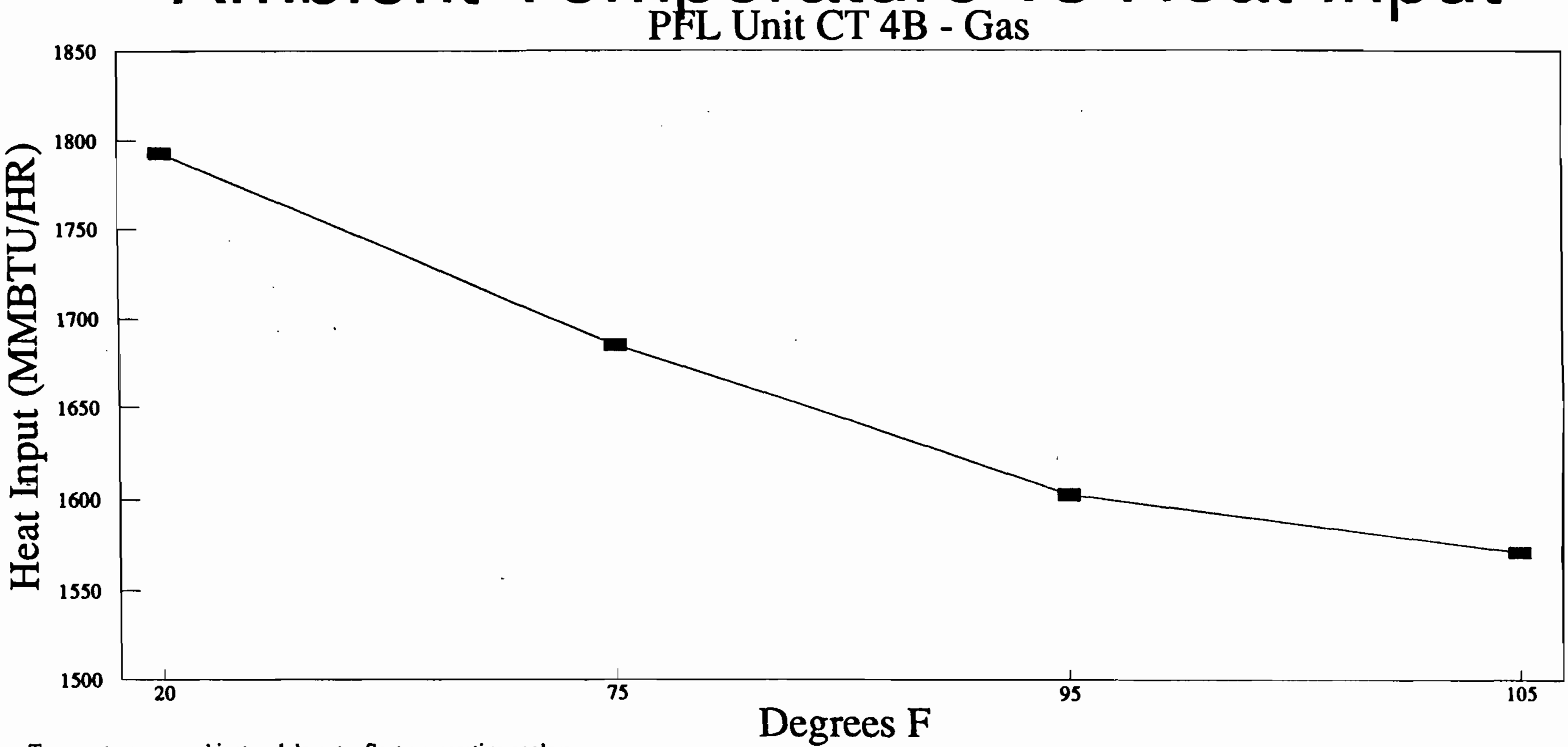
5/14/93

STEAM INJECTION CONTROL CURVE--CT 4B OIL



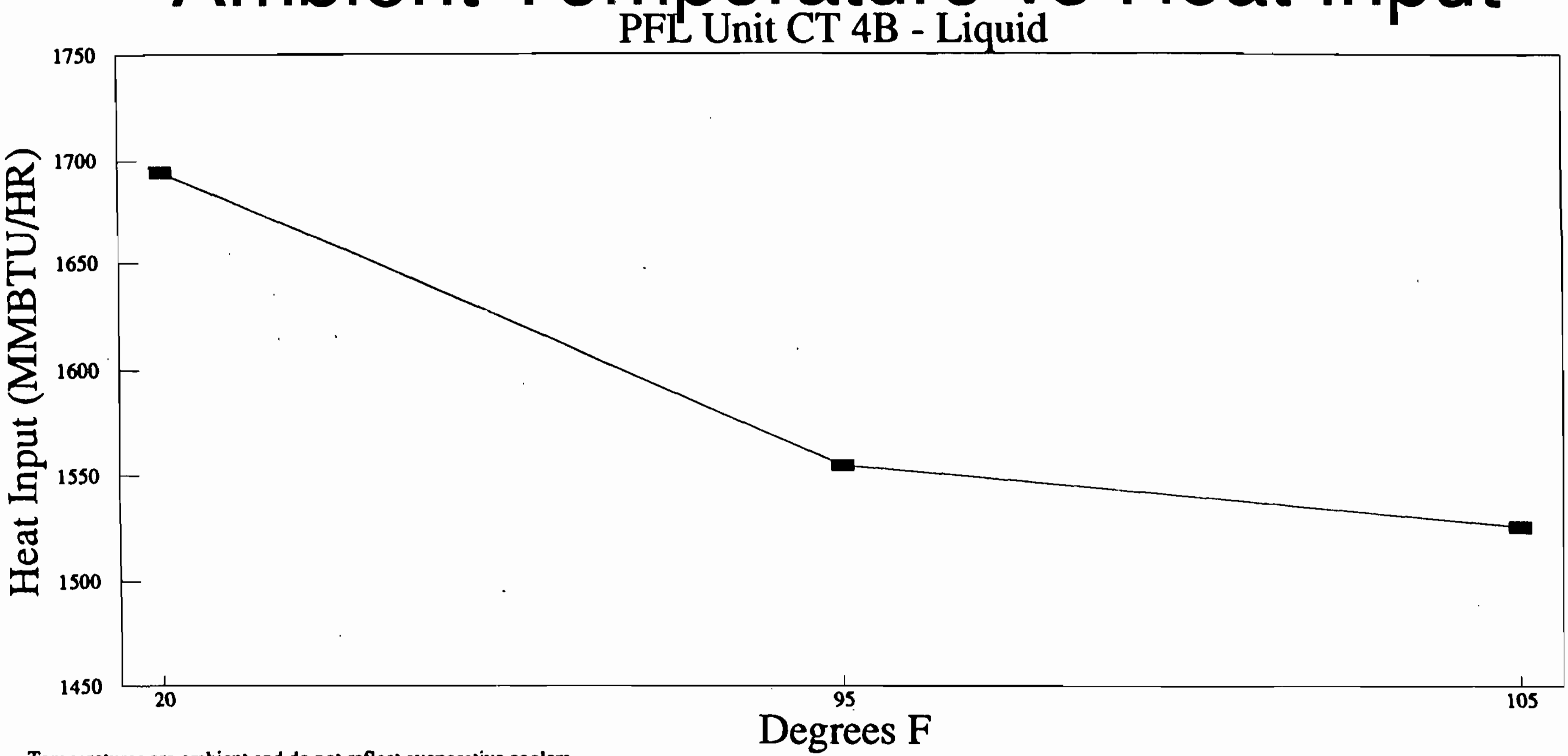
5/14/93

Ambient Temperature vs Heat Input



Temperatures are ambient and do not reflect evaporative coolers.

Ambient Temperature vs Heat Input



Temperatures are ambient and do not reflect evaporative coolers.

HOPPING BOYD GREEN & SAMS

ATTORNEYS AND COUNSELORS

123 SOUTH CALHOUN STREET

POST OFFICE BOX 6526

TALLAHASSEE, FLORIDA 32314

(904) 222-7500

FAX (904) 224-8551

FAX (904) 681-2964

June 25, 1993

Hamilton S. Oven
Department of Environmental Protection
3900 Commonwealth Blvd., Suite 953
Tallahassee, FL 32399

RECEIVED

JUN 29 1993

Division of Air
Resources Management

RE: FPL Lauderdale Repowering Project
Request for Modification of Certification
Final Order

Dear Buck,

As we recently discussed, FPL requests that the Department proceed to issue the final order for the modification of certification for the Lauderdale Repowering Project. I have enclosed a marked copy of the Department's draft order with some minor corrective comments.

The parallel request for a PSD permit amendment for the Project has been processed by the Department and forwarded to USEPA Region IV for issuance of the final permit amendment. Based on discussions with Department and USEPA staff, we do not expect that there will be any problems with the Department's recommendation. We anticipate receiving the USEPA permit amendment in the near future.

Therefore, FPL would like for the Department to now proceed to issue the PPSA modification order. No objections have been raised to the request by any party or interested person.

Your attention to this request is appreciated. Should you have any questions, please do not hesitate to call me.

Sincerely,

Doug Roberts

Douglas S. Roberts

DSR/mee
Encls

cc: Gary Smallridge
Clair Fancy
W. Hanks

HOPPING BOYD GREEN & SAMS

ATTORNEYS AND COUNSELORS

123 SOUTH CALHOUN STREET

POST OFFICE BOX 6526

TALLAHASSEE, FLORIDA 32314

(904) 222-7500

FAX (904) 224-8551

FAX (904) 681-2964

June 14, 1993

Gary Smallridge
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399

Re: Draft Modification Orders for FPL Projects

Dear Gary:

Enclosed are marked-up copies of the Department's draft modification orders for the FPL Martin and Lauderdale Projects that reflect our suggested corrections to the orders. These changes will conform the modified certification conditions to the current proposed conditions for the PSD permits for the two projects as prepared by the Bureau of Air Resources. We also suggest deleting the references to net megawatts in the orders since the original certification orders address that issue and these modifications do not affect the generating capacity of the units. It would be appropriate to let the original orders be the sole reference to megawattage to avoid confusion over the issue where no change in megawatts is proposed.

We appreciate the opportunity to submit these comments. Please call should you have any questions or wish to discuss these further.

Sincerely,

Doug Roberts

Douglas S. Roberts

DSR/mee
Encls

cc: Buck Oven w/encls
Dr. Hanks

draft

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

In Re: Florida Power & Light Company Lauderdale Repowering Project Power Plant Siting Application No. PA 89-26 Broward County, Florida	DER CASE NO.PA89-26B

FINAL ORDER MODIFYING CONDITIONS OF CERTIFICATION

On January 10, 1991, the Governor and Cabinet, acting as the Siting Board, issued a final order approving certification for Florida Power & Light Company's (FPL) Lauderdale Repowering Project. That certification order approved the construction and operation of a ~~954 MW (net)~~ natural gas/oil fired combined cycle facility and associated facilities to be located in Broward County, Florida. Subsequently, on November 11, 1992, the Department issued a final order modifying the certification to authorize certain changes to the facilities and buildings on the Lauderdale Plant site.

On March 12, 1993, FPL filed a request to modify the conditions of certification pursuant to section 403.516(1)(b), F.S. FPL requested that the conditions be modified to approved several recently identified changes to the project design and operation. These proposed changes include changing SO_2 emission rates to correspond with sulfur concentrations in the natural gas pipeline and changing heat input limits to reflect the decision not to install duct burners in the combined cycle at this time

units. FPL also proposed the certification be modified to reflect the more stringent limits on oil firing of the units contained in the separate Prevention of Significant Deterioration permit for the Project. FPL submitted changes to several conditions of certification to address the proposed changes.

Copies of FPL's request were distributed to all parties to the certification proceeding and made available for public review. On March 19, 1993, a Notice of Proposed Modification of Power Plant Certification regarding the proposed modifications was published in the Florida Administrative Weekly. On ____________ ,1993, copies of the intent to modify were provided to all parties to the original proceeding. The notices specified that a hearing would be held on or before 45 days from receipt of the proposed modification by the parties, or if requested by a person having substantial interest within 30 days of publication of the notice. No hearing was requested and no person has filed written objections to the proposed modifications.

Accordingly, in the absence of any dispute,

IT IS ORDERED:

The proposed changes to the Lauderdale Repowering Project, described in the March 12, 1993, request for modification, are approved based on the absence of any request for a hearing or written objections. The Department hereby approves the requested modifications. All modifications to the original certification as ~~conceptually~~ described in the request for modification, in and of themselves and as they impact the total infrastructure, shall be in conformance and in compliance with the following as appropriate:

- Stationary Sources -
  Chapters 17-296, and 17-297, F.A.C.

- Potable Water - Chapters 17-4, 17-531, 17-532, 17-550, 17-555, and 17-560, F.A.C.

- Industrial Waste - Chapters 17-4, and 17-660, F.A.C.

- Stormwater - Chapters 17-4, and 17-25, F.A.C.

Pursuant to Section 403.516(1)(b), F.S. the Department hereby modifies the conditions of certification for the Lauderdale Repowering Project as follows:

II.A Emission Limitations for LRP

1. <u>When the duct burners are installed,</u> the maximum heat input to each combustion turbine (CT) shall neither exceed 1,685.0 MMBtu/hr while firing natural gas, nor 1,646.9 MMBtu/hr while firing fuel oil (@75°F). Each CTs fuel consumption shall be continuously measured and recorded. The maximum heat input to each duct burner shall not exceed 90.62 MMBtu/hr. Each duct burner's fuel consumption shall

be continuously measured and recorded.

Until the duct burners are ~~not~~ installed, the maximum heat input to each CT shall neither exceed 1,775.62 MMBtu/hr. while firing natural gas nor 1,646.9 MMBtu/hr. while firing fuel oil (@75°F). Each CTs fuel consumption shall be continuously measured and recorded.

* * *

2. Each of the four CTs may operate continuously, i.e., 8,760 hrs/year provided that the total (four turbines) annual heat input attributed to light distillate fuel oil firing does not exceed 14,426,844 MMBtu (@75°F) and the total heat input for all four turbines and the duct burners does not exceed 54,129,421 MMBtu.

* * *

5. The maximum allowable sulfur (total) content of natural gas burned at this facility shall not exceed 10 grains per 1,000 cubic feet (gr/1000 CF). The permittee shall monitor the sulfur content of the natural gas by the customized fuel monitoring schedule approved by EPA. The sulfur content of the fuel oil shall not exceed a maximum of 0.3 percent and shall not exceed an average of 0.2 percent during any 12-month period.

* * *

MAXIMUM ALLOWABLE EMISSIONS PRIOR TO THE INSTALLATION OF THE DUCT BURNERS**

			Emission Limitations	
Pollutant	Basis	Fuel	lb/hr/CT	4 CT* (TPY)
NOx***	42 ppmvd	Gas	264	4,868
	65 ppmvd	Oil	422	
VOC	1 ppmvd	Gas	1.3	50
	6 ppmvd	Oil	7.8	
CO	30 ppmvd	Gas	89	1,489
	33 ppmvd	Oil	100	
PM/PM_{10}		Gas	14.7	
		Oil	58.0	424.7
SO_2		Gas	4.9	

	Oil	538	1,582.8

CT - Combustion Turbine
DB - Duct Burners

NOTES: * Refers to the maximum facility emissions (four CTs); with capacity factor limitations of 25 percent on oil.

** Table revised to reflect removal of the duct burners and reallocation of the annual emissions to the CTs.

*** ppm NOx (dry) corrected to ISO standard ambient air conditions and 15 percent oxygen.

MAXIMUM ALLOWABLE EMISSION LIMITS WITH THE DUCT BURNERS INSTALLED

Pollutant	Basis	Fuel	lb/hr/CT	Emission Limitations lb/hr/DB (TPY)	4 CT* (TPY)	4DB+
NOx**	42 ppmvd	Gas	264	10.0		152
	65 ppmvd	Oil	422		4,716	
VOC	1 ppmvd	Gas	1.3	2.0		30.5
	6 ppmvd	Oil	7.8		48.3	
CO	30 ppmvd	Gas	89	17.6		268
	33 ppmvd	Oil	100		1,405	
PM/PM_{10}		Gas	14.7	0.7		10.7
		Oil	58.0		414	
SO_2		Gas	4.9	0.25		4.0
		Oil	538		1,578.2	

CT - Combustion Turbine
DB - Duct Burners

NOTES: * Refers to the maximum facility emissions (four CTs). With capacity factor limitations of 25 percent on oil ~~and 87-percent-for-the-facility.~~

7

** ppm NOx (dry) ct corrected to ISO standard ambient air conditions ~~and~~ 15 percent oxygen.

~~+--Refers-to-maximum-duct-burner-emissions-at-87-percent capacity-factor.~~

NO_x emissions from duct burners are based on an as-fired emission limitation of 0.11 lbs/MMBtu.

The permittee shall calculate ~~a~~ an appropriate lbs/MMBtu emission factor for each pollutant based on the compliance tests heat input rates/steam injection rate/emission measurements. After submittal to and approval by the Department, the permittee shall program the on site computer system to calculate and record the emissions of each pollutant for each CT. Results shall be reported as lbs/hr and TPY.

~~Sulfur dioxide emissions assume a maximum of 0.3 percent sulfur in fuel oil for hourly emissions and an average sulfur content of 0.2 percent for annual emissions.~~

Any party to this Order ha~~d~~s the right to seek judicial review of the Order pursuant to Section 120.68, Florida Statutes, by the filing of Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the clerk of the Department of Environmental Regulation in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date that the Final Order is filed with the Department of Environmental Regulation.

DONE AND ENTERED this _________ day of __________, 1993 in Tallahassee, Florida.

STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL REGULATION

____
Virginia B. Wetherell
Secretary

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400
Telephone: (904) 488-9730

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a copy of the foregoing was sent by U.S. Mail to the following this __________ day of ____________, 1993.

Douglas S. Roberts
Hopping Boyd Green & Sams
P.O. Box 6526
Tallahassee, FL 32314

David Jordan, Senior Attorney
Department of Community Affairs
2740 Centerview Drive
Tallahassee, FL 32399-2100

DELETE AS REPEAT

~~Vernon Whittier~~
~~Assistant General Counsel~~
~~Department of Transportation~~
~~Haydon Burns Building~~
~~605 Suwannee Street~~
~~Tallahassee, FL 32399~~

Sara Nall
South FL Water Management District
P.O. Box 24680
3301 Gun Club Road
West Palm Beach, FL 33416-4680

M. B. Adelson
Assistant General Counsel
Department of Natural Resources
3900 Commonwealth Blvd.
Tallahassee, FL 32399

Noel M. Pfeffer
Deputy County Attorney
Broward County
115 South Andrews Avenue
Suite 423
Fort Lauderdale, FL 33301

Michael Palecki
Division of Legal Services
Florida Public Service Commission
101 East Gaines Street
Fletcher Building,Room 212
Tallahassee, FL 32399-0850

Susan M. Coughanour
South FL Water Management District
P.O. Box 24680
3301 Gun Club Road
West Palm Beach, FL 33416-4680

James Antista
General Counsel
FL Game and Fresh Water Fish Comm.
Bryant Bldg.
620 S. Meridian Street
Tallahassee, FL 32399-1600

William Roberts
Assistant General Counsel
Department of Transportation
Haydon Burns Building
605 Suwanee Street, M.S. #58
Tallahassee, FL 32399

Thomas R. Henderson
Broward County Resource Recovery
114 South Andrews Avenue
Fort Lauderdale, FL 33301

Florida Department of Environmental Regulation

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

Lawton Chiles, Governor

Virginia B. Wetherell, Secretary

June 2, 1993

Ms. Jewell Harper, Chief
Air Enforcement Branch
U. S. Environmental
Protection Agency
Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30065

RE: Amendment of Permit No. PSD-FL-145

Dear Ms. Harper:

Florida Power & Light Company has requested that the referenced permit for the Lauderdale Repowering Project be amended to: (1) Account for a higher than estimated sulfur content in the natural gas fuel burned at the electric utility plant and (2) Obtain permission to burn the fuel allotted for the duct burners in the combustion turbines. The amendment will not allow an increase in emissions of any air pollutant.

The Department finds their proposal acceptable and has drafted the enclosed amendment to permit No. PSD-FL-145. Because this facility is subject to Florida's Power Plant Certification regulations, we request EPA review and approve the enclosed draft amendment.

Sincerely,

C. H. Fancy, P.E.
Chief
Bureau of Air Regulation

HLR/CF/wmh

Enclosure

cc: H. Harlow
B. Oven
J. Tittle

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Charles D. Henderson
Environmental Affairs Department
Florida Power & Light Company
P. O. Box 088801
North Palm Beach, Florida 33408-8801

RE: Florida Power & Light Company - Lauderdale Repowering Project
PSD-FL-145

Dear Mr. Henderson:

The review of Mr. Daniel MacDougall's March 12, May 18, and May 26, 1993, letters requesting administrative changes to the conditions of the Prevention of Significant Deterioration permit (PSD-FL-145) issued to Florida Power & Light Company on March 14, 1991, for the Lauderdale Repowering Project has been completed. You requested that Specific Conditions 1 and 5 of the permit be revised to account for a higher sulfur content in the natural gas and to authorize the burning of all natural gas fuel permitted for this facility in the combustion turbines. The basis of your request is that the natural gas contains more sulfur than was originally estimated, that there is a delay in installing the duct burners, and that the combustion turbines can burn the natural gas permitted for the duct burners without any increase in emissions.

Based on the foregoing, it is determined that the proposed revision to Specific Conditions 1 and 5 of PSD-FL-145 is acceptable and will not result in the increase of any emissions subject to the PSD regulations. As an administrative change, this revision will not require additional public participation procedures.

Authority to construct a stationary source was granted for the Florida Power & Light Company, Lauderdale Repowering Project, subject to the conditions contained in the permit to construct on March 14, 1991. The administrative change to PSD-FL-145 does not alter the commence construction deadline for the Lauderdale Repowering Project. This authority to construct is based solely on the requirements of 40 CFR 52.21, the federal regulations governing significant deterioration of air quality, and in no way affects approvals under other Federal or State regulatory authorities. Please be advised that a violation of any condition issued as part of this approval, as well as any construction which proceeds in material variance with information submitted in your application, may subject Florida Power & Light Company to enforcement action.

Any questions concerning this administrative permit revision may be directed to Mr. Winston A. Smith, Director, Air, Pesticides, and Toxics Management Division at (404) 347-3043.

Sincerely yours,

Patrick M. Tobin
Acting Regional Administrator

Enclosures

cc: Mr. C. H. Fancy
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

PSD-FL-145

PERMIT TO CONSTRUCT UNDER THE RULES FOR THE PREVENTION OF SIGNIFICANT DETERIORATION OF AIR QUALITY

Pursuant to and in accordance with the provisions of Part C, Subpart 1 of the Clean Air Act, as amended, 42 U.S.C. 7470 et seq., and the regulations promulgated thereunder at 40 C.F.R. 52.21, as amended at 45 Fed. Reg. 52676, 52735-41 (August 7, 1980)

Florida Power & Light Company
P. O. Box 088801
North Palm Beach, Florida 33408-8801

is hereby authorized to construct/modify a stationary source, specifically the Lauderdale Repowering Project, at the following location:

Florida Power & Light Company
Lauderdale Electric Utility Plant
Griffin Road
Dania, Florida

UTM Coordinates: Zone 17 - 580.1 km E, 2883.3 km N

Upon completion of this authorized construction and commencement of operation/production, this stationary source shall be operated in accordance with the emission limitations, sampling requirements, monitoring requirements and other conditions set forth in the attached Specific Conditions (Part I) and General Conditions (Part II).

The revisions to this permit shall become effective on the date signed below.

If construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable time, this permit shall expire and authorization to construct shall become invalid.

This authorization to construct/modify shall not relieve the owner or operator of the responsibility to comply fully with all applicable provisions of Federal, State, and Local law.

Date Signed

Patrick M. Tobin
Acting Regional Administrator

The Specific Conditions of federal permit PSD-FL-145 shall be modified as follows:

<u>FROM</u>:

SPECIFIC CONDITION NO. 1

The maximum heat input to each combustion turbine (CT) shall neither exceed 1,685.0 MMBtu/hr while firing natural gas, nor 1,646.9 MMBtu/hr while firing fuel oil (@ 75°F). Each CT's fuel consumption shall be continuously measured and recorded. The maximum heat input to each duct burner shall not exceed 90.62 MMBtu/hr. Each duct burner's fuel consumption shall be continuously measured and recorded.

SPECIFIC CONDITION NO. 5

The maximum allowable emissions from each CT in accordance with the BACT determination shall not exceed the following emission limitations at 75°F:

Pollutant	Basis	Fuel	Emission Limitations lbs/hr/CT	lbs/hr/DB	4 CT* (TPY)	4 DB+ (TPY)
NOx	42 ppmvd	Gas	264	10.0		152
	65 ppmvd	Oil	422		4,716	
VOC	1 ppmvd	Gas	1.3	2.0		30.5
	6 ppmvd	Oil	7.8		48.3	
CO	30 ppmvd	Gas	89	17.6	1,405	268
	33 ppmvd	Oil	100			
PM/PM10		Gas	14.7	0.7		10.7
		Oil	58.0		414	
SO2		Gas	0.97	0.05		0.8
		Oil	538		1,582	

CT - Combustion Turbine
DB - Duct Burner

NOTES: * Refers to the maximum facility emissions (four CTs). With capacity factor limitations of 25 percent on oil and 87 percent for the facility.
+ Refers to maximum duct burner emissions at 87 percent capacity factor.

NOx emissions from duct burners are based on an as-fired emission limitation of 0.11 lbs/MMBtu.

Sulfur dioxide emissions assume a maximum of 0.3 percent sulfur in fuel oil for hourly emissions and an average sulfur content of 0.2 percent for annual emissions.

TO:

SPECIFIC CONDITION NO. 1

When the duct burners are installed, the maximum heat input to each combustion turbine (CT) shall neither exceed 1,685.0 MMBtu/hr while firing natural gas, nor 1,646.9 MMBtu/hr while firing fuel oil (@ 75°F). Each CT's fuel consumption shall be continuously measured and recorded. The maximum heat input to each duct burner shall not exceed 90.62 MMBtu/hr. Each duct burner's fuel consumption shall be continuously measured and recorded.

Until the duct burners are installed, the maximum heat input to each CT shall not exceed 1,775.62 MMBtu/hr while firing natural gas nor 1,646.9 MMBtu/hr while firing fuel oil (@75°F). Each CTs fuel consumption shall be continuously measured and recorded.

SPECIFIC CONDITION NO. 5

The maximum allowable sulfur (total) content of the natural gas burned at this facility shall not exceed 10 grains per 1,000 cubic feet (gr/1000 CF). The permittee shall monitor the sulfur content of the natural gas by the customized fuel monitoring schedule approved by EPA. The sulfur content of the fuel oil shall not exceed a maximum of 0.3 percent and shall not exceed an average of 0.2 percent during any 12-month period.

In accordance with the BACT determination, the maximum allowable emissions from each CT and duct burner shall not exceed any of the following emission limitations:

MAXIMUM ALLOWABLE EMISSIONS PRIOR TO THE INSTALLATION OF THE DUCT BURNERS

Pollutant	Basis	Fuel	Emission Limitations**	
			lbs/hr/CT	4 CT* (TPY)
NOx***	42 ppmvd	Gas	264	4,868
	65 ppmvd	Oil	422	
VOC	1 ppmvd	Gas	1.3	50
	6 ppmvd	Oil	7.8	
CO	30 ppmvd	Gas	89	1,489
	33 ppmvd	Oil	100	
PM/PM10		Gas	14.7	
		Oil	58.0	424.7
SO2		Gas	4.9	
		Oil	538	1582.8

CT - Combustion Turbine
DB - Duct Burner

NOTES: * Refers to the maximum facility emissions (four CTs). With capacity factor limitations of 25 percent on oil.

** Table revised to reflect removal of the duct burners and reallocation of the annual emissions to the CTs.

*** ppm NOx, dry, corrected to ISO standard ambient air conditions and 15 percent oxygen.

MAXIMUM ALLOWABLE EMISSION LIMITS WITH THE DUCT BURNERS INSTALLED

Pollutant	Basis	Fuel	Emission Limitations* lbs/hr/CT	lbs/hr/DB	4 CT* (TPY)	4 DB* (TPY)
NOx**	42 ppmvd	Gas	264	10.0		152
	65 ppmvd	Oil	422		4,716	
VOC	1 ppmvd	Gas	1.3	2.0		30.5
	6 ppmvd	Oil	7.8		48.3	
CO	30 ppmvd	Gas	89	17.6	1,405	268
	33 ppmvd	Oil	100			
PM/PM10		Gas	14.7	0.7		10.7
		Oil	58.0		414	
SO2		Gas	**4.9**	**0.25**		**4.0**
		Oil	538		1,578.2	

CT - Combustion Turbine
DB - Duct Burner

NOTES: * Refers to the maximum facility emissions (four CTs). With capacity factor limitations of 25 percent on oil.

**** ppm NOx, dry, corrected to ISO standard ambient air conditions at 15 percent oxygen.**

NOx emissions from duct burners are based on an as-fired emission limitation of 0.11 lbs/MMBtu.

The permittee shall calculate an appropriate lbs/MMBtu emission factor for each pollutant based on the compliance tests heat input rates/steam injection rate/emission measurements. After submittal to and approval by the Department, the permittee shall program the on site computer system to calculate and record the emissions of each pollutant for each CT. Results shall be reported as lbs/hr and TPY.

HOPPING BOYD GREEN & SAMS

ATTORNEYS AND COUNSELORS

123 SOUTH CALHOUN STREET

POST OFFICE BOX 6526

TALLAHASSEE, FLORIDA 32314

(904) 222-7500

FAX (904) 224-8551

FAX (904) 681-2964

June 1, 1993

Hamilton S. Oven
Office of Siting Coordination
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399

RE: Proposed Modification Order for FPL Lauderdale Project

Dear Buck:

Enclosed is a proposed order from the Department approving the pending modification request for the FPL Lauderdale Project. Based on discussions with Willard Hanks of the Bureau of Air Resources, the revised conditions reflect the changes that will be proposed by the Department for the amended PSD permit for the Project. Of course, those PSD provisions are still subject to final approval by USEPA. But, we feel these will be acceptable to USEPA.

We will be pursuing the final issuance of the amended PSD permit in the coming days. We will keep you apprised of any developments in the hopes of a prompt issuance of a modification order once the PSD conditions have been finalized.

Please call should you have any questions about this matter or if we can provide any assistance to you.

Sincerely,

Doug Roberts

Douglas S. Roberts

DSR/mee
Encls.

cc: Gary Smallridge
Willard Hanks

RECEIVED

JUN 01 1993

Division of Air
Resources Management

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

In Re:	FLORIDA POWER & LIGHT CO., LAUDERDALE REPOWERING PROJECT, MODIFICATION OF CERTIFICATION PA 89-26, BROWARD COUNTY, FLORIDA	DER CASE NO. PA 89-26

FINAL ORDER MODIFYING CONDITIONS OF CERTIFICATION

On January 10, 1991, the Governor and Cabinet, acting as the Siting Board, issued a final order approving certification for Florida Power & Light Company's (FPL) Lauderdale Repowering Project. That certification order approved the construction and operation of repowered electrical generating units located in Broward County, Florida. Subsequently, on November 11, 1992, the Department issued a final order modifying the certification to authorize certain changes to the facilities and buildings on the Lauderdale Plant site.

On March 12, 1993, Florida Power & Light filed a request to modify the Project's certification, pursuant to Section 703.516(1)(b), Florida Statutes. Florida Power & Light requested that the certification, including the conditions of certification, be modified to approve several changes to the facilities at the Project site. The proposed changes include a change in the sulfur dioxide (SO_2) emission rates for the units when firing natural gas due to a higher sulfur content in natural gas; and revisions to the certification to reflect FPL's decision not to install duct burners in the units at this time. FPL also proposed the certification be modified to reflect the more stringent limits on oil firing of the units contained in the separate Prevention of Significant Deterioration permit for the Project. FPL submitted changes to several conditions of certification to address the proposed changes.

Copies of FP&L's request were distributed to all parties to the certification proceeding and made available for public review. On March 19, 1993, a Notice of Intent to Issue Proposed Modification of Power Plant Certification regarding the requested modification was published by the Department in the Florida Administrative Weekly. The notice specified that a hearing would be held on the proposed modification if requested by a party to the certification within 45 days from receipt by the parties of the Department's notice of the proposed modification or if requested by a member of the public within 30 days of publication of the notice. No hearing has been requested. No person has filed written objections to the proposed modification.

The Department has reviewed the modification request and additional supporting information submitted by FPL. The Department concurs in the requested modification to the extent reflected in the modified conditions below.

Accordingly, in the absence of any dispute,

IT IS ORDERED:

The proposed changes to the FPL Lauderdale Repowering Project, described in the March 12, 1993, request for modification of certification are approved, based on the absence of any request for a hearing or written objections. The Department hereby approves the requested modifications. All modifications to the original certification as described in the request for modification, in and of themselves, shall be in conformance and in compliance with the existing conditions of certification as modified herein and with the additional conditions imposed by this order.

Pursuant to Section 403.516(1)(b), F.S., the Department hereby modifies the conditions of certification for the Lauderdale Repowering Project as follows:

II.A. Emission Limitations for LRP

1. When the duct burners are installed, the maximum heat input to each combustion turbine (CT) shall neither exceed 1,685.0 MMBtu/hr while firing natural gas, nor 1,646.9 MMBtu/hr while firing fuel oil (@75°F). Each CT's fuel consumption shall be continuously measured and recorded. The maximum heat input to each duct burner shall not exceed 90.62 MMBtu/hr. Each duct burner's fuel consumption shall be continuously measured and recorded.

   Until the duct burners are installed, the maximum heat input to each CT shall not exceed 1,775.62 MMBtu/hr while firing natural gas nor 1,646.9 MMBtu/hr while firing fuel oil (@75°F). Each CTs fuel consumption shall be continuously measured and recorded.

$\frac{1775.62 \times 10^6 \text{ Btu}}{\text{hr}} \cdot \frac{\text{FT}^3}{1000 \text{ Btu}} \cdot \frac{1}{10^6} = 1.8$

* * *

2. Each of the four CTs may operate continuously, i.e., 8,760 hrs/year provided that the total (four turbines) annual heat input attributed to light distillate fuel oil firing does not exceed 14,426,844 MMBtu (@75°F) and the total heat input for all four turbines and the duct burners does not exceed 54,129,421 MMBtu.

$\frac{14,426,844 \times 10^6}{139,000 \times 1000 \times 4} = 25,947.6$ $\times 2$ $= 51,895$

$\frac{1,646.9 \times 10^6 \text{ Btu}}{\text{hr}} \cdot \frac{\text{Gal}}{139,000 \text{ Btu}} \cdot \frac{1}{1000 \text{ gal}} = 11.8$

* * *

5. The maximum allowable sulfur (total) content of the natural gas burned at this facility shall not exceed 10 grains per 1,000 cubic feet (gr/1000 CF). The permittee shall monitor the sulfur content of the natural gas by the customized fuel monitoring schedule approved by EPA. The sulfur content of the fuel oil shall not exceed a

maximum of 0.3 percent and shall not exceed an average of 0.2 percent during any 12-month period.

In accordance with the BACT determination, the maximum allowable emissions from each CT and duct burner shall not exceed any of the following emission limitations:

MAXIMUM ALLOWABLE EMISSIONS PRIOR TO THE INSTALLATION OF THE DUCT BURNERS**

			Emission Limitations	
Pollutant	Basis	Fuel	lb/hr/CT	4 CT* (TPY)
NOx***	42 ppmvd	Gas	264	4,868
	65 ppmvd	Oil	422	
VOC	1 ppmvd	Gas	1.3	50
	6 ppmvd	Oil	7.8	
CO	30 ppmvd	Gas	89	1,489
	33 ppmvd	Oil	100	
PM/PM10		Gas	14.7	
		Oil	58.0	424.7
SO2		Gas	4.9	
		Oil	538	1,582.8

CT - Combustion Turbine
DB - Duct Burner

Notes:
- * Refers to the maximum facility emissions (four CTs); with capacity factor limitations of 25 percent on oil.
- ** Table revised to reflect removal of the duct burners and reallocation of the annual emissions to the CTs.
- *** ppm NO_x (dry) corrected to ISO standard ambient air conditions and 15 percent oxygen.

* * *

1000 gal x 137,000 BTU/gal 10^6

MAXIMUM ALLOWABLE EMISSION LIMITS WITH THE DUCT BURNERS INSTALLED

Pollutant	Basis	Fuel	Emission Limitations lb/hr/CT	lb/hr/DB	4 CT* (TPY)	4DB+ (TPY)
NO_x**	42 ppmvd	Gas	264	10.0		152
	65 ppmvd	Oil	422		4,716	
VOC	1 ppmvd	Gas	1.3	2.0		30.5
	6 ppmvd	Oil	7.8		48.3	
CO	30 ppmvd	Gas	89	17.6		268
	33 ppmvd	Oil	100		1,405	
PM/PM_{10}		Gas	14.7	0.7		10.7
		Oil	58.0		414	
SO_2		Gas	4.9	0.25		4.0
		Oil	538		1,578.2	

CT - Combustion Turbine
DB - Duct Burners

NOTES: * Refers to the maximum facility emissions (four CTs). With capacity factor limitations of 25 percent on oil ~~and 87 percent for the facility.~~

** ppm NO_x (dry) corrected to ISO standard ambient air conditions and 15 percent oxygen.

~~+ Refers to maximum duct burner emissions at 87 percent capacity factor.~~

NOx emissions from duct burners are based on an as-fired emission limitation of 0.11 lbs/MMBtu.

The permittee shall calculate a lb/MMBtu emission factor for each pollutant based on the compliance tests heat input rates/steam injection rate/emission measurements. After submittal to and approval by the Department, the permittee shall program the on site computer system to calculate and record the emissions of each pollutant for each CT. Results shall be reported as lbs/hr and TPY.

~~Sulfur dioxide emissions assume a maximum of 0.3 percent sulfur in fuel oil for hourly emissions and an average sulfur content of 0.2 percent for annual emissions.~~

Any party to this Order has the right to seek judicial review of the Order pursuant to Section 120.68, Florida Statutes, by the filing of Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the clerk of the Department of Environmental Regulation in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date that the Final Order is filed with the Department of Environmental Regulation.

DONE AND ENTERED this ____ day of ________________, 1992 in Tallahassee, Florida.

STATE OF FLORIDA, DEPARTMENT
OF ENVIRONMENTAL REGULATION

____
Virginia Wetherell
Secretary

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400
(904) 488-9730

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a copy of this Order has been furnished by US Mail to the following on ____________________, 1993:

Peter C. Cunningham
Douglas S. Roberts
PO Box 6526
Tallahassee, Fla. 32314

Daniel MacDougall
Environmental Affairs Department
FPL
JEN/GB
PO Box 088801
North Palm Beach, Fla. 33408-8801

M. B. Adelson
Assistant General Counsel
Department of Natural Resources
3900 Commonwealth Boulevard
Tallahassee, FL 32399

Susan M. Coughanour
South Florida Water Management District
Post Office Box 24680
West Palm Beach, FL 33416-4680

Sara Nall, Esquire
South Florida Water Management District
Post Office Box 24680
West Palm Beach, FL 33416-4680

Michael Palecki, Esquire
Division of Legal Services
Florida Public Service Commission
101 East Gaines Street
Fletcher Building, Room 212
Tallahassee, FL 32399-0850

David Jordan, Senior Attorney
Paul Darst, Planner IV
Florida Department of Community Affairs
2740 Centerview Drive
Tallahassee, FL 32399-2100

William Roberts
Assistant General Counsel
Department of Transportation
Haydon Burns Building
605 Suwannee Street, M.S. #58
Tallahassee, FL 32399

Noel M. Pfeffer, Esquire
Deputy County Attorney
Governmental Center, Suite 423
115 South Andrews Avenue
Ft. Lauderdale, FL 33301

Attorney

BEST AVAILABLE COPY

FPL

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

May 26, 1993

Mr. Willard Hanks
DER/Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RE: Lauderdale Plant
PSD-FL-145, PA89-26
Revision to Request to Modify PSD Permit

Dear Mr. Hanks:

After review of the Department's draft PSD permit modification, FPL would like to propose the following additional change. FPL would like to change the total annual TPY SO_2 emission limit from the requested 1629 TPY to the original 1582.8 TPY. This change will result in no increase in annual emission as compared to the original permit. Enclosed is a copy of appropriate pages of the draft permit which have been marked up to reflect FLP's latest request.

If you have any questions please call me at (407) 625-7661.

Sincerely,

Dan MacDougall

Dan MacDougall
Environmental Specialist
Environmental Affairs

DRAFT

Mr. Charles D. Henderson
Amendment of Permit No. PSD-FL-145
Page Three

SPECIFIC CONDITION NO. 5

The maximum allowable sulfur (total) content of the natural gas burned at this facility shall not exceed 10 grains per 1,000 cubic feet (gr/1000 CF). The permittee shall monitor the sulfur content of the natural gas by the customized fuel monitoring schedule (as may be appropriately amended) approved in EPA's April 8, 1993, letter to the Department. The sulfur content of the fuel oil shall not exceed a maximum of 0.3 percent and shall not exceed an average of 0.2 percent during any 12-month period.

In accordance with the BACT determination, the maximum allowable emissions from each CT and duct burner shall not exceed any of the following emission limitations:

MAXIMUM ALLOWABLE EMISSIONS PRIOR TO THE INSTALLATION OF THE DUCT BURNERS

			Emission Limitations**	
Pollutant	Basis	Fuel	lb/hr/CT	4 CT* (TPY)
NOx***	42 ppmvd	Gas	264	4,868
	65 ppmvd	Oil	422	
VOC	1 ppmvd	Gas	1.3	50
	6 ppmvd	Oil	7.8	
CO	30 ppmvd	Gas	89	1,489
	33 ppmvd	Oil	100	
PM/PM10		Gas	14.7	
		Oil	58.0	424.7
SO2		Gas	4.9	
		Oil	538	~~1,629~~ 1582.8

CT - Combustion Turbine
DB - Duct Burner

NOTES: * Refers to the maximum facility emissions (four CTs); with capacity factor limitations of 25 percent on oil.
** Table revised to reflect removal of the duct burners and reallocation of the annual emissions to the CTs.
*** ppm NO_x (dry) corrected to ISO standard ambient air conditions and 15 percent oxygen.

DRAFT

Mr. Charles D. Henderson
Amendment of Permit No. PSD-FL-145
Page Four

MAXIMUM ALLOWABLE EMISSION LIMITS WITH THE DUCT BURNERS INSTALLED

			Emission Limitations			
Pollutant	Basis	Fuel	lb/hr/CT	lb/hr/DB	4 CT* (TPY)	4 DB+ (TPY)
NO_x**	42 ppmvd	Gas	264	10.0		152
	65 ppmvd	Oil	422		4,716	
VOC	1 ppmvd	Gas	1.3	2.0		30.5
	6 ppmvd	Oil	7.8		48.3	
CO	30 ppmvd	Gas	89	17.6	1,405	268
	33 ppmvd	Oil	100			
PM/PM10		Gas	14.7	0.7		10.7
		Oil	[illegible]		424	
SO2		Gas	4.9	0.25		4.0
		Oil	538		~~1,6[illegible]~~ 1578.8	

CT - Combustion Turbine
DB - Duct Burner

NOTES: * Refers to the maximum facility emissions (four CTs); with capacity factor limitations of 25 percent on oil.
** ppm NO_x (dry) corrected to ISO standard ambient air conditions and 15 percent oxygen.

1578.8
+ 4.0
1582.8

NO_x emissions from duct burners are based on an as-fired emission limitation of 0.11 lbs/MMBtu.

The permittee shall calculate ~~a~~ an appropriate lb/MMBtu emission ~~curve~~ factor(s) for each pollutant based on the compliance tests heat input rates/~~water~~ steam injection rate/emission measurements. After submittal to and approval by the Department, the permittee shall program the on site computer system to calculate and record the emissions of each pollutant for each CT. Results shall be reported as lbs/hr and TPY.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Petitions filed by the permit

FPL

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

RECEIVED
MAY 24 1993
Division of Air
Resources Management

May 21, 1993

Mr. Clair Fancy
DER/Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RE: Lauderdale Plant
PSD-FL-145, PA89-26
Compliance Testing Notification

Dear Mr. Fancy:

As required by PSD Condition 10 and Condition of Certification II.A.10, the Lauderdale Plant will conduct an initial stack compliance test for Unit 5A during June 22 - 24, 1993 and Unit 5B during June 29 - July 1, 1993. FPL is providing by this letter 30 days advance notice of the compliance test as required by PSD Condition 17 and Condition of Certification II.A.17.

If you have any questions, please call me at (407) 625-7661.

Sincerely,

D. MacDougall

Dan MacDougall
Environmental Specialist
Environmental Affairs

cc: Jewel Harper, EPA
Tom Tittle, DER/SE
H. S. Oven, DER/TAL
Al Linero, DNRP/BC

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

FPL

RECEIVED

MAY 18 1993

Division of Air Resources Management

May 18, 1993

Mr. Hamilton S. Oven, Jr. PE.
Florida Department of Environmental Regulation
2600 Blair Stone Rd Room 612
Tallahassee, FL 32399

Re: **Lauderdale Repowering Project**
PA 89-26 Modification Request
Response to Letter Dated May 5, 1993

Dear Mr. Oven:

In response to your letter dated May 5, 1993, FPL submits the following responses to the comments of the Department concerning our March 12, 1993, request for modification of the Site Certification for the Lauderdale Repowering Project. The actual Department comments have been repeated prior to FPL's response in order to provide a complete and coherent picture.

1.) REQUEST TO INCREASE SULFUR DIOXIDE (SO_2) EMISSION FROM EACH CT FROM 0.97 LBS/HR TO 4.9 LBS/HR. --The proposed limit of 4.9 lbs/hr is based on natural gas containing 10 gr/1000 cf of sulfur. The 1990 analytical data from Florida Gas Transmission Company showed the natural gas averaged 4.3 gr/1000 cf and had a maximum sulfur content of 8.0 gr/1000 cf in 1990. Please provide additional support (analysis from other years, statement from an officer of Florida Gas Transmission Company, etc.) to justify any higher sulfur content for the natural gas than was shown in the 1990 data. After the projected sulfur content of the natural gas is established, recalculate the increase in SO_2 emission. Address any changes this increase in emission will have on the ambient air impact.

RESPONSE: FPL decided to base the SO_2 emission from the CT on 10 gr/1000 cf because it provided a slight safety margin over the maximum reported values in 1990 of 8.0 gr/1000 cf. Section 2.2(b) of Attachment A (FERC Gas Tariff for FGT) states that the natural gas may have a sulfur content as high as 200 gr/ 1000 cf. While this is the theoretical maximum, this value is expected to occur only under rare pipeline failures where the gas supply will be suspended until the situation has been resolved. Therefore, FPL has elected to use a reasonable sulfur value in the natural gas instead of the worst case transient value.

As currently proposed, the SO_2 emission for each CT is 4.9 lb/hr when firing natural gas. The Project impacts were originally modeled using 0.5 percent sulfur fuel oil for 8760 hours (860.89 lb/hr or 3770.7 TPY at 75 F). All standards were predicted to be met by the modeling at this level of sulfur content. During the Site Certification process, FPL elected to use a lower sulfur oil (0.2 percent annual average and 0.3 percent maximum) and to reduce the hours of operation on oil to 40 percent of the time (3504 hr) to primarily reduce the NO_x values to a more realistic level. The SO_2 emission from the Project under this scenario was 538 lb/hr or 2413 TPY. Prior to the issuance of the final PSD permit, FPL agreed again to reduce the hours of oil operation to 25 percent or 2190 hours. The SO_2 emission from the Project when firing oil 25 percent of the time is 1570.96 TPY while the expected emission from the Project on natural gas is only 57.7 TPY when using 4.9 lb/hr. As can be seen, the proposed emission of 4.9 lb/hr on gas will not adversely affect ambient air quality since the Project impacts were previously analyzed based on oil firing which has a much greater SO_2 emission than natural gas even at the requested increased sulfur content.

As discussed with the Department's staff, FPL has obtained approval from the USEPA of a customized fuel monitoring schedule for the Lauderdale Repowering Project. A copy of that letter is attached as Attachment B hereto.

2.) REQUEST TO REALLOCATE THE FUEL BURNED IN THE DB TO THE CT--The PSD permit limits each duct burner to 90.62 MMBtu/hr of natural gas. Is your request to burn additional 90.62 MMBtu/hr of either natural gas or distillate oil in each CT? Either way, there will be an increase in air pollutant emissions from the CT unless the emission factors (lbs/MMBtu) for some pollutants are reduced. Please provide a table showing the proposed emissions factors, emissions (lb/hr and TPY), and change in emissions (TPY) under the worst fuel burning scenario. The table should be based on the amendment being approved and cover natural gas and distillate oil fuels along with each regulated air pollutant in the permit.

RESPONSE: FPL is proposing to increase the CT permitted hourly input rate only when firing natural gas by the requested 90.62 MMBbtu/hr, which is the heat input rate originally allocated to the duct burners. FPL will conduct the stack compliance test within 10% of the proposed maximum heat input rate of 1775.62 MMBtu/hr as authorized by Specific Condition 10 of the PSD permit for the Project. Since the permit limits pollutant emissions to a maximum lb/hr value, FPL will calculate a lb/MMBtu emission curve for each pollutant based on the various compliance test heat input rates and on the lb/hr emissions of each tested pollutant. These curves will

be input into the onsite computer system and will track the emissions of each pollutant based upon fuel flow to each CT Therefore, FPL will be able to calculate compliance with the permitted lb/hr emission limit by multiplying the recalculated emission factor of the tested pollutant by the actual heat input rate.

On an annual basis, FPL is limiting the CT emissions to no greater than the sum of the emissions from the CT and the duct burners as follows:

	CT TPY	DB TPY	Project TPY	Proposed Limit (TPY)	Percent Change
NO_x	4716	152	4868	4868	0
VOC	48.3	30.5	78.8	50	-36
CO	1405	268	1673	1489	-11
PM/PM_{10}	414	10.7	424.7	424.7	0
SO_2 *	1625	4.0	1629	1629	0

***Based on maximum permitted annual oil use (25%) and balance of operation on gas at 4.9 lb/hr of SO_2.**

Therefore, there will be no greater impact on the ambient air quality with the natural gas reallocated from the DB to the CT. In fact for VOC and CO the impact will be less with the reallocated natural gas due to the improved operating efficiencies of the CTs as compared to the duct burners.

3.) PSD SPECIFIC CONDITION 2--Please review specific condition No. 2 along with the other specific conditions of the permit and note any changes your requested amendment would have on them.

RESPONSE: There are no changes required to Specific Condition 2 of the PSD permit due to this pending request. However, FPL is requesting that the Site Certification conditions be conformed to the PSD permit and therefore, Condition of Certification II.A.2 needs to be revised to reflect the reduced annual allowance of fuel oil from 23,082,950 to 14,426,844 MMBtu at 75 F.

If you have any questions about these responses, Please call me at (407) 625-7661.

Sincerely,
Daniel M MacDougall / DSR

Daniel M MacDougall
Environmental Specialist
Environmental Affairs

cc: Clair Fancy DER/TAL
Preston Lewis DER/TAL
Willard Hanks DER/TAL

GENERAL TERMS AND CONDITIONS
(continued)

(d) shall contain not more than ten (10) grains of total sulphur per one hundred (100) cubic feet of gas;

(e) shall contain not more than a combined total three percent (3%) by volume of carbon dioxide and/or nitrogen;

(f) shall contain not more than one quarter percent (1/4%) by volume of oxygen;

(g) shall have a temperature of not more than one hundred twenty (120) degrees Fahrenheit; and

(h) shall have a BTU content of not less than nine hundred fifty (950) BTU per cubic foot.

(i) Seller may refuse to accept any gas which fails to conform with the quality standards itemized in (a) through (h) above. Seller, in its reasonable discretion exercised on a not unduly discriminatory basis, may waive the quality standards for gas delivered into its pipeline system at receipt points, provided that such waiver will not affect Seller's ability to maintain an acceptable gas quality in its pipeline and adequate service to its customers consistent with the applicable Rate Schedule and these General Terms, including (without limitation) Section 2.2 below.

2.2 The gas delivered by Seller to Buyer shall conform to the following standards:

(a) The gas shall be natural gas, or its equivalent as provided for in 2.2(c) below, from the sources of supply attached or delivered to Seller's pipeline system; provided, however, that moisture, impurities, helium, natural gasoline, butane, propane, and other hydrocarbons or other substances, may be removed prior to delivery to Buyer. Seller may subject or permit the subjection of the gas to compression, heating, cooling, cleaning or other processes, which are not substantially detrimental to the merchantability of the gas.

GENERAL TERMS AND CONDITIONS
(continued)

(b) The gas shall have a total heating value of not less than 950 Btu per cubic foot of dry gas, and be reasonably free of moisture, objectionable liquids and solids so as to be merchantable upon delivery to Buyer, and shall contain not more than 200 grains of total sulphur, nor more than 15 grains of hydrogen sulphide, per MCF. The gas may contain an odorant at the point of delivery, but it is the responsibility of the customer to monitor and maintain any required odorant levels after the point of delivery.

NOTE - MCF HERE DENOTES 1,000 CUBIC FEET.

(c) Seller may permit its supplier to supply, or it may itself supply gas from any standby equipment installed by it or by such supplier, provided the gas so supplied shall be reasonably equivalent to the natural gas supplied hereunder, and adopted for use by Buyer's consumers without the necessity of making adjustments to fuel-burning equipment.

3. PRESSURE:

Gas shall be delivered at such uniform pressure as Buyer may reasonably require, and as Seller may agree to, up to but not exceeding one hundred (100) pounds per square inch gauge at the point of delivery provided however, Seller may grant an increase in pressure from time to time above one hundred (100) pounds per square inch gauge if Seller determines in its sole discretion that such increase would not adversely affect the operation of Sellers' pipeline system or would not otherwise impair or inhibit Sellers' ability to deliver gas to its other customers. Buyer shall be required to install, operate and maintain such regulating devices as may be necessary to regulate the pressure after delivery to Buyer.

4. MEASUREMENT:

The volume and total heating value of the gas shall be determined as follows:

a. Sales Unit. Except as otherwise expressly provided, the unit of the gas sold shall be the therm, consisting of one hundred thousand (100,000) British thermal units. The number of therms received or delivered shall be determined by multiplying the

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

4APT-AE

APR 08 1993

Mr. Clair H. Fancy, Chief
Bureau of Air Permitting
Florida Department of
Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399

RE: FPL Lauderdale Repowering Project PA 89-26, PSD-FL-145
Customized Fuel Monitoring Schedule

Dear Mr. Fancy:

This letter is in response to FPL's March 12, 1993, request for approval of a customized fuel monitoring schedule for the above referenced project. This request was addressed to you and a copy was sent to Region IV. Since the authority for implementing §60.334(b) of 40 CFR Part 60, Subpart GG was not delegated to the State of Florida, we have reviewed FPL's custom fuel monitoring schedule and have determined that it is acceptable, because it conforms to custom fuel monitoring guidance (a copy of this guidance memo was included in the FPL's March 12, 1993, letter) issued by EPA Headquarters in 1987. Therefore, you may modify FPL's permit accordingly.

If you have any questions regarding the determination provided in this letter, please contact Mr. Mirza P. Baig of my staff at 404/347-5014.

Sincerely yours,

for Jewell A. Harper, Chief
Air Enforcement Branch
Air, Pesticides, and Toxics
Management Division

cc: Mr. Mike Harley, FDER
Mr. Charles Logan, FDER

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

FPL

March 12, 1993

Mr. C. H. Fancy, Chief
Bureau of Air Permitting
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399

RE: FPL Lauderdale Repowering Project
PA 89-26, PSD-FL-145
Customized Fuel Monitoring Schedule

Dear Mr. Fancy:

The repowered Units 4 & 5 at the FPL Lauderdale Plant have been permitted under the Power Plant Siting Act (Chp 403 Part II F.S.) and a corresponding PSD permit. These Units consist of 4 dual fuel fired "advanced" combustion turbines, with heat recovery steam generators (HRSG). The combustion turbines are subject to New Source Performance Standards (NSPS-40 CFR 60, Subpart GG). 40 CFR 60.334(b) requires the owner/operator of any combustion turbine to monitor the sulfur and nitrogen content of the fuel as follows: 1) If the turbine fuel is supplied by a bulk storage tank then the sulfur and nitrogen content are to be determined whenever new fuel is transferred into the bulk storage tank and 2) If the turbine fuel is supplied without an intermediate bulk storage tank then daily monitoring of the sulfur and nitrogen content of the fuel is required. FPL has an intermediate bulk storage tank(s) for the light distillate oil and will test the sulfur and nitrogen content of the fuel oil as required by 40 CFR 60.334(b)(2).

Since the natural gas used by the combustion turbines does not pass through an intermediate bulk storage tank, FPL is hereby requesting a customized fuel monitoring schedule as allowed by 40 CFR 60.334(b)(2) for the Lauderdale Plant. While firing natural gas, FPL requests the following customized fuel monitoring schedule which was developed based on an EPA guidance memorandum (Attachment A):

1. Monitoring of natural gas nitrogen content shall not be required in accordance with page 2 of the EPA guidance memorandum and the attached enclosure.

2. Sulfur Monitoring

a. Analysis for sulfur content of the natural gas shall be conducted using one of the EPA approved ASTM reference methods for the measurement of sulfur in gaseous fuels, or an approved alternate method. The reference methods are: ASTM D1072-80; ASTM D3031-81; ASTM D3245-81; and ASTM D4048-82 as referenced in 40 CFR 60.335(b)(2).

b. Effective on the commercial operation date of the CTs or the approval date of the customized fuel monitoring schedule whichever is later, sulfur monitoring shall be conducted twice a month for six months. If this monitoring shows little variability in the sulfur content and indicates consistent compliance with 40 CFR 60.333, then sulfur monitoring shall be conducted once per quarter for six quarters.

c. If the monitoring required by 2(b), above, of the sulfur content of the natural gas shows little variability and the calculated sulfur dioxide emissions, represents consistent compliance with the sulfur dioxide emission limits specified under 40 CFR 60.333, sample analysis shall be conducted twice per year. This monitoring shall be conducted during the first and third quarters of each calendar year.

d. Should any sulfur analysis as required by items 2(b) or 2(c) above indicate noncompliance with 40 CFR 60.333, FPL will notify the Department of Environmental Regulation of such excess emission and the customized fuel monitoring schedule shall be reexamined. The sulfur content of the natural gas will be monitored weekly during the interim period while this monitoring schedule is being reexamined.

3. FPL will notify the Department of Environmental Regulation of any change in natural gas supply for reexamination of this monitoring schedule. A substantial change in natural gas quality (i.e. sulfur content varying greater than 10 grains/1000 cf gas) shall be considered as a change in natural gas supply. Sulfur content of the natural gas will be monitored weekly during the interim period when this monitoring schedule is being reexamined.

4. Records of sampling analysis and natural gas supply pertinent to this monitoring schedule shall be retained by FPL for a period of three years, and be available for inspection by appropriate regulatory personnel.

5. FPL will obtain the sulfur content of the natural gas from Florida Gas Transmission Company at its Brooker Lab.

Data from natural gas at the Brooker Lab site is considered representative of the sulfur content of the natural gas at the Lauderdale site since there is no additional entry point for sulfur or other elements/compounds which may affect the quality of the natural gas. The data presented in Attachment B is based upon representative samples of natural gas taken by Florida Gas Transmission.

If you or you staff have any questions about this request please call me at (407) 625-7661.

Sincerely,

Daniel M. MacDougall/DSK

Daniel M. MacDougall
Environmental Specialist
Florida Power & Light Company

cc: Mike Harley, FDER
Charles Logan, FDER
David McNeal, Region IV, EPA

HOPPING BOYD GREEN & SAMS

ATTORNEYS AND COUNSELORS

123 SOUTH CALHOUN STREET

POST OFFICE BOX 6526

TALLAHASSEE, FLORIDA 32314

(904) 222-7500

FAX (904) 224-8551

FAX (904) 681-2964

May 5, 1993

RECEIVED

MAY 05 1993

Division of Air
Resources Management

BY HAND DELIVERY

Clair Fancy, Chief
Bureau of Air Regulation
Florida Department of Environmental
Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: FPL Lauderdale Repowering Project
Request for Modification of Site Certification
PA 89-26

Dear Clair:

Enclosed for your information please find a copy of Broward County's letter to Buck Oven advising of no objection to the modification of the Lauderdale Repowering Project site certification proposed by Florida Power & Light Company on March 12, 1993. The proposed modification is the same, in substance, as the amendment to the corresponding PSD permit (PSD-FL-145) also requested by FPL on March 12, 1993. I thought you would be interested in Broward County's position on this, and I am forwarding the enclosed letter to you because I was not sure whether Buck has done so.

Sincerely,

Peter C. Cunningham

PCC/gbb

cc: Hamilton S. Oven, Jr.
Willard Hanks
Dan MacDougall

Enclosure

John J. Copelan, Jr.
County Attorney

BROWARD COUNTY
FLORIDA

OFFICE OF THE COUNTY ATTORNEY
115 S. Andrews Avenue, Suite 423
Fort Lauderdale, FL 33301

(305) 357-7600 • Telecopier (305) 357-7641 • Suncom 442-7600

RECEIVED
APR 15 1993
Hopping Boyd
Green & Sams

April 13, 1993

Our File: 90-185

Hamilton S. Oven, P.E.
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399

RE: **FPL Lauderdale Repowering Project--Request for Modification of Site Certification - PA 89-26**

Dear Mr. Oven:

Broward County (the "County") has received by certified mail a notice of intent to modify the repowering plant certification for the above-referenced matter.

The County has reviewed the modifications and additional conditions requested by FPL in its pleading and exhibits filed in this cause and dated March 12, 1993. Based upon our review of this material, this is to advise you that the County has no objections to the entry of an order granting the relief sought by FPL in the above-referenced matter.

Very truly yours,

Noel M. Pfeffer
Deputy County Attorney

NMP:dp

cc: Counsel of Record ✓

Oven.L01

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

For Routing To Other Than The Addressee	
To	Location
To	Location
To	Location
From	Date

Interoffice Memorandum

To: Hamilton Oven

Thru: Clair Fancy
Preston Lewis

From: Willard Hanks

Date: May 3, 1993

Subject: FPL Lauderdale Repowering Project Amendment Request

BAR has reviewed FPL's March 12, 1993 letter requesting that permit No. PSD-FL-145 for the Ft. Lauderdale Repowering Project be amended to allow an increase in the sulfur content of the natural gas burned at this facility and to reallocate the fuel consumption between the combustion turbines (CT) and the duct burners (DB). Additional information from FPL is needed before we can address this request. Please have FPL furnish BAR the following information:

1. REQUEST TO INCREASE SULFUR DIOXIDE (SO2) EMISSIONS FROM EACH CT FROM 0.97 LBS/HR TO 4.9 LBS/HR.

The proposed limit of 4.9 lbs/hr is based on natural gas containing 10 gr/1000 CF of sulfur. The 1990 analytical data from Florida Gas Transmission Company showed the natural gas averaged 4.3 gr/1000 CF and had a maximum sulfur content of 8.0 gr/1000 CF in 1990. Please provide additional support (analysis from other years, statement from an officer of Florida Gas Transmission Company, etc.) to justify any higher sulfur content of the natural gas then was shown in the 1990 data.

After the projected sulfur content of the natural gas is established, recalculate the increase in SO2 emissions. Address any changes this increase in emission will have on the ambient air impact.

2. REQUEST TO REALLOCATE THE FUEL BURNED IN THE DB TO THE CT

The PSD permit limits each duct burner to 90.62 MM Btu/hr of natural gas. Is your request to burn an additional 90.62 MM Btu/hr of either natural gas or distillate oil in each CT? Either way, there will be an increase in air pollutant emissions from the CT unless the emission factors (lbs/MM Btu) for some pollutants are reduced. Please provide a table showing the proposed emissions factors, emissions (lbs/hr and TPY), and change in emissions (TPY) under the worst fuel burning scenario. The table should be based on the amendment being approved and cover natural gas and distillate oil fuels along with each regulated air pollutant in the permit.

3. Please review specific conditions No. 2 along with the other specific conditions of the permit and note any changes your requested amendment would have on them.

The Department will need to review FPL's response to these questions before making any recommendation on the permit amendment.

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

April 16, 1993

FPL

Mr. C. H. Fancy, Chief
Bureau of Air Permitting
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399

RE: **FPL Lauderdale Repowering Project**
PA89-26, PSD-FL-145
40 CFR 60.334(a) CMS Information

Dear Mr. Fancy:

The repowered Units 4 & 5 at the FPL Lauderdale Plant have been permitted under the Power Plant Siting Act (Chapter 403 Part II F.S.) and a corresponding PSD permit. These units consist of 4 "advanced" dual fuel fired combustion turbines (CT), each with a heat recovery steam generator (HRSG).

In compliance with 40 CFR 60.334(a), PSD Condition 14 and Condition of Certification II.A.14, FPL is hereby providing the Department with information on the continuous monitoring system used to monitor and record the fuel consumption and the ratio of steam to fuel being injected into each CT. The system to be used is accurate to within the required ± 5 percent. Each CT will have its own monitoring system, which is connected to the main distributed control system.

The steam flow to each CT is measured by a pitot tube which has an accuracy of ± 1 percent of the steam flow. The fuel consumption of each CT is measured by an orifice plate which compensates for temperature and pressure. The orifice plate is also accurate to ± 1 percent of the fuel flow.

The two measuring devices each generate a milliamp signal which is sent to the plant's main distributive control system (DCS), Westinghouse's WDPFII. The DCS will calculate and record the steam to fuel ratio for each CT. The DCS also controls the motor control valves in the steam and fuel system. Therefore, the DCS will correct the steam injection rate, depending on the fuel flow, to maintain the correct steam to fuel ratio needed to comply with the NO_X limits.

If you have any questions about this information please call me (407) 625-7661.

Sincerely,

for Judy McHardy

Daniel M. MacDougall
Environmental Specialist
Florida Power & Light Company

DMM:jm

cc: H. S. Oven - DER/Tallahassee
T. Tittle - DER/WPB
D. McNeel - EPA/Atlanta

041693.lrp

RECEIVED

APR 22 1993

Division of Air
Resources Management

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

FPL

April 16, 1993

Mr. C. H. Fancy, Chief
Bureau of Air Permitting
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399

RE: Lauderdale Plant
PA89-26 PSD-FL-145
Compliance Testing Notification

Dear Mr. Fancy:

As required by PSD Condition 10 and Condition of Certification II A10, Lauderdale Units 4A will conduct their initial stack compliance test for Unit 4A May 18 - 20, 1993. FPL is providing by this letter 30 days advance notice of the compliance test as required by PSD Condition 17 and Condition of Certification II A17.

If you have any questions, please call me at (407) 625-7661.

Sincerely,

for Judy McGrady

Dan M. MacDougall
Environmental Specialist
Florida Power & Light Company

DMM:jmm

cc: Jewel Harper - EPA/Atlanta
H. S. Oven - DER/Tall
Tom Tittle - DER/WPB

041693.lrp

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

FPL

April 16, 1993

Mr. Clair Fancy, Chief
Bureau of Air Regulation
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399

RE: Martin CC/CG Project
PSD-FL-145
Anticipated Start-up

Dear Mr. Fancy:

In compliance with 40 CFR 60.7(a)(2), FPL is hereby notifying the Department that Martin Unit 3A is expected to initially fire the CT on May 22, 1993. Also, Martin Unit 3B is expected to initially fire the CT on May 26, 1993.

Please call me at (407) 625-7661 if you have any questions.

Sincerely,

for Judy McGrady
Dan MacDougall
Environmental Specialist
Florida Power & Light Company

DMM:jm

Enclosure

cc: Jewel Harper - EPA
Stephanie Brooks - DER/WPB
Buck Oven - DER/TAll

041693.pmr

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

FPL

March 15, 1993

Mr. Hamilton S. Oven, Jr.
Mr. Clair Fancy
Florida Department of Environmental Regulation
2600 Blair Stone Road, Room 612
Tallahassee, FL 32399-2400

RE: FPL Lauderdale Repowering Project
PA 89-26; PSD FL-145
Request to Modify EPA Method 20

Dear Messrs. Oven and Fancy:

As you may recall, Florida Power & Light Company (FPL) recently submitted a request for authorization to use Environmental Protection Agency (EPA) Method 7E for determining compliance with permitted nitrogen oxides (NO_x) emission limits rather than Method 20 listed in the site certification and PSD permit for the above-referenced project. Upon a closer comparison of Methods 7E and 20, FPL believes that Method 20 with a minor change in the methodology would be more appropriate. Therefore, FPL now requests authorization to use a slightly modified Method 20, described below, for determining compliance with permitted NO_x emission limits pursuant to Condition II.A.10 of the site certification, Specific Condition 10 of the Prevention of Significant Deterioration (PSD) permit, 40 C.F.R. § 60.8(b)(1), (5), and Rule 17-297.620, Florida Administrative Code.

EPA Method 20 requires a preliminary oxygen (O_2)/carbon dioxide (CO_2) traverse (48 points) to establish eight locations with the lowest O_2/CO_2 values. The NO_x emissions are to be measured at the required loads at these eight locations for each of the required loads (30, 50, 75 & 100 percent or four other points in the normal operating range). If FPL is able to demonstrate that no significant gas stratification occurs in the stack, we would propose that all eight samples be taken at a single port, contrary to the literal requirements of Section 6.1.2.4. Because of the insignificance in stratification, the same level of accuracy should be achieved. FPL therefore requests approval of the following testing protocol:

1. FPL proposes to conduct the preliminary O_2 or CO_2 traverse (48 points), consistent with EPA Method 1 (Section 2.3.1; see figure 1-3).

2. Upon demonstration that the total variation of the O_2/CO_2 values is less than five percent (sampling system bias check, Method 6C, Section 6.4.2), FPL would

identify the traverse (sample port) that had the lowest O_2/CO_2 concentration average.

3. FPL would then sample the NO_x concentration at the eight points (lowest O_2/CO_2) along that traverse (sample port) at the required loads as required by Method 20.

One of the greatest advantages of using this slightly modified Method 20 is the shorter length of time necessary to complete the testing. As you may know, the Lauderdale plant consists of two dual-fuel-fired Units (two combustion turbines (CTs) per unit, four CTs total) and NO_x emissions testing must be conducted for each CT at four different loads for each of the two fuels (eight test runs per CT, 32 runs total). If the testing is conducted using Method 20, the testing on oil would be conducted in approximately six hours (12 hours total both fuels per CT, 48 hours total). The primary fuel for the CTs is natural gas, rather than fuel oil. The annual cost of performing the tests on oil only would be approximately $404,544 (total for the 4 CTs), based on the cost of burning oil. By using this slightly modified Method 20 (taking 8 samples along a single traverse), the testing on oil could be completed in approximately four hours, and the annual cost would be approximately $269,696. This results in an annual savings of approximately $134,848, based on the cost of the oil alone.

This change in test methodology also reduces the potential for leaks and equipment breakage since the test apparatus is not moved around during the test period. All aspects of NO_x compliance testing will be performed in accordance with Method 20 except as indicated in this request.

In addition to the above request, FPL is notifying the Department that it intends to use Method 5B and Method 8 simultaneously, where deemed feasible, for sulfur dioxide/sulfuric acid mist and particulate matter emissions testing.

The stack testing is anticipated to begin in late April for Unit 4 (CT 4 A and B). Therefore, FPL would appreciate a prompt response to its request. If you have any questions, please call me at (407) 625-7661 or A. J. de la Vega at (305) 252-3098.

Sincerely,

Dan MacDougall

Dan MacDougall /arm
Environmental Specialist
Environmental Affairs

cc: Mike Harley, DER
Charles Logan, DER
Tom Tittle, DER SE District
David McNeal, EPA Region IV

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

FPL

March 12, 1993

Mr. C. H. Fancy, Chief
Bureau of Air Permitting
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399

RE: FPL Lauderdale Repowering Project
PA89-26, PSD-FL-145
PSD Permit Amendment Request

Dear Mr. Fancy:

The repowered Units 4 & 5 at the FPL Lauderdale Plant have been permitted under the Power Plant Siting Act (Ch. 403, Part II, F.S.) and a corresponding PSD permit which was issued on March 14, 1991. These combined cycle units consist of 4 dual fuel fired "advanced" combustion turbines (CT), each with a heat recovery steam generator (HRSG).

As a result of recent information, FPL has identified the need to make the following minor changes to the PSD permit: 1) change the SO_2 emission limit for the CT when firing natural gas and 2) establish alternate emission limits for the Project that will reallocate to the CTs the fuel usage and annual emissions from the duct burners until such time as those burners are installed in the transitional duct of the HRSG as originally planned. In parallel to this request, FPL is seeking a separate modification of the site certification to address these same issues. These changes are explained below with proposed revised language for the affected PSD Permit specific conditions presented in Attachment B hereto.

FPL has recently obtained information which suggests that the sulfur content of 2 grains per 1000 cubic feet (cf) of natural gas, used to license the Project, was only the hydrogen sulfide in the gas and not the total sulfur. The total sulfur content includes the sulfur from the mercaptans which are added for safety reasons. FPL is requesting that the SO_2 emissions for the CTs when firing natural gas be changed from 0.97 lb/hr to 4.9 lb/hr, based on a sulfur content of the natural gas of 10 grains per 1000 cf. The data presented in Attachment A shows that the total sulfur content of the natural gas is in the 0 to 10 grains range, based upon representative samples of natural gas taken by Florida Gas Transmission, which will be the natural gas supplier for the Project. Therefore, FPL believes that the requested 10 grains per 1000 cf is an appropriate basis to establish emission limits for the Project. It should be noted that the increase in emission when firing natural gas will in no way affect the air quality impact increased emissions due to the larger amount of total sulfur in the natural gas to be supplied to the Project.

The duct burners were designed to provide additional heat (energy) to the CT exhaust gas to increase the amount of steam produced by the HRSG and correspondingly to increase MWs generated by the steam turbine. As originally designed, the duct burners would have generated an additional 11 MW from each Unit (22 MW total). However, CT design evolutions have increased the CT exhaust gas heat (energy) quantity and the HRSG has been optimized to recover more heat (energy) such that the additional output from the duct burners would be only 5.7 MW per Unit (11.4 MW total) when referenced to 95°F. Although duct burners are somewhat attractive on a cost per KW basis, the current total capital cost and operating cost favor not installing the duct burners at this time.

Therefore, FPL would like to reallocate the fuel used and the annual emissions from the duct burners back to the CT until such time as FPL installs the duct burners. New Condition 5b in Attachment B reflects the reallocation of these emissions from the duct burners to the CTs. This reallocation will not increase the impact to the environment since the new annual emissions from the CT will not be higher than the sum of the original CT annual emissions and the duct burners annual emissions. In fact, the requested annual emissions of VOC and CO from the CT is less than the originally permitted total of the CT and duct burner combined.

Because the current design does not preclude the installation of the duct burners in the future, FPL would like to reserve the right to install the duct burners at a later date should the Project economics favor such a decision. At such time as the duct burners are installed, FPL would comply with the limitations in Condition 5a which were established when the Project was originally certified and issued a PSD Permit (except for the slightly increased SO_2 emissions). FPL believes that since there will be no increase in the total annual emissions or an increase in fuel consumed by the Project, no formal modification to the PSD permit is required for this reallocation of fuel usage and annual emissions.

If you have any question about this request please call me at (407) 625-7661.

Daniel M MacDougall/DSR

Daniel M. MacDougall
Environmental Specialist
Florida Power & Light Company

cc: Doug Neeley-EPA/Atlanta
H.S. Oven-DER/Tal
Tom Title-DER/WPB
Richard Donelan-DER/Tal
Peter Cunningham-HBGS

FPL LAUDERDALE REPOWERING PROJECT

REQUEST FOR AMENDMENT OF PSD PERMIT

ATTACHMENT A

FPL LAUDERDALE REPOWERING PROJECT

REQUEST FOR AMENDMENT OF PSD PERMIT

ATTACHMENT B

PROPOSED REVISED PERMIT CONDITIONS

ATTACHMENT A

Sulfur Content of Natural Gas

Date	Sulfur Content (gr/1000 cf)
02/06/90	3.0
02/13/90	0.5
02/20/90	3.5
02/27/90	4.5
03/06/90	4.5
03/13/90	3.0
03/20/90	3.5
03/27/90	3.5
04/03/90	6.0
04/10/90	2.5
04/17/90	4.0
04/24/90	3.0
05/01/90	4.0
05/08/90	2.5
05/15/90	2.0
06/05/90	4.5
06/12/90	4.0
06/19/90	7.0
06/26/90	4.5
07/03/90	5.5
07/10/90	3.5
07/17/90	4.5
07/30/90	3.0
08/07/90	5.0
08/14/90	4.5
08/21/90	4.0
08/28/90	7.0
09/04/90	5.5
09/11/90	4.0
09/18/90	4.5
09/25/90	4.0
10/02/90	4.5
10/09/90	4.5
10/16/90	7.0
10/28/90	8.0
Average	4.3
Maximum	8.0
Minimum	0.5

Source: Florida Gas Transmission Company, 1990

NOTES: * Refers to the maximum facility emissions (four CTs). With capacity factor limitations of ~~40~~ 25 percent on oil ~~and 87 percent for the facility~~.

~~+ Refers to maximum duct burner emissions at 87 percent capacity factor.~~

NOx emissions from duct burners are based on an as-fired emission limitation of 0.11 lbs/MMBtu.

Sulfur dioxide emissions assume a maximum of 0.3 percent sulfur in fuel oil for hourly emissions and an average sulfur content of 0.2 percent for annual emissions.

* * *

b. Until the duct burners are installed, the maximum allowable emissions from each CT in accordance with the BACT determination shall not exceed the following emission limitations at 75°F:

Pollutant	Basis	Fuel	Emission Limitations ** lb/hr/CT	4 CT * (TPY)
NO_x	42 ppmvd	Gas	264	
	65 ppmvd	Oil	422	4,868
VOC	1 ppmvd	Gas	1.3	
	6 ppmvd	Oil	7.8	50
CO	30 ppmvd	Gas	89	
	33 ppmvd	Oil	100	1,489
PM/PM_{10}		Gas	14.7	
		Oil	58.0	424.7
SO_2		Gas	4.9	
		Oil	538	1,629

CT-Combustion Turbine

SPECIFIC CONDITIONS:

1. The maximum heat input to each combustion turbine (CT) shall neither exceed 1,685.0 MMBtu/hr while firing natural gas, nor 1,646.9 MMBtu/hr while firing fuel oil (@75°F). Each CTs fuel consumption shall be continuously measured and recorded. The maximum heat input to each duct burner shall not exceed 90.62 MMBtu/hr. Each duct burner's fuel consumption shall be continuously measured and recorded. In the event duct burners are not installed, the maximum heat input to each CT shall neither exceed 1,775.62 MMBtu/hr. while firing natural gas nor 1,646.9 MMBtu/hr. while firing fuel oil (@75°F).

* * *

5. a. The maximum allowable emissions from each CT and duct burner in accordance with the BACT determination shall not exceed the following emission limitations at 75°F:

Pollutant	Basis	Fuel	Emission Limitations * lb/hr/CT	lb/hr/DB	4 CT * (TPY)	4DB* (TPY)
NO_x	42 ppmvd	Gas	264	10.0		152
	65 ppmvd	Oil	422		4,716	
VOC	1 ppmvd	Gas	1.3	2.0		30.5
	6 ppmvd	Oil	7.8		48.3	
CO	30 ppmvd	Gas	89	17.6		268
	33 ppmvd	Oil	100		1,405	
PM/PM_{10}		Gas	14.7	0.7		10.7
		Oil	58.0		414	
SO_2		Gas	~~0.97~~ 4.9	~~0.05~~ 0.25		~~0.8~~ 4.0
		Oil	538		~~1,582~~ 1,625	

CT-Combustion Turbine
DB-Duct Burners

NOTES: * Refers to the maximum facility emissions (four CTs). With capacity factor limitations of 25 percent on oil ~~and 87 percent for the facility.~~

** Table revised to reflect removal of the duct burners and reallocation of the annual emissions to the CTs.

Sulfur dioxide emissions assume a maximum of 0.3 percent sulfur in fuel oil for hourly emissions and an average sulfur content of 0.2 percent for annual emissions.

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

FPL

March 12, 1993

Mr. C. H. Fancy, Chief
Bureau of Air Permitting
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399

RE: FPL Lauderdale Repowering Project
PA 89-26, PSD-FL-145
Customized Fuel Monitoring Schedule

Dear Mr. Fancy:

The repowered Units 4 & 5 at the FPL Lauderdale Plant have been permitted under the Power Plant Siting Act (Chp 403 Part II F.S.) and a corresponding PSD permit. These Units consist of 4 dual fuel fired "advanced" combustion turbines, with heat recovery steam generators (HRSG). The combustion turbines are subject to New Source Performance Standards (NSPS-40 CFR 60, Subpart GG). 40 CFR 60.334(b) requires the owner/operator of any combustion turbine to monitor the sulfur and nitrogen content of the fuel as follows: 1) If the turbine fuel is supplied by a bulk storage tank then the sulfur and nitrogen content are to be determined whenever new fuel is transferred into the bulk storage tank and 2) If the turbine fuel is supplied without an intermediate bulk storage tank then daily monitoring of the sulfur and nitrogen content of the fuel is required. FPL has an intermediate bulk storage tank(s) for the light distillate oil and will test the sulfur and nitrogen content of the fuel oil as required by 40 CFR 60.334(b)(2).

Since the natural gas used by the combustion turbines does not pass through an intermediate bulk storage tank, FPL is hereby requesting a customized fuel monitoring schedule as allowed by 40 CFR 60.334(b)(2) for the Lauderdale Plant. While firing natural gas, FPL requests the following customized fuel monitoring schedule which was developed based on an EPA guidance memorandum (Attachment A):

1. Monitoring of natural gas nitrogen content shall not be required in accordance with page 2 of the EPA guidance memorandum and the attached enclosure.

2. Sulfur Monitoring

a. Analysis for sulfur content of the natural gas shall be conducted using one of the EPA approved ASTM reference methods for the measurement of sulfur in gaseous fuels, or an approved alternate method. The reference methods are: ASTM D1072-80; ASTM D3031-81; ASTM D3245-81; and ASTM D4048-82 as referenced in 40 CFR 60.335(b)(2).

b. Effective on the commercial operation date of the CTs or the approval date of the customized fuel monitoring schedule whichever is later, sulfur monitoring shall be conducted twice a month for six months. If this monitoring shows little variability in the sulfur content and indicates consistent compliance with 40 CFR 60.333, then sulfur monitoring shall be conducted once per quarter for six quarters.

c. If the monitoring required by 2(b), above, of the sulfur content of the natural gas shows little variability and the calculated sulfur dioxide emissions, represents consistent compliance with the sulfur dioxide emission limits specified under 40 CFR 60.333, sample analysis shall be conducted twice per year. This monitoring shall be conducted during the first and third quarters of each calendar year.

d. Should any sulfur analysis as required by items 2(b) or 2(c) above indicate noncompliance with 40 CFR 60.333, FPL will notify the Department of Environmental Regulation of such excess emission and the customized fuel monitoring schedule shall be reexamined. The sulfur content of the natural gas will be monitored weekly during the interim period while this monitoring schedule is being reexamined.

3. FPL will notify the Department of Environmental Regulation of any change in natural gas supply for reexamination of this monitoring schedule. A substantial change in natural gas quality (i.e. sulfur content varying greater than 10 grains/1000 cf gas) shall be considered as a change in natural gas supply. Sulfur content of the natural gas will be monitored weekly during the interim period when this monitoring schedule is being reexamined.

4. Records of sampling analysis and natural gas supply pertinent to this monitoring schedule shall be retained by FPL for a period of three years, and be available for inspection by appropriate regulatory personnel.

5. FPL will obtain the sulfur content of the natural gas from Florida Gas Transmission Company at its Brooker Lab.

Data from natural gas at the Brooker Lab site is considered representative of the sulfur content of the natural gas at the Lauderdale site since there is no additional entry point for sulfur or other elements/compounds which may affect the quality of the natural gas. The data presented in Attachment B is based upon representative samples of natural gas taken by Florida Gas Transmission.

If you or you staff have any questions about this request please call me at (407) 625-7661.

Sincerely,

Daniel M. MacDougall/DSR

Daniel M. MacDougall
Environmental Specialist
Florida Power & Light Company

cc: Mike Harley, FDER
Charles Logan, FDER
David McNeal, Region IV, EPA

BEST AVAILABLE COPY

ATTACHMENT A

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 14 1987

OFFICE OF
AIR AND RADIATION

MEMORANDUM

SUBJECT: Authority for Approval of Custom Fuel Monitoring Schedules Under NSPS Subpart GG

FROM: John B. Rasnic, Chief
Compliance Monitoring Branch

TO: Air Compliance Branch Chiefs
Regions II, III, IV, V, VI and IX

Air Programs Branch Chiefs
Regions I-X

The NSPS for Stationary Gas Turbines (Subpart GG) at 40 CFR 60.334(b)(2) allows for the development of custom fuel monitoring schedules as an alternative to daily monitoring of the sulfur and nitrogen content of fuel fired in the turbines. Regional Offices have been forwarding custom fuel monitoring schedules to the Stationary Source Compliance Division (SSCD) for consideration since it was understood that authority for approval of these schedules was not delegated to the Regions. However, in consultation with the Emission Standards and Engineering Division, it has been determined that the Regional Offices do have the authority to approve Subpart GG custom fuel monitoring schedules. Therefore it is no longer necessary to forward these requests to Headquarters for approval.

Over the past few years, SSCD has issued over twenty custom schedules for sources using pipeline quality natural gas. In order to maintain national consistency, we recommend that any schedules Regional Offices issue for natural gas be no less stringent than the following: sulfur monitoring should be bimonthly, followed by quarterly, then semiannual, given at least six months of data demonstrating little variability in sulfur content and compliance with §60.333 at each monitoring frequency; nitrogen monitoring can be waived for pipeline quality natural gas, since there is no fuel-bound nitrogen and since the free nitrogen does not contribute appreciably to NO_x emissions. Please see the attached sample custom schedule for details. Given the increasing trend in the use of pipeline quality natural gas, we are investigating the possibility of amending Subpart GG to allow for less frequent sulfur monitoring and a waiver of nitrogen monitoring requirements where natural gas is used.

Where sources using oil request custom fuel monitoring schedules, Regional Offices are encouraged to contact SSCD for consultation on the appropriate fuel monitoring schedule. However, Regions are not required to send the request itself to SSCD for approval.

If you have any questions, please contact Sally M. Farrell at FTS 382-2875.

Attachment

cc: John Cronshaw
George Walsh
Robert Ajax
Earl Salo

BEST AVAILABLE COPY

Enclosure

Conditions for Custom Fuel Sampling Schedule for Stationary Gas Turbines

1. Monitoring of fuel nitrogen content shall not be required while natural gas is the only fuel fired in the gas turbine.

2. Sulfur Monitoring

   a. Analysis for fuel sulfur content of the natural gas shall be conducted using one of the approved ASTM reference methods for the measurement of sulfur in gaseous fuels, or an approved alternative method. The reference methods are: ASTM D1072-80; ASTM D3031-81; ASTM D3246-81; and ASTM D4084-82 as referenced in 40 CFR 60.335(b)(2).

   b. Effective the date of this custom schedule, sulfur monitoring shall be conducted twice monthly for six months. If this monitoring shows little variability in the fuel sulfur content, and indicates consistent compliance with 40 CFR 60.333, then sulfur monitoring shall be conducted once per quarter for six quarters.

   c. If after the monitoring required in item 2(b) above, or herein, the sulfur content of the fuel shows little variability and, calculated as sulfur dioxide, represents consistent compliance with the sulfur dioxide emission limits specified under 40 CFR 60.333, sample anaylsis shall be conducted twice per annum. This monitoring shall be conducted during the first and third quarters of each calendar year.

   d. Should any sulfur analysis as required in items 2(b) or 2(c) above indicate noncompliance with 40 CFR 60.333, the owner or operator shall notify the State Air Control Board) of such excess emissions and the custom schedule shall be re-examined by the Environmental Protection Agency. Sulfur monitoring shall be conducted weekly during the interim period when this custom schedule is being re-examined.

3. If there is a change in fuel supply, the owner or operator must notify the State of such change for re-examination of this custom schedule. A substantial change in fuel quality shall be considered as a change in fuel supply. Sulfur monitoring shall be conducted weekly during the interim period when this custom schedule is being re-examined.

4. Records of sample analysis and fuel supply pertinent to this custom schedule shall be retained for a period of three years, and be available for inspection by personnel of federal, state, and local air pollution control agencies.

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

FPL

RECEIVED $10,000 fee modification

MAR 12 1993

Division of Air
Resources Management

March 12, 1993

Mr. C. H. Fancy, Chief
Bureau of Air Permitting
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399

RE: FPL Lauderdale Repowering Project
PA89-26, PSD-FL-145
PSD Permit Amendment Request

Dear Mr. Fancy:

The repowered Units 4 & 5 at the FPL Lauderdale Plant have been permitted under the Power Plant Siting Act (Ch. 403, Part II, F.S.) and a corresponding PSD permit which was issued on March 14, 1991. These combined cycle units consist of 4 dual fuel fired "advanced" combustion turbines (CT), each with a heat recovery steam generator (HRSG).

As a result of recent information, FPL has identified the need to make the following minor changes to the PSD permit: 1) change the SO_2 emission limit for the CT when firing natural gas and 2) establish alternate emission limits for the Project that will reallocate to the CTs the fuel usage and annual emissions from the duct burners until such time as those burners are installed in the transitional duct of the HRSG as originally planned. In parallel to this request, FPL is seeking a separate modification of the site certification to address these same issues. These changes are explained below with proposed revised language for the affected PSD Permit specific conditions presented in Attachment B hereto.

FPL has recently obtained information which suggests that the sulfur content of 2 grains per 1000 cubic feet (cf) of natural gas, used to license the Project, was only the hydrogen sulfide in the gas and not the total sulfur. The total sulfur content includes the sulfur from the mercaptans which are added for safety reasons. FPL is requesting that the SO_2 emissions for the CTs when firing natural gas be changed from 0.97 lb/hr to 4.9 lb/hr, based on a sulfur content of the natural gas of 10 grains per 1000 cf. The data presented in Attachment A shows that the total sulfur content of the natural gas is in the 0 to 10 grains range, based upon representative samples of natural gas taken by Florida Gas Transmission, which will be the natural gas supplier for the Project. Therefore, FPL believes that the requested 10 grains per 1000 cf is an appropriate basis to establish emission limits for the Project. It should be noted that the increase in emission when firing natural gas will in no way affect the air quality impact increased emissions due to the larger amount of total sulfur in the natural gas to be supplied to the Project.

The duct burners were designed to provide additional heat (energy) to the CT exhaust gas to increase the amount of steam produced by the HRSG and correspondingly to increase MWs generated by the steam turbine. As originally designed, the duct burners would have generated an additional 11 MW from each Unit (22 MW total). However, CT design evolutions have increased the CT exhaust gas heat (energy) quantity and the HRSG has been optimized to recover more heat (energy) such that the additional output from the duct burners would be only 5.7 MW per Unit (11.4 MW total) when referenced to 95°F. Although duct burners are somewhat attractive on a cost per KW basis, the current total capital cost and operating cost favor not installing the duct burners at this time.

Therefore, FPL would like to reallocate the fuel used and the annual emissions from the duct burners back to the CT until such time as FPL installs the duct burners. New Condition 5b in Attachment B reflects the reallocation of these emissions from the duct burners to the CTs. This reallocation will not increase the impact to the environment since the new annual emissions from the CT will not be higher than the sum of the original CT annual emissions and the duct burners annual emissions. In fact, the requested annual emissions of VOC and CO from the CT is less than the originally permitted total of the CT and duct burner combined.

Because the current design does not preclude the installation of the duct burners in the future, FPL would like to reserve the right to install the duct burners at a later date should the Project economics favor such a decision. At such time as the duct burners are installed, FPL would comply with the limitations in Condition 5a which were established when the Project was originally certified and issued a PSD Permit (except for the slightly increased SO_2 emissions). FPL believes that since there will be no increase in the total annual emissions or an increase in fuel consumed by the Project, no formal modification to the PSD permit is required for this reallocation of fuel usage and annual emissions.

If you have any question about this request please call me at (407) 625-7661.

Daniel M. MacDougall / DSR

Daniel M. MacDougall
Environmental Specialist
Florida Power & Light Company

cc: Doug Neeley-EPA/Atlanta
H.S. Oven-DER/Tal
Tom Title-DER/WPB
Richard Donelan-DER/Tal
Peter Cunningham-HBGS
W. Hanks
J. Rogers

FPL LAUDERDALE REPOWERING PROJECT

REQUEST FOR AMENDMENT OF PSD PERMIT

ATTACHMENT A

ATTACHMENT A

Sulfur Content of Natural Gas

Date	Sulfur Content (gr/1000 cf)
02/06/90	3.0
02/13/90	0.5
02/20/90	3.5
02/27/90	4.5
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03/13/90	3.0
03/20/90	3.5
03/27/90	3.5
04/03/90	6.0
04/10/90	2.5
04/17/90	4.0
04/24/90	3.0
05/01/90	4.0
05/08/90	2.5
05/15/90	2.0
06/05/90	4.5
06/12/90	4.0
06/19/90	7.0
06/26/90	4.5
07/03/90	5.5
07/10/90	3.5
07/17/90	4.5
07/30/90	3.0
08/07/90	5.0
08/14/90	4.5
08/21/90	4.0
08/28/90	7.0
09/04/90	5.5
09/11/90	4.0
09/18/90	4.5
09/25/90	4.0
10/02/90	4.5
10/09/90	4.5
10/16/90	7.0
10/28/90	8.0
Average	4.3
Maximum	8.0
Minimum	0.5

Source: Florida Gas Transmission Company, 1990

FPL LAUDERDALE REPOWERING PROJECT

REQUEST FOR AMENDMENT OF PSD PERMIT

ATTACHMENT B

PROPOSED REVISED PERMIT CONDITIONS

SPECIFIC CONDITIONS:

1. The maximum heat input to each combustion turbine (CT) shall neither exceed 1,685.0 MMBtu/hr while firing natural gas, nor 1,646.9 MMBtu/hr while firing fuel oil (@75°F). Each CTs fuel consumption shall be continuously measured and recorded. The maximum heat input to each duct burner shall not exceed 90.62 MMBtu/hr. Each duct burner's fuel consumption shall be continuously measured and recorded. In the event duct burners are not installed, the maximum heat input to each CT shall neither exceed 1,775.62 MMBtu/hr. while firing natural gas nor 1,646.9 MMBtu/hr. while firing fuel oil (@75°F).

* * *

5. a. The maximum allowable emissions from each CT and duct burner in accordance with the BACT determination shall not exceed the following emission limitations at 75°F:

Pollutant	Basis	Fuel	Emission Limitations *			
			lb/hr/CT	lb/hr/DB	4 CT * (TPY)	4DB* (TPY)
NO_x	42 ppmvd	Gas	264	10.0		152
	65 ppmvd	Oil	422		4,716	
VOC	1 ppmvd	Gas	1.3	2.0		30.5
	6 ppmvd	Oil	7.8		48.3	
CO	30 ppmvd	Gas	89	17.6		268
	33 ppmvd	Oil	100		1,405	
PM/PM_{10}		Gas	14.7	0.7		10.7
		Oil	58.0		414	
SO_2		Gas	~~0.97~~ 4.9	~~0.05~~ 0.25		~~0.8~~ 4.0
		Oil	538		~~1,582~~ 1,625	

CT-Combustion Turbine
DB-Duct Burners

NOTES: * Refers to the maximum facility emissions (four CTs). With capacity factor limitations of ~~40~~ 25 percent on oil ~~and 87 percent for the facility.~~

~~+ Refers to maximum duct burner emissions at 87 percent capacity factor.~~

NOx emissions from duct burners are based on an as-fired emission limitation of 0.11 lbs/MMBtu.

Sulfur dioxide emissions assume a maximum of 0.3 percent sulfur in fuel oil for hourly emissions and an average sulfur content of 0.2 percent for annual emissions.

* * *

b. Until the duct burners are installed, the maximum allowable emissions from each CT in accordance with the BACT determination shall not exceed the following emission limitations at 75°F:

Pollutant	Basis	Fuel	Emission Limitations **	
			lb/hr/CT	4 CT * (TPY)
NO_x	42 ppmvd	Gas	264	
	65 ppmvd	Oil	422	4,868
VOC	1 ppmvd	Gas	1.3	
	6 ppmvd	Oil	7.8	50
CO	30 ppmvd	Gas	89	
	33 ppmvd	Oil	100	1,489
PM/PM_{10}		Gas	14.7	
		Oil	58.0	424.7
SO_2		Gas	4.9	
		Oil	538	1,629

CT-Combustion Turbine

NOTES: * Refers to the maximum facility emissions (four CTs). With capacity factor limitations of 25 percent on oil ~~and 87 percent for the facility.~~

** Table revised to reflect removal of the duct burners and reallocation of the annual emissions to the CTs.

Sulfur dioxide emissions assume a maximum of 0.3 percent sulfur in fuel oil for hourly emissions and an average sulfur content of 0.2 percent for annual emissions.

FACSIMILE COVER SHEET

FPL

FLORIDA POWER & LIGHT COMPANY
GOLDEN BEAR
11770 U.S. HIGHWAY ONE
P. O. BOX 088801
NORTH PALM BEACH, FLORIDA 33408-8801

DATE: 3/2/93 19 ____

SEND TO:

NAME: Buck Oven / Clair Fancy

COMPANY ____

FACSIMILE PHONE NUMBER: 904-922-6979

PHONE NUMBER/EXTENSION: ____

FROM: Don MacDougall
ENVIRONMENTAL AFFAIRS DEPARTMENT (JEN/GB)

PHONE NUMBER (407) 625-7661

TOTAL NUMBER OF PAGES (INCLUDING COVER PAGE): 2

SPECIAL INSTRUCTIONS:

Advance Copy

JEN/GB FACSIMILE PHONE NO: (407) 625-7666

FACSIMILE OPERATOR/TELEPHONE NO: ____ / (407) 625____

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

FPL

February 27, 1993

Mr. C. H. Fancy, Chief
Bureau of Air Permitting
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399

RE: FPL Lauderdale Repowering Project
PA89-26 PSD-FL-145
Cancellation of Compliance Testing Notification

Dear Mr. Fancy:

On February 1, 1993, FPL notified the Department of its intent to conduct stack compliance tests for Unit 4B on March 9-11 and for Unit 4A on March 16-18. Due to mechanical problems with the combustion turbines, FPL is hereby notifying you that the stack compliance tests scheduled for March are canceled and will be rescheduled. At this time FPL does not know when the CTs will be available for testing. Therefore, FPL will again notify your office at least 30 days in advance of the scheduled stack compliance test.

If you have any questions, please call me at (407) 625-7661.

Sincerely,

Dan M. MacDougall
Environmental Specialist
Florida Power & Light Company

DMM:jmm

cc: Jewel Harper - EPA/Atlanta
H. S. Oven - DER/Tall
Tom Tittle - DER/WPB

030193.lrp

Post-It™ brand fax transmittal memo 7671 | # of pages ▸

To	From
Co.	Co.
Dept.	Phone #
Fax #	Fax #

FPL

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

February 27, 1993

RECEIVED

MAR 05 1993

Division of Air
Resources Management

Mr. C. H. Fancy, Chief
Bureau of Air Permitting
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399

RE: FPL Lauderdale Repowering Project
PA89-26 PSD-FL-145
Cancellation of Compliance Testing Notification

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If you have any questions, please call me at (407) 625-7661.

Sincerely,

Dan M. MacDougall
Environmental Specialist
Florida Power & Light Company

DMM:jmm

cc: Jewel Harper - EPA/Atlanta
H. S. Oven - DER/Tall
Tom Tittle - DER/WPB

030193.lrp

Florida Department of Environmental Regulation

Southeast District • P.O. Box 15425 • West Palm Beach, Florida 33416

Lawton Chiles, Governor

1900 S. Congress Ave., Suite A
Telephone: 407/433-2650
Fax: 407/433-2666

Virginia B. Wetherell, Secretary

FEB 24 1993

Broward County
AP - FPL Lauderdale Plant
Units 4 & 5,Turbines 1-24 & Tanks

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Martin A. Smith, Manager
Environmental Permitting & Programs
Florida Power & Light Company
P.O.Box 078768
West Palm Beach, Florida 33407-0768

Dear Mr. Smith:

Re: Modification of Permit, Permit Number AO 06-199041

We are in receipt of your request for modification of the permit. The permit is changed as follows:

1. <u>FROM:</u> (Page 1 of 7 Paragraph 2)

   OPERATE: An air pollution source consisting of the following:

   <u>TO:</u>

   OPERATE: Air Pollution sources consisting of the following:

2. <u>FROM:</u> (Page 5 of 7 Specific Condition 5)

   5. During steady state operations: A) visible emissions shall not exceed 20% opacity during the 3 hour period of excess emissions allowed for soot blowing and load changes, and B) particulate emissions shall not exceed 0.1 pounds per million Btu heat input.

   <u>TO:</u>

   5. During steady state operations: A) visible emissions shall not exceed 20% opacity and B) particulate emissions shall not exceed 0.1 pounds per million Btu heat input.

RECEIVED

MAR 01 1993

Division of Air
Resources Management

BEST AVAILABLE COPY

FEB 24 1993

Mr. Martin A. Smith, Manager
Florida Power & Light Company
Page 2

3. FROM: (Page 5 of 7 Specific Condition 11)

11. Total VOC emissions from both units when operating at their permitted capacity shall not exceed 16.5 lbs/hr. when they are burning natural gas.

TO:

11. Total VOC emissions from both units when operating at their permitted capacity shall not exceed 16.5 lbs./hr. when they are burning oil and 4.49 lbs./hr. when they are burning natural gas.

4. FROM: (Page 5 of 7 Specific Condition 16)

16. Emissions compliance testing should be conducted with the source firing No. 6 fuel oil and/or natural gas and operating within ten percent (10%) of its permitted capacity; provided, however, that such testing may be conducted with the source operating at less than ninety percent (90%) of its permitted capacity, in which case the source may subsequently be operated at any capacity up to one hundred ten percent (110%) of the average load at which compliance was demonstrated, and at higher capacities for up to fifteen days for purposes of additional compliance testing. A particular test to show compliance must be conducted within sixty (60) days of the monthly fuel analysis if the equivalent sulfur content of the fuel burned (fuel oil and/or natural gas) is increased by 0.5 percentage points or more from that used during the previous test.

TO:

16. Emissions compliance testing should be conducted with the source firing No. 6 fuel oil and/or natural gas and operating within ten percent (10%) of its permitted capacity; provided, however, that such testing may be conducted with the source operating at less than ninety percent (90%) of its permitted capacity, in which case the source may subsequently be operated at any capacity up to one hundred ten percent (110%) of the average load at which compliance was demonstrated, and at higher capacities for up to fifteen days for purposes of additional compliance testing. A particulate test to show compliance must be conducted within sixty (60) days of the monthly fuel analysis if the equivalent sulfur content of the fuel burned (fuel oil and/or natural gas) is increased by 0.5 percentage points or more from that used during the previous test.

5. FROM: (Page 6 of 7 Specific Condition 22)

22. The VOC emission factors for the gas turbines shall be confirmed every five (5) years by EPA Method 25A tests as described in 40 CFR 60, Appendix A (July 1, 1988) on any of the gas turbines while burning 10% natural gas and while burning 100% No. 2 fuel oil.

TO:

22. The VOC emission factors for the gas turbines shall be confirmed every five (5) years by EPA Method 25A tests as described in 40 CFR 60, Appendix A (July 1, 1988) on any of the gas turbines while burning 100% natural gas and while burning 100% No. 2 fuel oil.

FEB 24 1993

This letter must be attached to the original permit and becomes part of that permit.

This letter constitutes final agency action unless a person substantially affected by this action requests an administrative hearing pursuant to Section 120.57, Florida Statutes. The petition must be filed within fourteen (14) days from receipt of this letter. The petition must comply with the requirements of Florida Administrative Code Rule 28-5.201 and be filed pursuant to Rule 17-103.155(1) in the Office of General Counsel of the Department of Environmental Regulation at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Petitions which are not filed in accordance with the above provisions will not be accepted by the Department if a formal proceeding pursuant to Section 120.57(1) is requested, at such formal hearing all parties shall have an opportunity to respond to present evidence and argument on all issues involved, to conduct cross-examination of witnesses and submit rebuttal evidence, to submit proposed findings of facts and orders, to file exceptions to any order or hearing officers's recommended order, and to be represented by counsel. If an informal proceeding is requested, the agency will, in accordance with its rules of procedure, give affected persons or parties or their counsel an opportunity, at a convenient time and place, to present to the agency or hearing officer written or oral evidence in opposition to the agency's action or refusal to act, or a written statement challenging the grounds upon which the agency has chosen to justify it action or inaction, pursuant to Section 120.57(2), Florida Statutes. The hearing process is designed to formulate agency action. Accordingly, the Department's final action as a result of a hearing may be different from the position taken by it in this stage. Therefore any person who may wish to contest the Department's ultimate permitting decision must petition for hearing within the fourteen day period described above. 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.

This modification is final and effective on the date filed with the Clerk of the Department unless a petition is filed in accordance with the above paragraphs or unless a request for extension of time in which to file a petition is filed within the time specified for filing a petition and conforms to Rule 17-103.070, F.A.C. Upon timely filing of a petition or a request for an extension of time this modification will not be effective until further Order of the Department.

When the Order (Modification) is final, any party to the Order has the right to seek judicial review of the Order pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate procedure, with the Clerk of the Department in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date the Final Order is filed with the Clerk of the Department.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

Mary E. S. Williams

Mary E. S. Williams
Director of District Management
F.D.E.R. Southeast District
West Palm Beach, FL 33416
407/433-2650

CERTIFICATE OF SERVICE

This is to certify that this MODIFICATION OF PERMIT and all copies were mailed before the close of business on FEB 24 1993 to the listed persons.

Clerk Stamp

FILING AND ACKNOWLEDGEMENT FILED, on this date, pursuant to §120.52(10), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Gloria Lindsey
Clerk

FEB 24 1993
Date

MESW:ms:gml

Copies furnished to: Elsa A. Bishop, FPL
Clair Fancy, DER/ARM
Broward County Department of Natural Resource Protection
Claire Lardner, OGC/Tlh.

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

FPL

February 10, 1993

Mr. Clair Fancy, Chief
Bureau of Air Regulation
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399

RE: Lauderdale Repowering
PAD-FL-145
Initial Start-up of CT5A

Dear Mr. Fancy:

In compliance with 40 CFR 60.7(a)(3), FPL is hereby notifying the Department that Lauderdale Repowering project initially fire CT5A on February 5, 1993.

Please call me at (407) 625-7661 if you have any questions.

Sincerely,

for Russell M McGrady

Dan MacDougall
Environmental Specialist
Florida Power & Light Company

DMM:jm

Enclosure

cc: Jewel Harper - EPA
Tom Tittle - DER/WPB
Buck Oven - DER/TAll

021093.lrp

FPL

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

February 10, 1993

Mr. Clair Fancy, Chief
Bureau of Air Regulation
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399

RE: Lauderdale Repowering
PAD-FL-145
Initial Start-up of CT5B

Dear Mr. Fancy:

In compliance with 40 CFR 60.7(a)(3), FPL is hereby notifying the Department that Lauderdale Repowering project initially fire CT5B on February 9, 1993.

Please call me at (407) 625-7661 if you have any questions.

Sincerely,

for Judith M McGrady

Dan MacDougall
Environmental Specialist
Florida Power & Light Company

DMM:jm

Enclosure

cc: Jewel Harper - EPA
Tom Tittle - DER/WPB
Buck Oven - DER/TAll

021093.lrp

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

FPL

January 15, 1993

RECEIVED

JAN 21 1993

Division of Air
Resources Management

Mr. Clair Fancy
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Dear Mr. Fancy:

The purpose of this letter is to provide the information requested by Ms. Peggy Holly, Vice President of the Croissant Park Civic Association, in her letter of November 30, 1992 regarding status of the "low NOx burners" which were required to be installed on the Port Everglades Units 3 and 4 prior to the in-service date of the Lauderdale Repowering Project.

Baseline maximum NOx emission rates of Port Everglades Units 3 and 4 were established by testing in March, 1991, using FDER-approved EPA test methods. Test results averaged 0.55 lb/10^6Btu on natural gas fuel and 0.77 lb/10^6Btu on oil fuel. The goal of the installation of low NOx burners was to achieve at least a 25% reduction from the baseline values; or targets of 0.41 lb/10^6Btu on natural gas fuel and 0.58 lb/10^6Btu on oil fuel.

Low NOx burners were installed and started up on April 4, 1992 and May 20, 1992 on Units 3 and 4 respectively. Compliance tests were performed on November 17-18, 1992. The results of compliance testing averaged 0.39 lb/10^6Btu on natural gas fuel and 0.52 lb/10^6Btu on oil fuel. These tests demonstrated that the installation of low NOx burners on Port Everglades Units 3 and 4 has resulted in a reduction in NOx emission rates (lb/10^6Btu) of approximately 29% on natural gas fuel and 32% on oil fuel.

In regard to the Lauderdale Repowering Project (LRP), test-firing of the first combustion turbine of the LRP began on December 6, 1992. Trial operation of LRP Unit 4 is currently scheduled for January 21, 1993 while trial operation of LRP Unit 5 is currently scheduled for March 15, 1993.

In summary, I am pleased to report that FPL has met or exceeded all stipulation and certification requirements regarding the required low NOx burners installation and reductions prior to the in-service date of the Lauderdale Repowering Project.

Sincerely,

C. D. Henderson

C. D. Henderson, P.E.
Environmental Affairs Department

cc: Mira Barer - Broward County Office of Natural Resource Protection
Preston Lewis - DER
Lynn Shatas - FPL
John Stanton - FPL

CDH/lms/Fancy.115

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

FPL

January 15, 1993

Mr. Clair Fancy
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

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In summary, I am pleased to report that FPL has met or exceeded all stipulation and certification requirements regarding the required low NOx burners installation and reductions prior to the in-service date of the Lauderdale Repowering Project.

Sincerely,

C. D. Henderson

C. D. Henderson, P.E.
Environmental Affairs Department

cc: Mira Barer - Broward County Office of Natural Resource Protection
Preston Lewis - DER
Lynn Shatas - FPL
John Stanton - FPL

CDH/lms/Fancy.115

Florida Power & Light Company, P O Box 088801, North Palm Beach, FL 33408-8801

FPL

December 18, 1992

Mr. Hamilton S. Oven, Jr., P.E.
Florida Department of Environmental Regulation
2600 Blair Stone Road, Room 612D
Tallahassee, FL 32399-2400

Dear Mr. Oven:

In accordance with Condition II.A.9 of the Conditions of Certification for the Lauderdale Repowering Project and with the testing protocol described in my letter of March 4, 1991, tests to establish the NOx emission rates of the low NOx burners installed on Port Everglades Units 3 and 4 were performed on November 17 - 18, 1992.

Attached please find the detailed results of the subject tests, which are representative of normal operation at continuous capacity while burning either 100% gas or 100% oil. EPA methods 3A and 7E were used for sampling and analysis. The test results are summarized below:

	100% natural gas fuel			100% low sulfur oil fuel		
	Date	Unit load-MW	NOx $lb/10^6Btu$	Date	Unit load-MW	NOx $lb/10^6Btu$
Unit 3	11/18/92	379	0.41	11/18/92	379	0.54
Unit 4	11/17/92	379	0.37	11/17/92	378	0.50
Average			0.39			0.52

The results of the baseline testing, transmitted in my letter of April 8, 1991, established the average NOx emission rates for the Port Everglades Units, prior to the installation of low NOx burners, to average 0.55 $lb/10^6Btu$ on 100% natural gas fuel and 0.77 $lb/10^6Btu$ on oil fuel.

In these "before" and "after" low NOx burner tests, the reduction in NOx emissions on natural gas fuel averages $\frac{0.55 - 0.39}{0.55} \times 100 = 29\%$ and on oil fuel averages $\frac{0.77 - 0.52}{0.77} \times 100 = 32\%$

Thus, these tests have demonstrated that the installation of low NOx burners on Port Everglades Units 3 and 4 have resulted in a reduction of NOx emission rates ($lb/10^6Btu$) of at least 25%, thus satisfying Condition II.A.9 of the Conditions of Certification of the Lauderdale Repowering Project.

FPL will continue to test for NOx emissions from the Port Everglades Units 3 and 4 as part of regularly scheduled annual compliance tests.

Sincerely,

Elsa A. Bishop
for C. D. Henderson
Manager
Air and Water Permitting & Programs

cc: Mary E. S. Williams w/attachment
Clair Fancy
Broward County Office of Natural Resource Protection

CDH/tms/Oven1218

FPL

P O Box 078768 West Palm Beach FL 33407-0768
5500 Village Blvd

April 8, 1991

Mr. Hamilton S. Oven, Jr., P.E.
Florida Department of Environmental Regulation
2600 Blairstone Road, Room 309L
Tallahassee, Florida 32399-2400

Dear Mr. Oven:

In accordance with Condition II.A.9 of the Conditions of Certification for the Lauderdale Repowering Project (LRP) and with testing protocol as described in my letter of March 4, 1991, tests to establish the maximum NO_x emission rate(s) for the existing Port Everglades Units 3 and 4 was performed on March 19-22, 1991.

Attached please find the detailed results of the subject tests, which are representative of normal operation at continuous capacity while burning either 100% gas or 100% oil. EPA methods 3 and 7E were used for sampling and analysis. Test results are summarized below:

	100% natural gas fuel			100% low sulfur oil fuel		
	Date	Unit load-MW	NO_x - $lb/10^6$ Btu	Date	Unit load-MW	NO_x - $lb/10^6$ Btu
Unit 3	3/19/91	376	0.52	3/20/91	376	0.74
Unit 4	3/21/91	376	0.57	3/22/91	378	0.79
Average			0.55			0.77

The subject tests have thus established the maximum NO_x emission rates for the existing Port Everglades Units 3 and 4 to be 0.55 $lb/10^6$ Btu on 100% natural gas fuel and 0.77 $lb/10^6$ Btu on 100% low sulfur oil fuel. These maximum emission rates have been established in a manner we understand is acceptable to the Department.

Once "low NO_x" burners are installed on Port Everglades Units 3 and 4 acceptance testing will be performed within 60 days of the return of each unit to normal service in order to demonstrate that the units achieve the maximum NO_x emission rates specified in Condition II.A.9. Thereafter, as also specified in Condition II.A.9, testing of NO_x emissions from Port Everglades Units 3 & 4 shall be conducted as part of regularly scheduled annual compliance tests.

Sincerely,

Charles Henderson

C. D. Henderson, P.E.
Manager, Environmental Technical Services

CDH:ku
Attachments
cc: Thomas A. Tittle (w/attachments)
Clair Fancy

FPL

HAND DELIVERED

March 4, 1991

Mr. Hamilton S. Oven, Jr. P.E.
Florida Department of Environmental Regulation
2600 Blair Stone Road, Room 309 L
Tallahassee, Florida 32399-2400

Dear Mr. Oven:

As you know, Condition II.A.9 of the Conditions of Certification for the Lauderdale Repowering Project (LRP) requires that FPL install "low NO_x" burners on Port Everglades Units 3 and 4 on or before the in service date of the LRP that are capable of achieving a maximum NO_x emission rate which shall not exceed the greater of 0.5 lb/10^6 Btu, or 75% of the maximum rate determined for the existing Port Everglades Units 3 and 4 burner configuration. The Condition provides that the maximum NO_x emission rate for the existing Units 3 and 4 be determined in a manner acceptable to the Department.

In order to insure that the low NO_x burners will be installed prior to the scheduled LRP in service date (12/31/92), FPL has developed a plan to implement the requirements of Condition II.A.9. A Request For Proposal (RFP) for the design, fabrication, delivery and installation of the low NO_x burners will soon be sent to several bidders. Stack testing to establish the existing maximum NO_x emission rate of Port Everglades Units 3 and 4 will be performed on March 19-22, 1991 to support the schedule. The Department of Environmental Regulation is hereby invited to witness these tests.

The protocol which FPL's Power Resources Emissions Test Group intends to follow for these tests is attached. We believe this protocol should be acceptable to the Department. If you should have any questions or comments regarding the testing protocol, please advise us by March 11, 1991 so that we can meet the scheduled dates.

Sincerely,

Charles Henderson

Charles D. Henderson, P.E.
Manager, Environmental Technical Services

CDH:ku
Attachment
cc: Thomas A. Tittle
Clair Fancy

Attachment 1

PORT EVERGLADES UNITS 3 AND 4 NO_x TESTING PROTOCOL

I. Testing of Existing Units 3 and 4 NO_x Emissions

1. Minimum of 15 days notice given prior to testing.

2. Each Unit tested for NO_x emissions by Chemiluminescent Analyzer (EPA Method 7E.). Each Unit will be tested on both 100% oil fuel and 100% natural gas fuel, while operating at 90-100% of maximum load.

3. Due to the ductwork configuration at Port Everglades Units 3 and 4, each test run will consist of two 30 minute samples, (East and West ducts). The arithmetic average of the results of both ducts will constitute one test run.

4. Three test runs will constitute one test.

II. Testing of Units 3 and 4 NO_x Emissions After Installing Low NO_x Burners

1. Minimum of 15 days notice given prior to testing.

2. Tests will be performed following procedures outlined in I.2 through I.4 above.

P. O. Box 13118, Ft. Lauderdale, FL 33316-0100

FPL

December 10, 1992

Ms. Peggy Holly
VP, Croissant Park Homeowners Assoc.
P.O. Box 13117
Ft. Lauderdale, Florida 33316

Dear Peggy,

I am in receipt of my copy of your letter to Clare Fancy of DER concerning the Lauderdale Repowering/Port Everglades Low NOx issue. I appreciate being copied and just wanted to drop you this note to let you know that the equipment is installed and functioning properly. In no way am I suggesting that this letter should take the place of assurance from the DER. In your position I would want the same thing.

As your neighbor and with respect to our previous interactions, I would like to let you know that the burner installation on units 3 and 4 has been completed and that the compliance testing found them to meet the mandated 25% reduction in NOx emissions. I'm sure this will be confirmed to your satisfaction soon by the DER. I would also like to pass along the testing has begun on Low NOx burner technology for Units 1 and 2. In addition, I can share that the work being done by the team dedicated to reducing emissions from the Gas Turbines is having excellent results with the prototype hardware they have developed. This group has been dedicated full time to this project since April which I believe shows that FPL's commitment to the environment is far more than just meeting the letter of the law.

If I can be of any assistance to you or your organization, please let me know. Best wishes for a joyous holiday season!

John Stanton
General Manager-Port Everglades Plant

Copies: Mira Barer
Lynn Shatas
Katie O'Reilly

FPL

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

December 10, 1992

Mr. Clair Fancy, Chief
Bureau of Air Regulation
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399

RE: Lauderdale Repowering
PAD-FL-145
<u>Initial Start-up of CT4B</u>

Dear Mr. Fancy:

In compliance with 40 CFR 60.7(a)(3), FPL is hereby notifying the Department that Lauderdale Repowering project initially fire CT4B on December 10, 1992.

Please call me at (407) 625-7661 if you have any questions.

Sincerely,

Dan MacDougall
Environmental Specialist
Florida Power & Light Company

DMM:jm

Enclosure

cc: Jewel Harper - EPA
Stephanie Brooks - DER/WPB
Buck Oven - DER/TAll

RECEIVED

DEC 14 1992

Division of Air
Resources Management

FPL

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

December 7, 1992

Mr. Clair Fancy, Chief
Bureau of Air Regulation
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399

RE: **Lauderdale Repowering**
PAD-FL-145
Initial Start-up of CT4A

Dear Mr. Fancy:

In compliance with 40 CFR 60.7(a)(3), FPL is hereby notifying the Department that Lauderdale Repowering project initially fire CT4A on December 6, 1992.

Please call me at (407) 625-7661 if you have any questions.

Sincerely,

Judith L McGrady
for Dan MacDougall
Environmental Specialist
Florida Power & Light Company

DMM:jm

Enclosure

cc: Jewel Harper - EPA
Stephanie Brooks - DER/WPB
Buck Oven - DER/TAll

RECEIVED

DEC 14 1992

Division of Air
Resources Management

Florida Power & Light Company, P.O. Box 088801, North Palm Beach, FL 33408-8801

FPL

11/3 ~~John~~ JB
~~Bennington~~ JKP
PATTY ADAMS - FILE

October 29, 1992

Mr. Clair Fancy, Chief
Bureau of Air Regulation
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399

RE: Lauderdale Repowering
PAD-FL-145
Anticipated Start-up

Dear Mr. Fancy:

In compliance with 40 CFR 60.7(a)(2), FPL is hereby notifying the Department that Lauderdale repowering Units 4 & 5 are expected to initially fire the CTs on December 6, 1992 and January 22, 1993 respectively. Other relevant dates are shown on attachment A.

Please call me at (407) 625-7661 if you have any questions.

Sincerely,

for Judith McGrady
Dan MacDougall
Environmental Specialist
Florida Power & Light Company

DMM:jm

Enclosure

cc: Jewel Harper - EPA
Stephanie Brooks - DER/WPB
Buck Oven - DER/TAll

RECEIVED

NOV 0 2 1992

Division of Air
Resources Management

ATTACHMENT A

SEQUENCE OF STARTUP EVENTS
LAUDERDALE REPOWERING PROJECT

ACTIVITY	DATES
Full-speed, no-load testing (Unit 4)	12/6 - 12/11/92
Steam Blow, Unit 4	12/22 - 12/28/92
Emissions testing Unit 4	2/14 - 2/16/93
Full-speed, no-load testing (Unit 5)	1/22 - 1/26/93
Steam blow, Unit 5	1/29 - 2/4/93
Emissions testing Unit 5	3/28 - 3/30/93
Steam turbine trial operation Unit 4	2/1/93
Steam turbine trial operation Unit 5	3/15/93

DMM:fp:cfancy

MEMORANDUM

DATE: 12/5/91

TO: Clair Fancy (or Larry George if Clair is not there)

FROM: A. Linero

SUBJECT: Review of FPL visibility report

Clair - since you sent the letter to Ms Markert and received FPL's visibility report, I wanted you to get a copy of our reply (and position) on the matter including RACT on NOX. Steve will get his copy by mail. Could you please give Larry a copy of this since Title I SIP is his domain and he is interested in all the ozone related matters.

Thanks Al Linero

c I. Goldman

cc'd: CHF
LG
SS
12-5-91 RAL

BROWARD COUNTY
F L O R I D A

Office of Natural Resource Protection
Air Quality
621 S. Andrews Avenue
Fort Lauderdale, FL 33301
(305) 765-4437

December 2, 1991

Elsa A. Bishop
Senior Environmental Specialist
Florida Power & Light Co.
P.O. Box 078768
West Palm Beach, FL 33407-0768

Re: FPL Broward County Plants
Visible Emissions Evaluation Report

Dear Ms. Bishop:

Thank you for providing us with the subject report. We have reviewed it and have the following comments:

- We think that the report is a good qualitative review of the causes of the visible emissions phenomenon, as well as why they occur at the Broward FPL plants.

- Other factors such as plant operation, maintenance, soot blowing cycle, how smoothly load changes occur, how fuels are mixed when burnt simultaneously, etc., can play as important a role as the other factors mentioned in the report. Presumably these additional factors were studied or are under review. We have noticed improvement in the plume characteristics this fall versus this past summer and last fall, and believe some of the latter causes may have been addressed.

- On Page 6, it is stated that the opacity (at Port Everglades) under all operating conditions ranges from 5 to 35 percent. We dispute this based on qualitative visual observations made perhaps when units were blowing soot, starting up, or responding to load changes. The opacity may have been more pronounced outside of the stacks where it is not detected by the in-stack monitors.

- On Page 7, we concur that there are no established legal limits for NO_x emissions from the steam units or turbines. However, the Clean Air Act Amendments (CAAA's) require the installation of Reasonably Available Control Technology (RACT) on major sources of nitrogen oxides in areas characterized as "moderately" non-attainment with respect to ozone. We accept the inherent presumptions in the CAAA'S of the role of NO_x in the formation of ozone and of the efficacy of a combined NO_x and VOC reduction strategy to reduce ozone formation.

Page Two

- The comment on Page 5 that NO_2 (versus NO) is the predominant form of NO_x emitted from the turbines suggests that controls should be installed because NO_2 is the species which tends to drive the ozone-forming reactions the most.

- If, per Page 11, water injection increases VOC emissions, we recommend a comparison of how much nitrogen oxides are reduced per unit of VOC increase. We believe that if there is a big reduction in NO_x emissions, that a small increase in VOC emissions can be negotiated. Such flexibility is implied in the CAAA's.

- We cannot concur with nor do we dispute the $7,000 per ton of NO_x removed nor the $28,800,000 total cost figures for water injection. We believe there are numerous evaluations underway by EPRI to develop accurate cost figures for RACT on NO_x in view of the CAAA's.

We recommend that FPL also look at the problem from the RACT-on-NO_x point-of-view and the Acid Rain provisions of the CAAA's. That way much of the amount spent to ameliorate the visibility problem will be just an acceleration of a required capital expense per the CAAA's and, presumably, the Florida State Implementation Plan. Additionally, if started soon, units can be upgraded in an orderly manner, insuring continual high power generating capacity.

We encourage your ongoing efforts and look forward to your decisions. If you have any comments regarding this matter, please call A. A. Linero at (305) 765-4436.

Very truly yours,

Mira Barer

Mira Barer, Director

MB/AAL/mgs

cc: Steve Smallwood, DER, Tallahassee
Clair Fancy, DER, Tallahassee
Scott Benyon, DER, W. Palm Beach
Isidore Goldman, DER, W. Palm Beach
Nancy Roen, FPL
Martin Smith, FPL
B. Jack Osterholt, County Administrator

FPL

P.O. Box 078768, West Palm Beach, FL 33407-0768
5500 Village Blvd.

April 18, 1991

RECEIVED
APR 22 1991
DER - BAQM

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

Re: Florida Power and Light Company
Lauderdale Repowering Project
Permit No.: PSD-FL-145
Start of Construction Notification

Dear Mr. Fancy:

Following issuance of the final FDER Air Construction Permit, the foundation piling contractor was mobilized and pilings were first placed on April 1, 1991.

In accordance with the notification requirements of 40CFR60.7(a)(1), incorporated by reference in 17-2 F.A.C., FPL is formally notifying the Department that on site construction of the combustion turbines for the Lauderdale Repowering Project was commenced on April 1, 1991.

If you have any questions, please call me at (407) 697-6960.

Sincerely,

C. D. Henderson
Charles D. Henderson
Manager, Environmental Technical Services

CDH:ku

cc: Jewell A. Harper, EPA
I. Goldman, SE Dist.
A. Linero, BC NRP

bcc: Peter C. Cunningham
Ken Kosky
Dan MacDougall
Rich Piper
E. A. Bishop

FPL

P.O. Box 078768, West Palm Beach, FL 33407-0768
5500 Village Blvd.

RECEIVED
APR 12 1991
DER - BAQM

April 8, 1991

Mr. Hamilton S. Oven, Jr., P.E.
Florida Department of Environmental Regulation
2600 Blairstone Road, Room 309L
Tallahassee, Florida 32399-2400

Dear Mr. Oven:

In accordance with Condition II.A.9 of the Conditions of Certification for the Lauderdale Repowering Project (LRP) and with testing protocol as described in my letter of March 4, 1991, tests to establish the maximum NO_x emission rate(s) for the existing Port Everglades Units 3 and 4 was performed on March 19-22, 1991.

Attached please find the detailed results of the subject tests, which are representative of normal operation at continuous capacity while burning either 100% gas or 100% oil. EPA methods 3 and 7E were used for sampling and analysis. Test results are summarized below:

	100% natural gas fuel			100% low sulfur oil fuel		
	Date	Unit load-MW	NO_x - lb/10^6 Btu	Date	Unit load-MW	NO_x - lb/10^6 Btu
Unit 3	3/19/91	376	0.52	3/20/91	376	0.74
Unit 4	3/21/91	376	0.57	3/22/91	378	0.79
Average			0.55			0.77

The subject tests have thus established the maximum NO_x emission rates for the existing Port Everglades Units 3 and 4 to be 0.55 lb/10^6 Btu on 100% natural gas fuel and 0.77 lb/10^6 Btu on 100% low sulfur oil fuel. These maximum emission rates have been established in a manner we understand is acceptable to the Department.

Once "low NO_x" burners are installed on Port Everglades Units 3 and 4 acceptance testing will be performed within 60 days of the return of each unit to normal service in order to demonstrate that the units achieve the maximum NO_x emission rates specified in Condition II.A.9. Thereafter, as also specified in Condition II.A.9, testing of NO_x emissions from Port Everglades Units 3 & 4 shall be conducted as part of regularly scheduled annual compliance tests.

Sincerely,

Charles Henderson

C. D. Henderson, P.E.
Manager, Environmental Technical Services

CDH:ku
Attachments
cc: Thomas A. Tittle (w/attachments)
Clair Fancy

bcc: E. A. Bishop - JEN/NP (w/attachments)
R. N. Allen - JEN/NP
D. Keightley - SEU/SED
R. F. Messer - PRS/EDO
E. Preast, JPM/JB
D. H. Arnott - PPE (w/attachments)
P. C. Cunningham - HBG&S

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

4APT-AEB

APR - 4 1991

RECEIVED
APR 8 1991
DER - BAQM

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

RE: FPL Lauderdale Repowering Project (PSD-FL-145)

Dear Mr. Fancy:

The purpose of this letter is to follow-up to our letter of February 19, 1991, in which we commented on your preliminary determination for the above referenced facility. As discussed between Mr. Brian Beals of my staff and you on March 7, 1991, EPA will defer to FDER's decision in the permitting of this source, due to the unique situation of the source; however, there are several issues which we would like to address.

The first concern is how the Prevention of Significant Deterioration (PSD) program meshes with Florida's Site Certification process and whether all of the requirements of the PSD process are being met through the Site Certification process. We are currently studying this issue and will be addressing it in a separate letter.

Our second concern is that EPA's policy be made perfectly clear that a determination of best available control technology (BACT) for a specific emissions unit is independent of any reductions in pollutants that may be made elsewhere.

Lastly, we would like to emphasize that any decision by FDER to not require additional NO_x controls for this project will not alter EPA's position that stringent NO_x controls are both technically and economically feasible and should be required.

Thank you for the opportunity to review and comment on this package. If you have any questions or comments, please contact Mr. Gregg Worley of my staff at (404) 347-2904.

Sincerely yours,

Jewell A. Harper, Chief
Air Enforcement Branch
Air, Pesticides, and Toxics
Management Division

cc: B. Andrews
J. Rogers

Florida Department of Environmental Regulation
Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400
Lawton Chiles, Governor
Carol M. Browner, Secretary

March 14, 1991

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Original permit picked up 3-14-91 by Hopping Boyd Green & Sams for FP&L

Mr. Charles D. Henderson, Manager
Environmental Technical Service
Florida Power & Light Company
P. O. Box 078768
West Palm Beach, Florida 33407-0768

Dear Mr. Henderson:

Re: Florida Power & Light
Lauderdale Repowering Project, PSD-FL-145

Please find enclosed the above referenced permit. You have the right to petition for an administrative hearing pursuant to Section 120.57, Florida Statutes, within 14 days of receipt of this permit or file a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, within 30 days from the date this permit is filed with the Clerk of the Department. Further, you may request a public hearing. Such request must be submitted within 30 days of receipt of this permit.

If you have any questions, please call Barry Andrews at (904)488-1344 or write to me at the above address

Sincerely,

C. H. Fancy, P.E.
Chief
Bureau of Air Regulation

CHF/kt

50BRO 060037 10/27/93
Screen 30 "
33 "

enclosure

cc: J. Harper, EPA
I. Goldman, SE District
A. Linero, Broward Cty.
P. Cunningham, H.B.G. & S.
C. Shaver, NPS

No info 33 (done)

34

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this NOTICE OF PERMIT and all copies were mailed before the close of buisness on 3-14-91.

FILING AND ACKNOWLEDGEMENT FILED, on this date, pursuant to §120.52(9), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

[signature] 3-14-91

Clerk Date

Final Determination

Florida Power & Light Company
Lauderdale Repowering Project
Broward County, Florida

Permit No.: PSD-FL-145

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

March 13, 1991

FINAL DETERMINATION

Florida Power & Light Company (FPL) submitted a Prevention of Significant Deterioration (PSD) permit application for the Lauderdale Repowering Project on November 29, 1989, as part of Florida'a Power Plant Siting Act (PPSA) process. The Florida Department of Environmental Regulation (FDER) reviewed the application and requested additional information on February 16, 1990. The request for additional information included a comment letter from the U.S. Environmental Protection Agency (EPA) dated February 12, 1990. FPL submitted supplemental information on May 18, 1990, at which time the PSD permit application was deemed complete. FDER's Division of Air Resources Management (DARM) reviewed the application and issued a Preliminary Determination on August 31, 1990. The Preliminary Determination was included in FDER's report as required by the PPSA and was publicly noticed in accordance with PPSA and FDER PSD rules.

A public hearing was held September 24 through 26, 1990, a portion of which was directed toward the decision reached by FDER concerning the PSD permit. All parties to the proceeding, recommended certification in accordance with mutually accepted Conditions of Certification. Based on the evidence presented at the certification hearing, the Hearing Officer recommended certification in accordance with the Conditions of Certification jointly proposed by the parties. On January 10, 1991, the Governor and Cabinet, sitting as the Siting Board, certified the project in accordance with the Hearing Officer's Recommended Order and Conditions of Certification.

FDER issued a revised Preliminary Determination incorporating the emission limitations contained in the final Conditions of Certification on January 25, 1991. Based on comments received from EPA and the National Park Service (NPS) (addressed below), FDER has determined that a further restriction, to 25 percent, on the annual oil capacity factor for the repowered units is appropriate. In conjunction with the overall air quality strategy outlined in the revised Preliminary Determination, this further restriction on oil-firing at the Lauderdale plant ensures that potential NO_x emissions from the generating units involved will be approximately 460 tons per year less than current actual emissions, and that SO_2 emissions will be further reduced resulting in net air quality benefits.

Air Quality Analysis

The NPS letter discusses assessment of total ambient air concentrations in the Class I area based on all sources in the area of the Everglades National Park (ENP). However, the Lauderdale Repowering Project did not contribute to these maximum impacts as noted from the modeling analysis. Moreover, the final SO2 emission limits established for the Lauderdale Repowering Project (including the 25 percent annual capacity factor on oil) are 661 tons per year (TPY) less than the existing Units 4 and 5; the final limit is 1,582 TPY compared to the existing emissions of 2,243 TPY. Thus the Lauderdale Repowering Project will have lower impacts than the existing facility, resulting in a net air quality improvement. As noted above, there will also be a net reduction in NO_x emissions which will produce a concomitant reduction in impacts to the ENP.

Air Quality Related Values (AQRVs)

Terrestrial and Aquatic Effects -- The PSD application provided a detailed discussion of the AQRVs of the ENP including its soils, vegetation, wildlife, and threatened and endangered species. The analysis of the potential impacts to these resources demonstrated that there will be no adverse effects as a result of the Lauderdale Repowering Project. Given that there will be net reductions in SO_2 and NO_x associated with the project, any concern of potential impacts should be alleviated.

Visibility -- In its Preliminary Determination, FDER concluded that the Lauderdale Repowering Project would not cause or contribute to an exceedance of the applicable Class I or II PSD Increments or the ambient air quality standards (AAQS) based on the modeling analyses performed. FDER also determined that no significant impacts to soils, vegetation, or visibility are expected as a result of the project. The applicant demonstrated and the Department concurred that the use of the EPA visibility screening model VISCREEN is appropriate for assessing potential visibility impacts to the ENP. This model has been approved for this use by the EPA and the Department has accepted its use in other applications. Nonetheless, the reduction in SO_2 and NO_x emissions that result from the Lauderdale Repowering Project, as well as its distance from the ENP, assures the Department that the project will not have an adverse impact to visibility in the ENP.

BACT Analysis

FDER staff originally determined that SCR would be BACT for NO_x for the Lauderdale Repowering Project. However, due to concerns regarding the proximity of the power plant to a residential area and the need for ammonia storage, FDER determined that similar benefits to the ambient air quality could be achieved by the adoption of a strategy that involves: (a) establishing BACT for NO_x emissions as steam injection achieving 42 parts per million (ppm) when burning the primary fuel, natural gas, and 65 ppm when burning the alternate fuel, distillate oil; (b) removal of the existing Units 4 and 5 at the Lauderdale Site; and (c) the installation of low NO_x burners at nearby Port Everglades Units 3 and 4 to achieve a minimum of a 25 percent reduction in NO_x emission rates [pounds per million British thermal units ($lb/10^6$ Btu)] over the current actual rates. The combined effects of this strategy would have resulted in a net reduction of maximum potential NO_x emissions from the two power plants of approximately 1,700 tons per year (TPY) over those emissions that would result from the installation of SCR at Lauderdale, but no additional controls at Port Everglades. With this strategy, maximum NO_x emissions would have increased very slightly over current actual emission levels from the two plants.

Based on comments FDER received from EPA and NPS, the Department has now determined that an additional restriction, to 25 percent, on the annual oil capacity factor of the repowered Lauderdale units is appropriate. This will result in further reductions in maximum potential NO_x emissions from the repowered units and ensures a reduction of approximately 460 tons per year from current actual emissions from the two plants. In addition, the 25 percent restriction on oil firing is consistent with other recent BACT determinations.

FPL has contacted the vendor of the advanced combustion turbines selected for the project regarding the availability of low NO_x cumbustors. The vendor advised FPL that low NO_x cumbustors for the advanced machines are unavailable to meet the December 31, 1992 in-service date for the project.

In accordance with Florida Administrative Code, Chapter 17-2, FDER must determine BACT for a particular project, on a case-by-case basis, taking into account energy, environmental and economic impacts, and other costs. Given the unavailability of low NO_x combustors for the Lauderdale project, FDER has determined that an overall air quality strategy incorporating steam injection as BACT for Lauderdale, tighter fuel oil restrictions, and installation of low NO_x burners at Port Everglades Units 3 and 4 is appropriate under the circumstances.

The use of SCR at the Lauderdale site would require transportation and storage of approximately 500,000 gallons per year of ammonia near an adjacent residential neighborhood. A spill or leak of ammonia at or near the plant could have serious health consequences to nearby residents and workers. The Department believes that the overall air quality strategy embodied in the final permit will produce a net air quality benefit without the concerns that are associated with the use of SCR for this project at this time. However, the combined cycle units should be constructed with duct modules to allow easy installation of SCR equipment in the event that such technology is required in the future due to changes in regulations or required based on future BACT analyses.

SOBRO060037

Florida Department of Environmental Regulation

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

Lawton Chiles, Governor

Carol M. Browner, Secretary

PERMITTEE:
Florida Power & Light Company
Post Office Box 078768
West Palm Beach, FL 33407-0768

Permit Number: PSD-FL-145
Expiration Date:
County: Broward
Latitude/Longitude: 26 4'5"N
80 11'54"W

Project: Lauderdale Repowering Project

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 17-2, 17-4 and 17-17. 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:

035 036

For the repowering of Lauderdale Plant Units No. 4 and 5 by construction of new combustion turbines and heat recovery steam generators to replace the existing steam generators. Each of the resulting repowered units will comprise two advanced combustion turbines and two heat recovery steam generators in a combined cycle configuration. The repowered units will each have a generating capacity of approximately 480 megawatts, with natural gas as the primary fuel and very low sulfur distillate oil as an alternate fuel. The Lauderdale Repowering Project has been certified under the Florida Electrical Power Plant Siting Act (site certification number PA 89-26).

Port Everglades SO BRO 060038 03 04

Nitrogen oxide emissions will be controlled by water injection. In addition, on or before the in-service date for the repowered Lauderdale units, "low NO_x" burners must be installed at FPL's Port Everglades Plant Units No. 3 and 4 that are capable of achieving a maximum nitrogen oxides emission rate which shall not exceed the greater of 0.5 pounds per million Btu heat input or 75 percent of the maximum emission rate for the existing burner configuration.

Construction shall be in accordance with the attached permit application and additional information submitted except as otherwise noted in the Specific Conditions.

Attachments are as follows:

1. Power plant site certification package PA 89-25 and its associated attachments, dated August 31, 1990.

2. Letter from EPA dated February 19, 1991.

3. Letter from Hopping Boyd Green & Sams dated February 26, 1991.

4. Letter from Hopping Boyd Green & Sams dated February 27, 1991.

5. Letter from National Parks Service dated February 28, 1991.

6. DER's Final Determination dated March 13, 1991.

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

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. Neither 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 is not 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, or plan life, or property caused by the construction or operation of this permitted source, or from penalties therefore; 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.

6. The permittee shall 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 and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

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

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

c. Sample or monitor 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 provide the Department with the following information:

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

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

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 for 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 involving the permitted source

arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

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 Rule 17-4.120 and 17-30.300, F.A.C., 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 or a copy thereof shall be kept at the work site of the permitted activity.

13. This permit also constitutes:

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

14. The permittee shall comply with the following:

a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.

b. The permittee shall hold 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) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained 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 dates 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 corrected promptly.

SPECIFIC CONDITIONS:

1. The maximum heat input to each combustion turbine (CT) shall neither exceed 1,685.0 MMBtu/hr while firing natural gas, nor 1,646.9 MMBtu/hr while firing fuel oil (@ 75°F). Each CT's fuel consumption shall be continuously measured and recorded. The maximum heat input to each duct burner shall not exceed 90.62 MMBtu/hr. Each duct burner's fuel consumption shall be continuously measured and recorded.

2. Each of the four CTs may operate continuously, i.e., 8,760 hrs/year provided that the total (four turbines) annual heat input attributed to light distillate fuel oil firing does not exceed 14,426,844 MMBtu (@ 75°F) and the total heat input for all four turbines and the duct burners does not exceed 54,129,421 MMBTU.

limited to 25% CF oil?

~87% CF

3. The heat input restrictions in conditions 1 and 2 above are based on projected emissions and are thereby subject to change based on equipment vendors, emission guarantees or actual test data. Only natural gas or light distillate fuel oil shall be fired in the turbines.

4. The duct burners shall be fired with natural gas only. The duct burners shall not be operated when the turbines are firing oil.

5. The maximum allowable emissions from each CT in accordance with the BACT determination shall not exceed the following emission limitations at 75°F:

PERMITTEE:
Florida Power & Light Company

Permit Number: PSD-FL-145
Project: Lauderdale Repowering Project

Pollutant	Basis	Fuel	Emission Limitations lb/hr/CT	lb/hr/DB	4 CT* (TPY)	4 DB+ (TPY)
NO_x	42 ppmvd	Gas	264 .157 #NOx/mmBtu	10.0 .11 #NOx/mmBtu		152
	65 ppmvd	Oil	422		4,716	
VOC	1 ppmvd	Gas	7.7x10-4 lbs/mmBtu 1.3	2.0 0.022#/mmBtu		30.5
	6 ppmvd	Oil	7.8		48.3	
CO	30 ppmvd	Gas	89 0.053#/mmBtu	17.6 0.194#/mmBtu	1,405	268
	33 ppmvd	Oil	100			
PM/PM_{10}		Gas	8.7x10-3 14.7	0.7 7.7x10-3#/mmBtu		10.7
		Oil	58.0		414	
SO2		Gas	5.76x10-4 0.97	0.05 5.5x10-4		0.8
		Oil	538		1,582	

CT - Combustion Turbine
DB - Duct Burner

NOTES: * Refers to the maximum facility emissions (four CTs). With capacity factor limitations of 25 percent on oil and 87 percent for the facility.
+ Refers to maximum duct burner emissions at 87 percent capacity factor.

NO_x emissions from duct burners are based on an as-fired emission limitation of 0.11 lbs/MMBtu.

Sulfur dioxide emissions assume a maximum of 0.3 percent sulfur in fuel oil for hourly emissions and an average sulfur content of 0.2 percent for annual emissions.

6. The following emissions, determined by BACT, are tabulated for PSD and inventory purposes:

PERMITTEE:
Florida Power & Light Company

Permit Number: PSD-FL-145
Project: Lauderdale Repowering Project

Pollutant	Fuel	Maximum Allowable Emissions (@75°F) lb/hr/CT	lb/hr/DB	4 CT* (TPY)	4 DB+ (TPY)
H_2SO_4 Acid Mist	Gas	0.042 [2.5×10^{-5}]	0.0002 [2.21×10^{-6}]		0.003
	Oil	67		196	
Mercury	Gas	0.0192 [1.14×10^{-5}]	0.001 [1.10×10^{-5}]	0.3	0.002
	Oil	0.0049			
Fluoride	Oil	0.0535	-----	0.23	-----
Beryllium	Oil	0.0041	-----	0.02	-----

NOTES: * Refers to the maximum facility emissions (four CTs).
+ Refers to the maximum facility emissions (four DBs).

Sulfuric acid mist emissions assume a maximum of 0.3 percent sulfur in fuel oil for hourly emissions and an average sulfur content of 0.2 percent for annual emissions.

7. Visible emissions shall neither exceed 10% opacity while burning natural gas nor 20% opacity while burning distillate oil.

8. The nitrogen oxide emissions from each combustion turbine unit shall be controlled by using steam injection for both natural gas and fuel oil firing modes. In addition, the Permittee shall install duct modules suitable for later installation of SCR equipment when constructing the combined cycle generating units at the facility.

9. Under the unique circumstances of this case, the Department has determined that the Best Available Control Technology (BACT) NO_x emissions limit is 65 ppm when burning oil and 42 ppm when burning gas and, in addition to complying with BACT at the Lauderdale Plant, FPL shall install "low NO_x" burners on Port Everglades Units 3 and 4 on or before the in service date of the Lauderdale Repowering Project that are capable of achieving a maximum NO_x emission rate which shall not exceed the greater of 0.5 lbs/10^6 BTU, or 75% of the maximum rate determined for the existing Port Everglades Units 3 and 4 burner configuration. The maximum rate shall be determined in a manner acceptable to the Department. Stack testing of NO_x emissions from Port Everglades Units 3 and 4 shall be conducted as part of regularly scheduled annual compliance tests. Should the low NO_x burners prove

to be capable of achieving a significantly greater NO_x reduction at the Port Everglades Plant, the Department reserves the right to adjust the applicable pounds per million Btu limit for the Port Everglades Plant accordingly.

10. Initial (I) compliance tests shall be performed on each combustion turbine using both fuels. The stack test for each turbine shall be performed within 10 percent of the maximum heat input rate for the tested operating temperature. Annual (A) compliance tests shall be performed on each combustion turbine with the fuel(s) used for more than 400 hours in the preceding 12-month period. Tests shall be conducted using EPA reference methods in accordance with the July 1, 1988 version of 40 CFR 60 Appendix A:

a. 5 or 17 for PM (I, A - for oil only)

b. 8 for sulfuric acid mist (I, for oil only)

c. 9 for VE (I, A)

d. 10 for CO (I, A)

e. 20 for NO_x (I, A)

f. 25A for VOC (I, A)

g. 104 for Beryllium (I, for distillate oil only). A fuel analysis for Be using either Method 7090 or 7091, and sample extraction using Method 3040, as described in the EPA solid waste regulations SW 846, is also acceptable

h. ASTM D 2880-71 (or equivalent) for sulfur content of distillate oil (I, A)

i. ASTM D 1072-80, D 3031-81, D 4084-82 or D 3245-81 or equivalent for sulfur content of natural gas (I and A if deemed necessary by DER).

Other DER approved methods may be used for compliance testing after prior DER approval.

11. The average annual sulfur content of the light distillate fuel oil shall not exceed 0.2 percent by weight. The maximum sulfur content of the light distillate fuel oil shall not exceed 0.3 percent. Compliance shall be demonstrated in accordance with the requirements of 40 CFR 60.335 by testing all oil shipments for sulfur content using ASTM D 2880-71 or equivalent, testing for nitrogen content and testing for heating value.

12. Continuous monitoring of steam injection rates shall be installed, operated and maintained in accordance with 40 CFR 60, Subpart GG, for each combined cycle unit.

13. To determine compliance with the oil firing heat input limitation, the Permittee shall maintain daily records of fuel oil consumption for each turbine and monthly records of heating value for such fuel. All records shall be maintained for a minimum of three years after the date of each record and shall be made available to representatives of DER upon request.

14. The project shall comply with all the applicable requirements of Chapter 17-2, Florida Administrative Code, and the July 1, 1988 version of 40 CFR 60, Subpart GG, Gas Turbines.

15. Any change in the method of operation, fuels or equipment shall be submitted for approval to DER's Bureau of Air Regulation.

16. If start/black start capability for the CTs is provided by a combustion unit, DER shall be notified of the type/model, output capacity, anticipated hours of operation and air emissions of the unit.

17. The Permittee shall have required sampling tests of the emissions performed within 60 days after achieving the maximum turbine firing rate, but not later than 180 days from the start of operation. Thirty (30) days prior to the initial sampling test and fifteen (15) days notice before subsequent annual testing shall be provided to the Southeast District Office. Written reports of the tests shall be submitted to the Southeast District Office within 45 days of test completion.

18. If construction does not commence within 18 months of issuance of this certification/permit, then the Permittee shall obtain from DER a review and, if necessary, a modification of the control technology and allowable emissions for the unit(s) on which construction has not commenced (40 CFR 52.21(r)(2)).

19. Quarterly excess emission reports, in accordance with the July 1, 1988 version of 40 CFR 60.7 and 60.334 shall be submitted to DER's Southeast District Office. Annual reports shall be submitted to the District Office in accordance with Rule 17-2.700(7), Florida Administrative Code.

20. Literature on equipment selected shall be submitted as it becomes available. A CT-specific graph of the relationship between NO_x emissions and steam injection and also another of ambient temperature

PERMITTEE:
Florida Power & Light Company

Permit Number: PSD-FL-145
Project: Lauderdale Repowering Project

and heat inputs to the CT shall be submitted to DER's Southeast District Office and the Bureau of Air Regulation.

21. Stack sampling facilities shall be provided for each of the four stacks.

22. Construction period fugitive dust emissions shall be minimized by covering or watering dust generation areas.

Issued this 14 day of
March, 1991

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

Carol M. Browner

Carol M. Browner, Secretary

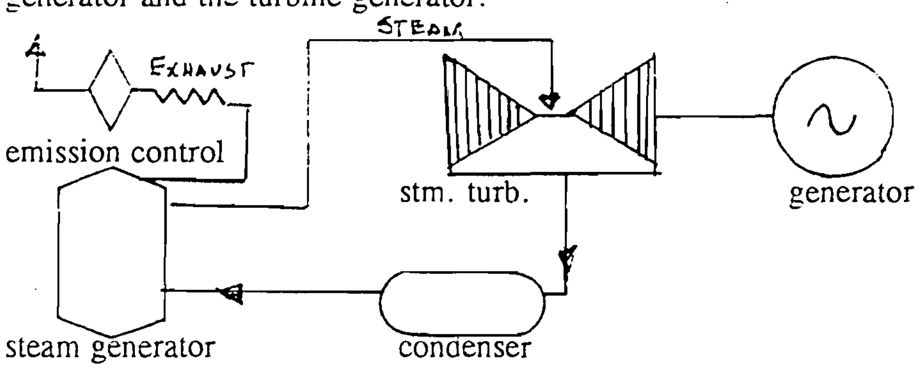
ELECTRIC POWER GENERATION EQUIPMENT
BRIEFING PAPER

INTRODUCTION

The purpose of this paper is to provide an overview of the types of electric power generation equipment, different fuels and various methods of control. Power generation equipment is divided in three basic types - hydro, steam (nuclear or fossil) and combustion. The air emissions from hydro and nuclear are zero. , but unfortunately, very little hydro exist in Florida. The paper will focus on steam and combustion. When either a steam or combustion facility provides process steam, as well as electricity, it is called "co-generation". However, usually the steam or combustion facility only produces electricity. The primary air pollutants include sulfur dioxide (SO_2), nitrogen oxides (NO_x), particulate matter (PM) - which may include metals, carbon monoxide (CO), volatile organic compounds (VOC) and sulfuric acid mist (H_2SO_4). Florida has a major concern with heavy metals (mercury, cadmium, etc.) and hazardous air pollutants (HAP's or toxic air emissions).

STEAM GENERATION

Steam generation has the highest capital cost, the lowest operating cost and accounts for the bulk of the electrical generating capacity in Florida. The most common fuels used in the steam generators include natural gas, propane gas, biogas, coal/coal gasification, heavy or distillate oils, wood or peat, nuclear and municipal waste. Except for nuclear each of the fuels presents unique challenges to control the air emissions. Control of SO_2 emissions is accomplished by using lower sulfur fuels, dry and wet scrubbers. Control of NO_x emissions is accomplished by combustion control - low NO_x burners (wet or dry), selective catalytic reduction (SCR) and selective non-catalytic reduction (SNCR). Control of the PM and the heavy metals is accomplished by a cyclone, an electromagnetic precipitator or a baghouse filter. Emission standards in recent coal permits are 0.17 lb/mmBtu for SO_2 and NO_x, 0.02 lb/mmBtu for PM and 0.20 lb/mmBtu for VOC. Shown below is a schematic representation of a fossil steam generator and the turbine-generator:



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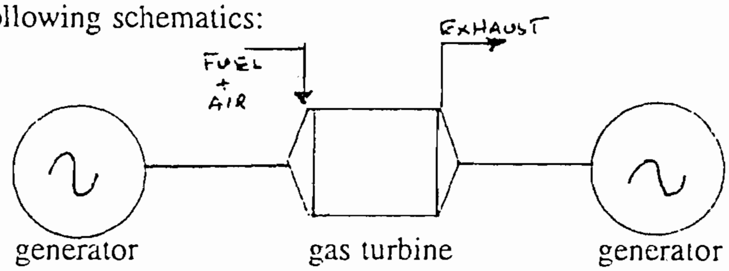
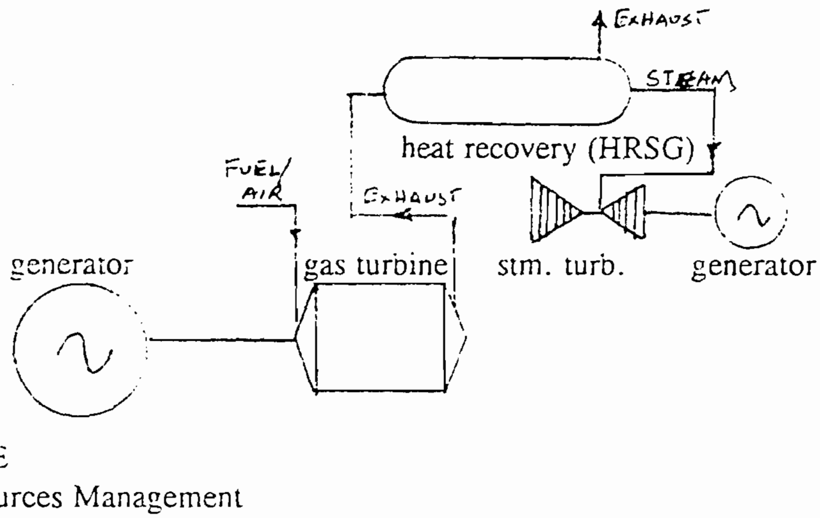
COMBUSTION GENERATION

Combustion generation has the lowest capital cost, the highest operating cost and is used primarily when demand for electricity peaks (coldest winter day or hottest summer day). The primary fuels are natural gas, propane or fuel oils. We have had an applicant indicate that a coal gasification project is planned. Coal gasification allows coal to be burned and the gases generated are used to fuel a combustion turbine. Coal gasification combusts coal and generates gases which can be burned in a combustion turbine to generate electricity. The primary air pollutants are SO_2, NO_x, PM, CO and VOC. SO_2 is controlled by firing low sulfur fuel (the current maximum is 0.2% sulfur for #2 fuel oil). The NO_x emission limt is met primarily with combustion control (wet or dry). The current NO_x standard emission limit is 15 ppm for gas and 42 ppm for oil. As the NO_x level is reduced the CO level sometimes increases for wet injection. Dry low NO_x burners do not have the problem with CO. Recent permits have limited CO to 10 - 40 ppmdv. VOC has been limited to 0.02 - 0.03 LB/mmBtu. Burning natural gas produces less air emissions than #2 fuel oil even at the 0.05% sulfur level. The two types of combustion turbines are simple cycle and combined cycle which are represented by the following schematics:

Simple Cycle



Combined Cycle



G. Preston Lewis, PE
Division of Air Resources Management
June 17, 1992

United States Department of the Interior

TAKE PRIDE IN AMERICA

NATIONAL PARK SERVICE
SOUTHEAST REGIONAL OFFICE
75 Spring Street, S.W.
Atlanta, Georgia 30303

IN REPLY REFER TO:

N3615 (SER-ODN)

FEB 28 1991

RECEIVED
MAR 01 1991
DER-BAQM

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

Dear Mr. Fancy:

We have reviewed the information you forwarded to us regarding Florida Power and Light Company's proposed Lauderdale Repowering Project. The Lauderdale plant is located in eastern Broward County, approximately 59 km northeast of Everglades National Park, a class I air quality area administered by the National Park Service. Our comments on the best available control technology, air quality, and air quality related values analyses with respect to the proposed project's potential impacts on Everglades National Park are discussed in detail in the enclosed technical review document. We ask that you consider these comments before making a final determination regarding the proposed project.

If you have any questions, please contact John Bunyak of our Air Quality Division in Denver at 303-969-2071.

Sincerely,

C. W. Ogle

FOR Robert M. Baker
Regional Director
Southeast Region

Enclosure
cc: B. Andrews
J. Rogers
J. Goldman, SE Dist
A. Linero, BCNRP
J. Harper, EPA

FEDERAL EXPRESS

[redacted]

QUESTIONS? CALL 800-238-5355 TOLL FREE.

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[redacted] Date 2/28/91

RECIPIENT'S COPY

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Company: NATIONAL PARK SERVICE	Department/Floor No.	Company: FDER, Bureau of Air Quality	Department/Floor No.
Street Address: 75 SPRING ST RM 1078		Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): Twin Towers, 2600 Blair Stone Road	
City: ATLANTA State: GA	ZIP Required: 30303	City: Tallahassee State: FL	ZIP Required: 32399-24

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DELIVERY AND SPECIAL HANDLING (Check services required)
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- 11 [ ] DESCRIPTION
- 12 [ ] HOLIDAY DELIVERY (If offered) (Extra charge)

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Technical Review of
Prevention of Significant Deterioration
Application for
Florida Power and Light Company's
Lauderdale Repowering Project

by

Policy, Planning, and Permit Review Branch
Air Quality Division, National Park Service

INTRODUCTION

Florida Power and Light Company (FPL) proposes to repower their Lauderdale electric generating station by replacing the existing two steam generators (Units 4 & 5) with four combustion turbines and four heat recovery steam generators operated as a combined cycle plant. The Lauderdale plant is located in eastern Broward County, approximately 59 km northeast of Everglades National Park (EVER), a class I air quality area administered by the National Park Service.

The combustion turbines would burn natural gas as the primary fuel and No. 2 fuel oil as the backup fuel. The existing emissions from Units 4 & 5, the emissions from the proposed turbines, and the net change in emissions resulting from the proposed project are as follows:

Pollutant	Existing Emissions (TPY)	Proposed Emissions (TPY)	Net Change (TPY)
Sulfur Dioxide (SO_2)	2,243	2,524	281
Nitrogen Oxides (NO_x)	2,456	5,214	2,758
Particulate Matter (PM)	195	533	338
PM_{10}	141	533	392
Carbon Monoxide (CO)	181	1,625	1,444
Sulfuric Acid Mist (H_2SO_4)	86	301	215
Beryllium (Be)	0.01	0.03	0.02

In addition, emissions of lead, mercury, and fluorides will increase slightly as a result of the proposed project.

Following are our comments on the best available control technology analysis, the air quality analysis, and the proposed project's potential impacts on the air quality related values at EVER.

BEST AVAILABLE CONTROL TECHNOLOGY ANALYSIS (BACT)

To minimize emissions of SO_2, PM/PM_{10}, CO, Be, and H_2SO_4 from the proposed turbines, FPL proposes to utilize proper combustion techniques and to fire the turbines with clean fuels (i.e., natural gas and low sulfur oil). We agree that these measures constitute BACT for these pollutants.

To control NO_x emissions, FPL proposes to use wet (water or steam) injection to reduce turbine emissions to 42 ppm (gas firing) or 65 ppm (oil firing). The Florida Department of Environmental Regulation (FDER) concluded that wet injection in combination with Selective Catalytic Reduction (SCR) constitutes BACT for the proposed turbines. Because FPL has several concerns with SCR, they proposed to obtain NO_x reductions elsewhere that would be equivalent to those achievable with SCR. They would achieve these reductions by retrofitting Units 3 & 4 at the nearby (approximately 5 miles away) Port Everglades electric generating facility with low NO_x burners. The low NO_x burners would be designed to reduce existing NO_x emissions from these units by a minimum of 25 percent. The FDER is considering accepting FPL's NO_x reduction proposal in lieu of requiring SCR.

First, we agree with the FDER that wet controls plus SCR constitutes BACT for combined cycle combustion turbines. Second, from an effects standpoint, because the two facilities are relatively close to each other and in the same air shed, the nitrogen dioxide impacts at EVER would be essentially the same under both the SCR and the Port Everglades retrofit scenarios. However, because the FPL proposal is unique and precedent-setting from a BACT standpoint, we suggest that the FDER carefully consider the policy implications of accepting such a proposal. For example, in essence, FPL is netting out of BACT by obtaining reductions from another facility. This is not the intent of the BACT provisions, which were developed to ensure that new sources install the best available emission control technology. Accepting the FPL proposal basically allows the installation of a new source which would not utilize the best available control technology. Also, if such an approach is allowed for FPL, it is likely that future sources will similarly try to net out of BACT. The FDER would need to develop a policy to determine under what circumstances, or at what source separation distances, such an approach would not be acceptable.

This proposal would be more acceptable from a regulatory standpoint if FPL demonstrated a net air quality improvement, rather than simply obtaining equivalent emission reductions. For example, according to the emissions inventory data provided in the FPL application, Units 1 & 2 at the Port Everglades facility are large NO_x sources (10,908 TPY). Assuming these units are not already equipped with low NO_x burners, FPL could obtain additional reductions by retrofitting these units as well. Also, although SCR could reduce emissions from the proposed 42 ppm to less than 9 ppm, an intermediate concentration of 25 ppm could be achieved by equipping the proposed turbines with low NO_x combustors. This, in combination with the Port Everglades Units 4 & 5 retrofit, would result in greater NO_x reductions than those achievable by SCR alone, resulting in a net environmental improvement. Considering our concerns discussed below regarding potential impacts on visibility and other air quality related values, we recommend that the FDER require as much NO_x reductions as possible in order to minimize potential impacts at EVER.

AIR QUALITY ANALYSIS

Florida Power and Light used the ISCST dispersion model to predict SO_2 and NO_2 impacts from the proposed source in EVER. Surface and upper air meteorological data (1982-1986) from Miami and West Palm Beach, Florida, respectively were deemed to be representative of the project area and were used as input to the model. The maximum SO_2 class I impacts were predicted to be 15.0, 4.4, and 0.28 ug/m^3 for the 3-hour, 24-hour, and annual averaging times, respectively. This represents a 60, 88, and 14 percent consumption of the SO_2 3-hour, 24-hour, and annual class I increments, respectively. The maximum NO_2 class I impact was predicted to be 0.3 ug/m^3 for the annual averaging time. This is a 12 percent consumption of the class I NO_2 annual increment. Although no class I analysis was provided for total suspended particulates (TSP), the class II analysis that was performed predicted that the maximum TSP class II increment consumed would be 3 and 0.2 ug/m^3 for the 24-hour and annual averaging times, respectively. These concentrations are less than the class I increments of 10 and 5 ug/m^3, respectively. Because the maximum TSP concentrations were predicted to occur near the plant site, and the pollutant concentrations decrease as the distance from source increases, the TSP concentrations at EVER should be much less than the allowable class I increments.

To assess potential impacts on sensitive air quality related values, it is important for us to know the <u>total</u> ambient concentrations (increment plus background) at the class I area. No such analyses were provided in the FPL application. A cumulative analysis should include all permitted and existing sources within 50 km of the facility's impact area that could potentially impact the class I area (this is especially important for annual effect determinations).

AIR QUALITY RELATED VALUES (AQRVs) ANALYSIS

<u>Terrestrial and Aquatic Effects</u>

The FDER's Preliminary Determination Document states that since the proposed project would not cause any exceedances of the secondary

National Ambient Air Quality Standards (NAAQS), which were designed to protect vegetation from the adverse impacts of air pollutants, there would not be any effect on vegetation. We wish to clarify that there are documented effects below the NAAQS, and that compliance with the NAAQS does not ensure that there will be no negative impacts. The secondary NAAQS are based primarily on effects on cash crops, such as wheat and tobacco, and may not reflect a level of protection for all AQRVs such as native vegetation found in class I areas. In addition, the secondary NAAQS are national levels set to protect against effects due to multiple and diverse sources and may not provide adequate protection for sensitive species found in only one area of the country, nor do they address synergistic effects of multiple pollutants. Therefore, there may be instances, and ongoing studies are confirming this, where adverse effects to AQRVs can occur at levels below the NAAQS.

The location of EVER at the southern tip of the Florida peninsula allows for a unique ecosystem whose native communities reflect both temperate and subtropical influences. Much of south Florida's vegetation is shaped by two competing forces: 1) recurring winter freezes that limit the northward expansion of subtropical species, and 2) in mild years, the lack of cold weather that many temperate species require to break dormancy. Studies have shown that fertilization can decrease the frost hardiness of certain plant species. We are concerned that the nitrates resulting from NO_x emissions would favor more frost tolerant species, thereby causing major shifts in community composition and structure. For example, south Florida slash pine (Pinus elliotti var. densa) is a major constituent of the upland park community, and is the predominant canopy tree species. The slash pines in the park grow on a limestone-derived soil, and they are most likely nitrogen limited. Fertilization by anthropogenic nitrogen could cause the pines to continue growing into the winter, increasing the likelihood of frost damage. Over time, the slash pines could be replaced by a tree species that is less responsive to fertilization.

We are also concerned about the role that nitrogen oxides play as ozone precursors. Fumigation studies conducted in chambers have shown that slash pine seedlings are particularly sensitive to ozone injury. The seedlings showed reductions in root growth even before visible foliar injury was observed. We have not yet duplicated the experiment in the field to determine if current ozone levels in EVER induce the same degree of growth reductions as were observed in the chambers.

Lichens and bryophytes are common in the park, and due to their unique morphology, are particularly sensitive to air pollutants. The nitrates in acid rain may be harmful to bryophytes, particularly to tank bryophytes which accumulate rainwater in a cup-shaped basin formed by overlapping leaves. Two species of epiphytes found in the park, Tillandsia flexuosa, a bromeliad, and

Epidendrum nocturnum, an orchid, are considered threatened under the Preservation of Native Flora of Florida Act. The sensitivity of these two threatened species to air pollutants is not known at this time.

Nitrogen oxide emissions may lead to the acidification of the huge wetland system that comprises much of the park. Acidification leads to changes in the flora and fauna of an aquatic ecosystem. The abundance and biomass of benthic invertebrates decreases and the community composition changes as the pH of the water drops. The loss of prey can result in a decline in fish populations. Additionally, many amphibian and fish species are unable to reproduce at low pH levels. This has a profound effect on consumers higher up the food chain. The federally endangered Everglade kite, peregrine falcon, southern bald eagle, brown pelican, and american crocodile are found in EVER and all depend, to a lesser or greater extent, on an abundant supply of fish and amphibians for food.

Finally, we are concerned about the high levels of mercury that have been found in the federally endangered Florida panther and other animals in the park. It is not known at this time what the source of the mercury is, but we encourage the FDER to limit mercury emissions in the vicinity of the park until the source can be identified and remedial action taken.

Visibility Impacts

A Level 1 visibility screening analysis based on the new visibility screening model--VISCREEN--described in the Environmental Protection Agency's Workbook for Plume Visual Impact Screening and Analysis (September 1988) was performed by FPL. The results of the Level 1 screening analysis showed that the proposed project had the potential to cause visibility impacts due to plumes in EVER. A Level 2 screening analysis was then performed. The results of that analysis indicated that the proposed project would have low potential for visibility impairment due to plume impacts in the park.

The FDER concluded that the proposed modification would not cause an adverse impact on visibility in EVER. As we have indicated in past reviews, this broad conclusion cannot be justified based on the type of model that was used. VISCREEN is a plume visual impact screening model intended for use in evaluating the potential for visibility impairment due to plume impacts. In this case, the modeling results only allow a conclusion that there is low potential for visibility impairment due to plumes in the class I area as a result of emissions from the proposed project. VISCREEN cannot determine a source's potential to contribute to regional haze, which is the most insidious visibility problem in EVER and the surrounding region. Visibility in the southern and eastern United States has degraded steadily since the early 1950s, with the most dramatic changes occurring in the summer months. On an annual average basis, sulfates are responsible for nearly 40 percent of the mass budget and over 50 percent of the light extinction budget in the park; nitrates contribute about 15 percent to light extinction; and organics account for between 15 to 25 percent of the light extinction budget, depending on assumptions about the hygroscopic characteristics of these compounds. There is some seasonal variability of visibility-reducing aerosols, but sulfates predominate as the most important contributor to visibility reduction in every season, with contributions ranging from 42 percent in the summer to as high as 64 percent in the spring. Nitrates and organics continue to be next in importance. At present, it is not possible, in most cases, to estimate the contribution of an individual source to regional haze. However, monitoring and recently developed models may, in the near future, provide a means of assessing the contribution of individual sources to this problem.

In the meantime, we encourage the FDER to take all steps possible to reach national and State visibility goals by limiting pollutants, such as SO_2, NO_x and PM, that contribute to visibility degradation not only in EVER, but in the whole region.

<u>CONCLUSIONS AND RECOMMENDATIONS</u>

1. Before allowing FPL to obtain NO_x reductions at the Port Everglades facility in lieu of installing SCR on the proposed turbines, the FDER should carefully consider the policy and precedent-setting implications of such a decision.

2. Considering the potential impacts to visibility and other air quality related values at EVER, if the FDER approves of the FPL retrofit concept, the FDER should require more than equivalent NO_x reductions (obtained by either retrofitting additional sources or installing low NO_x combustors on the new turbines), so that there is a net environmental improvement compared to the use of SCR alone.

3. The State of Florida should take all steps possible to reach national and State visibility goals by limiting pollutants, such as SO_2, NO_2, and PM, that contribute to visibility degradation not only in EVER, but in the whole region.

4. In order for us to be able to adequately assess potential impacts on sensitive air quality related values, future class I impact analyses should include estimates of the <u>total</u> ambient concentrations (increment plus background) at the class I area.

HOPPING BOYD GREEN & SAMS
ATTORNEYS AND COUNSELORS
123 SOUTH CALHOUN STREET
POST OFFICE BOX 6526
TALLAHASSEE, FLORIDA 32314
(904) 222-7500
FAX (904) 224-8551

February 27, 1991

Mr. Steve Smallwood, P.E., Director
Air Resources Management Division
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Re: Florida Power & Light Company/Lauderdale Repowering Project (PSD-FL-145)

Dear Steve:

We are writing on behalf of Florida Power & Light Company (FPL) to follow up on our discussion of the Lauderdale Repowering Project on Tuesday, February 19, 1991. As you know, last Friday, representatives of FPL met with Jewell Harper's staff at EPA Region IV in Atlanta to discuss EPA's recent letter to Clair Fancy. Enclosed please find a copy of FPL's letter to Ms. Harper regarding the issues discussed in Atlanta. In conjunction with the enclosed letter, FPL offers the following additional comments concerning the project.

As we informed EPA on Friday, Westinghouse Electric Corporation has advised FPL that the repowering project's schedule precludes the possibility of installing low NO_x combustors in the advanced combustion turbines currently being fabricated for the project. As you know, FPL selected the advanced Westinghouse turbines over conventional units because of their increased electrical output and higher efficiency, as well as their ability, when coupled with an HRSG, to match the steam requirements for the existing turbines at the Lauderdale plant. At the time FPL entertained proposals on the advanced turbines, no vendors were able to guarantee the availability of low NO_x combustors for the project. Not only are they (low NO_x combustors) unavailable for the advanced turbines, the combustors currently being developed lack the transferable dual fuel (natural gas/oil) capability required for the

Lauderdale project. (See Exhibit "B" to FPL's letter to EPA).

As discussed in our letter to EPA, we disagree with Region IV's conclusion that SCR would probably be BACT in the absence of the emission reductions at Port Everglades. The Conditions of Certification included in the Siting Board's Final Order conclusively establish BACT to be the emission limits reflecting the use of steam injection. The relevant condition provides:

> Under the unique circumstances of this case, the Department has determined that the Best Available Control Technology (BACT) NO_x limit is 65 ppm when burning oil and 42 ppm when burning gas . . .

Although the Port Everglades reductions are part of the overall air quality control strategy for the project, they are not an explicit or necessary component of the BACT determination. In fact, nothing in the Hearing Officer's Recommended Order or the record of the site certification proceeding would support a contrary finding. The Florida Power Plant Siting Act (PPSA) specifically provides that the "department's decision to issue the permit shall be based on the record and the recommended order of the certification hearing." Fla. Stat. §403.509(3) (Supp. 1990).

In any event, we believe it is proper for DER to consider the substantial environmental benefits of the NO_x reductions at Port Everglades in its BACT determination for the project. As discussed in the attached letter, an interpretation of EPA's emissions trading policy to allow consideration of the Port Everglades reductions would be consistent with the intent behind the policy. Moreover, the emissions trading policy is not binding on the State of Florida. As EPA recognized in a clarification concerning its recent approval of revisions to Kentucky's state implementation plan (SIP), the states are not "required to follow EPA's interpretations and guidance issued under the Clean Air Act in the sense that those pronouncements have independent status as enforceable provisions of the [state's] SIP, such that mere failure to follow such pronouncements, standing alone, would constitute a violation of the Clean Air Act." 55 Fed. Reg. 23548 (June 11, 1990) (Copy enclosed as Attachment "A"). Moreover, "EPA's continuing oversight role under the Clean Air Act leaves [the] states with considerable discretion to implement the NSR program as they see fit." Id. This broad discretion to implement the PSD program as the department "sees fit" certainly allows DER to consider the unique nature of this case when making its case-by-case BACT determination for the Lauderdale project.

Although we recognize DER's desire to consider EPA's comments on any BACT determination, we cannot overemphasize the tight construction schedule that FPL must follow in order to meet the December 31, 1992 in-service date for the project. As you know, the Florida Public Service Commission certified early last year that FPL must meet the project's in-service date if the company is to satisfy its projected 1993 system load requirements. In that regard, the PPSA requires the department to issue any permit required pursuant to a federally approved permit program simultaneously with the Siting Board's action on the application. Fla. Stat. §403.509(3) (Supp. 1990). As you know, over a month has passed since the Siting Board issued its Final Order.

As the Hearing Officer concluded in his Recommended Order, FPL has made a significant effort to minimize the environmental impacts of the repowering project. After repowering, total permitted air emissions will be lowered from existing levels. Moreover, with the emission reductions at Port Everglades, the project will result in no net increase in NOx emissions over existing levels despite the addition of 680 megawatts of generating capacity. Clearly, both the environment and FPL's customers are best served by a control strategy incorporating the Port Everglades reductions and the use of steam injection at the Lauderdale plant. However, although FPL has already made significant efforts toward procurement of low NO_x burners for Port Everglades Units 3 and 4, the company would be forced to reconsider its commitments concerning the overall air quality strategy if DER were to propose changes in its BACT determination at this late stage in the permitting process.

We would like to thank the Department for its continued consideration of this project. We see no reason for the Department to deviate from the agreement the Department and

FPL reached last September, upon which the company has based its subsequent planning efforts. Thus, we are confident that the Department will finalize the permit as proposed in DER's January 25, 1991 submittal to EPA. If you have any questions or comments prior to your scheduled discussion with EPA on February 28, 1991, please do not hesitate to call.

Sincerely,

Gary V. Perko

Peter C. Cunningham
Gary V. Perko

Attorneys for Florida Power & Light Company

Attachments
GVP/ltrLRP

cc: Clair Fancy
Barry Andrews

6. Have there been changes in technology and economic conditions since 1974 that affect the Rule or those covered by it?

The comments do not address this issue. While there have been changes in home stereo technology in the sixteen years since the Rule was promulgated, the changes are not of the type which are affected by the Rule. Further, there have been major changes in the market for automobile stereo and audio equipment, but this market is not covered by the Rule.

Extension of the Rule to Car Audio

Even though the Federal Register Notice did not seek information on extending the Rule to cover audio equipment for cars, two of the comments addressed this issue.

The EIA wrote:

> Currently, there are no guidelines for the car audio manufacturers and dealers to adhere to. Some manufacturers voluntarily utilize the standards set in 1974 for advertising and measuring, however, many do not. Manufacturers and consumers are experiencing the same confusion over unequal power output claims and methods of measuring performance in the area of car audio that existed for home audio prior to the 1974 Rule. There lacks a consistent standard for measuring power output for amplifiers and there lacks a consistent standard for advertising power output claims.
>
> * * * * *
>
> EIA would support the extension of the 1974 power output Rule to cover car audio based on the same logic and market situations that initiated the Rule almost sixteen years ago.

And the individual opined:

> If truth in advertising in this area is to mean anything, this regulation must remain in place, * * *. It should be expanded to cover car audio as it is an excellent example of what happens when you let the "market" decide an issue where consumers are not technically capable.

While these comments about expanding the Rule's coverage are not relevant to the Regulatory Flexibility Act review of the Amplifier Rule, they do raise an important issue. If there is significant deception in the marketing of car audio equipment with consequent consumer and competitive harm, the Commission should consider whether to initiate a rulemaking proceeding to expand the coverage of the Rule. Commission staff is aware of the issue and has informed the EIA that if it has data demonstrating the existence of a problem, staff will be receptive to analyzing it and making an appropriate recommendation to the Commission. The EIA is aware that even if staff takes no action, EIA can petition the Commission for an amendment proceeding.

Determination

Based on the comments and foregoing analysis, the Commission has determined to continue the Amplifier Rule without any change. There does not appear to be any significant adverse economic impact on a substantial number of small entities. Further, there appears to be a continued need for the Rule to prevent the return of deception to the market and to allow businesses to compete on a level playing field.

List of Subjects in 16 CFR Part 432

Amplifiers for home entertainment, Trade practices.

By direction of the Commission.

Donald S. Clark,

Secretary.

[FR Doc. 90-13429 Filed 6-8-90; 8:45 am]

BILLING CODE 6750-01-M

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 52

[KY-630; FRL-3786-6]

Approval and Promulgation of Implementation Plans, Kentucky; State Regulation for Prevention of Significant Deterioration and Visibility New Source Review in Attainment Areas

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of clarification.

SUMMARY: In this notice, EPA is clarifying certain interpretive statements contained in the Federal Register notice approving revisions to the Kentucky State Implementation Plan (SIP) under the Clean Air Act, 41 U.S.C. 7401-7642. That action, published on September 1, 1989 (54 FR 36307), was a final rule approving Kentucky's regulation for prevention of significant deterioration (PSD), a visibility monitoring strategy, and regulations for visibility new source review (NSR) in attainment areas. The purpose of today's notice is to clarify EPA's intent regarding certain interpretive language contained in that earlier notice. Today's action does not alter EPA's approval of the SIP revisions which were the subject of the earlier final action notice, but it does supersede the interpretive statements in that notice.

DATES: This notice is effective June 11, 1990.

ADDRESSES: Copies of the documents relevant to this action are available for public inspection during normal business hours at the following location: Environmental Protection Agency, Region IV, Air Programs Branch, 345 Courtland Street NE., Atlanta, Georgia 30365.

FOR FURTHER INFORMATION CONTACT: For information regarding this notice of clarification, contact Dennis Crumpler, EPA, New Source Review Section, Office of Air Quality Planning and Standards (MD-15), Research Triangle Park, North Carolina 27711, telephone (919) 541-0871, FTS 629-0871. For information regarding the September 1, 1989, approval of Kentucky's regulation for PSD, contact Richard A. Schutt at the above Region IV address or telephone (404) 347-2864, FTS 257-2864.

SUPPLEMENTARY INFORMATION: Following a December 30, 1985, public hearing in conformity with 40 CFR 51.102 (previously 40 CFR 51.4), the Commonwealth of Kentucky's Natural Resources and Environmental Cabinet (NREPC) adopted regulation changes involving PSD an visibility and submitted them to EPA on February 20, 1986, for approval as implementation plan revisions. EPA proposed to approve the revisions on March 17, 1987 (52 FR 8311). The final action notice of September 1, 1989 (54 FR 36307) finalized that approval. Specifically, EPA found that Kentucky's regulations for PSD (including stack heights and dispersion techniques), visibility monitoring, and visibility new source review in attainment areas are adequate to meet the requirements contained in 40 CFR 51.166, 51.305, and 51.307(a) and (d), respectively. See 54 FR 36310-11.

The Disputed Language in EPA's Approval of Kentucky's SIP Revisions

The September 1, 1989, notice described EPA's view of the relationship between EPA and the states under the Clear Air Act, and of the legal effect of EPA's approval of SIP measures implementing various programs under the Act. See 54 FR 36309-08. EPA pointed out that in adopting the Clean Air Act, Congress designated EPA as the agency primarily responsible for interpreting the Act and overseeing its implementation by the states. EPA also noted that it must approve state programs that meet the requirements of 40 CFR part 51. However, the Agency also referred to the very complex and dynamic nature of the Act's PSD requirements (including stack heights and dispersion techniques), and new source review and visibility programs.

Consequently, EPA noted, it would be administratively impracticable and legally unnecessary to include all statutory interpretations in the EPA regulations and the SIPs of the various states, or to amend the regulations and the SIPs everytime EPA interprets the statute or regulations or issues guidance regarding the proper implementation of the NSR program. Rather, EPA maintained that federal approval of these NSR-related regulations and narrative as part of the Kentucky SIP required the state to follow EPA's current and future interpretations of the Act's provisions and regulations, as well as EPA's operating policies and guidance, but only to the extent that such policies are intended to guide the implementation of approved state NSR programs. In making this assertion, EPA was careful to emphasize that as a matter of course any fundamental changes in the administration of NSR would have to be accomplished through amendments to the regulations in 40 CFR part 51 and subsequent SIP revisions.

EPA then explained the consequences of its approval of these portions of Kentucky's NSR programs in light of the Agency's views regarding the federal-state relationship under the Act. EPA noted that it will continue to oversee implementation of this important program by reviewing and commenting upon proposed permits as appropriate. Specifically, EPA stated, it will comment upon proposed permits that do not implement the letter of the law, as well as EPA's statutory and regulatory interpretations and applicable guidance. If a final permit is issued which still does not reflect consideration of the relevant factors, EPA stated that it may view the permit as inadequate for purposes of implementing the requirements of the Act and Kentucky's SIP, and may consider enforcement action under Sections 113 and 167 of the Act to address the permit deficiency.

Kentucky's Letter of November 17, 1989

On November 17, 1989, Mr. William C. Eddins, Director, Division of Air Quality, NREPC, submitted a letter regarding the preamble language in the September 1, 1989 notice discussed above. NREPC stated that an agreement by the state to comply with future guidelines and policies adopted by EPA would be a delegation of legislative power prohibited by the state constitution, and sought to clarify certain points regarding the September 1 Federal Register notice. In addition, NREPC stated that EPA should refrain from using policies and guidelines to implement substantive changes to regulatory and statutory requirements.

Litigation Regarding the September 1, 1989 Notice

A company sought judicial review of the interpretive language in the September 1, 1989, Federal Register notice. *Westvaco Corp.* v. *EPA*, No. 89-3975 (6th Cir.). In its brief, Westvaco asserted, *inter alia*, that the interpretive language in question constituted an improper imposition of binding regulatory requirements without proper rulemaking procedures.

EPA Clarification of Interpretive Language in the September 1, 1989 Notice

NREPC and Westvaco apparently have misinterpreted both the purpose and effect of the language in question. In response to the concerns expressed by NREPC and Westvaco, EPA today clarifies that it did not intend to suggest that Kentucky is required to follow EPA's interpretations and guidance issued under the Clean Air Act in the sense that those pronouncements have independent status as enforceable provisions of the Kentucky SIP, such that mere failure to follow such pronouncements, standing alone, would constitute a violation of the Clean Air Act. Rather, as discussed below, EPA's intent was merely to place the state and the public at large on notice of EPA's longstanding views that the Agency must continue to oversee and enforce the NSR provisions of the Act following approval of a state program. A such, strictly speaking the language in question was neither part of nor a condition of EPA's approval of Kentucky's SIP, and it has no binding effect. Rather than creating new rights or obligations, it advised the public of EPA's views regarding obligations that already exist by operation of the statutory scheme.

The issuance of NSR permits and other actions by the state in the administration of the federal Clean Air Act must conform to the requirements of the Act and the SIP. See section 167 and 113, 42 U.S.C. 7477 and 7413. In making judgments as to what constitutes compliance with the Act and regulations issued thereunder, EPA looks to (among other sources) its policy statements and interpretive rulings in effect at the time of EPA's action regarding those statutory and regulatory requirements.

It follows that state actions implementing the federal Clean Air Act which do not conform to the Act may lead to potential enforcement action by EPA. However, in defending against such an enforcement action, a party is free to assert that EPA has not reasonably interpreted the underlying statutory and regulatory provisions.

EPA's approval of a state NSR program or some portion of it does not divest the Agency of the duty to continue a vigorous oversight and enforcement role under sections 167 and 113. For example, section 167 provides that EPA shall take whatever enforcement action may be necessary to prevent construction of a major stationary source that does not "conform to the requirements of" the PSD program. Thus, as to PSD, the purpose of the preamble language in the September 1 notice was to advise Kentucky and the public of EPA's view that approval of a state's PSD program does not bar EPA from deciding whether a state-issued PSD permit conforms to the Act's PSD requirements.

Following SIP approval, then, EPA remains as the congressionally designated agency with primary responsibility to interpret the federal law under the Act and to base its enforcement actions on those interpretative rulings. If EPA determines that a state-issued permit does not conform to the Act's PSD requirements, EPA will decide whether to sue the state and/or the source for declaratory and injunctive relief. *See United States* v. *Solar Turbines, Inc.*, No. 88-0924. (M.D.Pa.) (slip op. Nov. 28, 1989).

EPA acknowledges that states have the primary role in administering and enforcing the various components of the NSR program. For the most part, the states have been successful in this effort, and EPA's involvement in interpretative and enforcement issues is limited to only a small number of cases. Consequently, EPA's continuing oversight role under the Clean Air Act leaves Kentucky and other states with considerable discretion to implement the NSR program as they see fit. First, as noted in the September 1 notice, EPA may not institute fundamental changes in the requirements set forth in its own regulations or state implementation plans through interpretive rulings or policy statements. The creation of new rights or obligations can only be accomplished by revisions to the regulations in 40 CFR parts 51 and 52 and by SIP revisions, in accordance with applicable rulemaking procedures. Second, EPA's interpretations often are intended in whole or in part to guide only EPA Regional Offices, and in such instances they have no implications whatsoever for a state's administration of its program.

In sum, states remain free to follow their own course, provided that state

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action is consistent with the letter and spirit of the SIP, when read in conjunction with the Clean Air Act and EPA's regulations. EPA believes that the language in question in the September 1, 1988, notice, as clarified here, accurately describes the legal relationship between EPA and the Commonwealth of Kentucky with respect to the NSR program.

Under 5 U.S.C. 605(b), I certify that this notice will not have a significant economic impact on a substantial number of small entities.

The Office of Management and Budget has exempted this rule from the requirements of section 3 of Executive Order 12291.

List of Subjects in 40 CFR Part 52

Air pollution control, Intergovernmental relations.

Authority: 42 U.S.C. 7401–7642.

Dated: May 31, 1990.

F. Henry Habicht,

Acting Administrator.

[FR Doc. 90–13432 Filed 6–8–90; 8:45 am]

BILLING CODE 6560-50-M

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40 CFR Part 281

[FRL-3785-6]

Mississippi; Final Approval of State Underground Storage Tank Program

AGENCY: Environmental Protection Agency.

ACTION: Notice of final determination on Mississippi's application for final approval.

SUMMARY: The State of Mississippi has applied for final approval of its underground storage tank program under Subtitle I of the Resource and Conservation and Recovery Act (RCRA). The Environmental Protection Agency (EPA) has reviewed Mississippi's application and has reached a final determination that Mississippi's underground storage tank program satisfies all the requirements necessary to qualify for final approval. Thus, EPA is granting final approval to the State of Mississippi to operate its program.

EFFECTIVE DATE: Final approval for Mississippi shall be effective July 11, 1990.

FOR FURTHER INFORMATION CONTACT: John K. Mason, Chief, Underground Storage Tank Section, U.S. EPA, Region IV, 345 Courtland Street NE., Atlanta, Georgia 30365, 404/347-3866.

SUPPLEMENTARY INFORMATION:

A. Background

Section 9004 of RCRA enables EPA to approve state underground storage tank programs to operate in a state in lieu of the federal underground storage tank program. To qualify for final authorization, a state's program must: (1) Be "no less stringent" than the federal program, and (2) provide for adequate enforcement (section 9004(a) of RCRA, 42 U.S.C. 6926(B)).

On October 2, 1989, EPA acknowledged receiving from the State of Mississippi a completed official application to obtain final approval to administer its underground storage tank program. On February 20, 1990, EPA published a tentative decision announcing its intent to grant Mississippi final approval of its program. Further background on the tentative decision to grant approval appears at 55 FR 5801, February 20, 1990.

Along with the tentative determination, EPA announced the availability of the application for public comment and the date of a public hearing on the application. EPA requested advance notice for testimony and reserved the right to cancel for lack of public interest. Since there was no public request, the public hearing was cancelled. No public comments were received regarding EPA's approval of Mississippi's underground storage tank program.

B. Decision

I conclude that the State of Mississippi's application for final approval meets all of the statutory and regulatory requirements established by Subtitle I of RCRA. Accordingly, Mississippi is granted final approval to operate its underground storage tank program. The State of Mississippi now has the responsibility for managing all regulated underground storage tank facilities within its borders and carrying out all aspects of the federal underground storage tank program except with regard to Indian lands where EPA will have regulatory authority. Mississippi also has primary enforcement responsibility, although EPA retains the right to conduct enforcement actions under section 9006 of RCRA.

Compliance with Executive Order 12291

The Office of Management and Budget has exempted this rule from the requirements of section 3 of Executive Order 12291.

Certification Under the Regulatory Flexibility Act

Pursuant to the provisions of 5 U.S.C. 605(b), I hereby certify that this approval will not have a significant economic impact on a substantial number of small entities. This approval effectively suspends the applicability of certain federal regulations in favor of the State of Mississippi's program, thereby eliminating duplicative requirements for owners and operators of underground storage tanks within the State. It does not impose any new burdens on small entities. This rule, therefore, does not require a regulatory flexibility analysis.

List of Subjects in 40 CFR Part 281

Administrative practice and procedure, Hazardous materials, State program approval and underground storage tanks.

Authority: section 9004 of the Solid Waste Disposal Act as amended, 42 U.S.C. 6912(a), 6974(b), and 6991(c).

Dated: April 27, 1990.

Greer C. Tidwell,

Regional Administrator.

[FR Doc. 90-13440 Filed 6-8-90; 8:45 am]

BILLING CODE 6560-50-M

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 33

Refuge Specific Fishing Regulations

CFR Correction

In title 50 of the Code of Federal Regulations, parts 1 to 199, revised as of October 1, 1989, on page 481 paragraphs (a)(1) and (2) and (b) were incorrectly removed from § 33.53. Section 33.53 was added at 50 FR 29994, July 23, 1985, and amended at 53 FR 1491, January 20, 1988. The entire text of paragraphs (a) and (b) of § 33.53 reads as follows:

§ 33.53 Wisconsin.

(a) *Horicon National Wildlife Refuge.* Fishing is permitted on designated areas of the refuge subject to the following conditions:

(1) Fishing is permitted from April 15 through September 15.

(2) Only bank fishing is permitted.

(b) *Necedah National Wildlife Refuge.* Fishing is permitted on designated areas of the refuge subject to the following conditions:

(1) Fishing is permitted only in Sprague and Goose Pools including their outlets as far south as Sprague-Mather Road.

HOPPING BOYD GREEN & SAMS

ATTORNEYS AND COUNSELORS

123 SOUTH CALHOUN STREET
POST OFFICE BOX 6526
TALLAHASSEE, FLORIDA 32314
(904) 222-7500
FAX (904) 224-8551

February 26, 1991

Ms. Jewell A. Harper, Chief
Air Enforcement Branch
Air, Pesticides, and Toxics
Management Division,
U.S. Environmental Protection Agency,
Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Re: Florida Power & Light Company/Lauderdale Repowering Project (PSD-FL-145)

Dear Ms. Harper:

On behalf of Florida Power & Light Company (FPL), we would like to thank you for the opportunity to meet with members of your staff on Friday, February 22, 1991, regarding the the Lauderdale Repowering Project. We are writing to follow up on our discussion of the Florida Department of Environmental Regulation's (FDER) BACT determination for project and Region IV's letter of February 19, 1991.

Background

A brief description of the Lauderdale project is helpful in understanding the site specific factors relevant to FDER's BACT determination. As you know, the project involves the conversion of units 4 and 5 at the Lauderdale site into two combined cycle units consisting of two advanced combustion turbines and two heat recovery steam generators (HRSG) each. The repowered units will provide approximately 680 additional megawatts to the area in FPL's system experiencing the greatest demand for electrical generation. Environmental impacts of the project will be significantly minimized by the repowering of existing units to create substantially more efficient equipment at a site used for electrical generation since the 1920s. Many existing plant facilities, including the cooling canal pond system, will be retained to serve the repowered units. No new off-site transmission lines, roads, or fuel supply lines will be constructed as part of the project and only a small portion of currently undeveloped land on-site will be needed to accommodate the project. After repowering, consumptive use of groundwater by the Lauderdale plant will be reduced considerably from present levels. Moreover, total permitted air emissions will be lower for the repowered plant than for the existing plant. (See Exhibit "A").

As discussed on Friday, the air quality control strategy embodied in FDER's proposed PSD permit evolved over a lengthy site certification process. In September of 1990, an administrative hearing was held in Fort Lauderdale to consider the environmental impacts of the project. All parties to the proceeding, including FDER and Broward County, recommended certification of the project in accordance with mutually accepted Conditions of Certification. Based on the evidence presented at the hearing, the Hearing Officer recommended certification in accordance with the Conditions of Certification jointly proposed by the parties. On January 10, 1991, the Governor and Cabinet, sitting as the Siting Board, accepted the Hearing Officer's recommendations. The BACT emission limitations included in FDER's proposed permit are consistent with the Conditions of Certification finally adopted by the Governor and Cabinet.

Recognizing the Lauderdale Plant's location in an ozone nonattainment area, FPL has made a considerable effort to reduce NO_x emissions from the repowering project. The company has agreed to an overall capacity factor limit of 87%, as well as a 40% capacity factor limit on oil-firing. In addition to installation of steam injection to comply with BACT for the project, FPL has committed to reduce NO_x emissions at the nearby Port Everglades Plant by 25% from historical levels. To help reduce VOC emissions in the area, FPL has also agreed to contribute seed money for Broward County's "Stage II" emissions control program. FPL is concerned that if FDER changes its BACT determination at this late stage in the process, the company will be forced to reconsider these other commitments which provide significant overall air quality benefits to Broward County.

Availability of Low NOx Combustors

After receiving your letter, FPL contacted Westinghouse Electric Corporation about the development status of low NO_x burners for the advanced W501F combustion turbines selected for the project. As discussed on Friday, Westinghouse advised FPL that such technology currently is unavailable. The attached letter confirms that Westinghouse expects to develop low NO_x combustors capable of achieving 25 ppm for its conventional W501D5 units by mid-1991. However, due to the higher turbine inlet temperature and other factors associated with the advanced W501F machines, significant additional design, engineering and testing will be required before Westinghouse markets low NO_x combustors for the advanced W501F turbines. Moreover, the combustors currently being developed are not capable of dual fuel (natural gas/oil) operation, as all combustors must be changed, with the unit off-line, to allow a switch from one fuel to another. (See Exhibit "B").

At the time FPL entertained proposals on combustion turbines for the project, no vendor guaranteed availability of low NO_x combustors. FPL chose the advanced Westinghouse units over conventional turbines because of their increased electrical output and higher efficiency, as well as their ability, when coupled with an HRSG, to generate the steam required for the existing turbines at the Lauderdale site. FPL has since contracted with Westinghouse, which is currently fabricating four of the advanced W501F turbines for the project. As Westinghouse concluded in its letter of February 21: "The Lauderdale Repowering Project schedule, which requires commercial operation by December 31, 1992, precludes the possibility of installing this low NO_x combustor design in the machines now being fabricated for delivery to FPL."

Relevance of the Port Everglades Emission Reductions

Although one interpretation of EPA's 1986 emissions trading policy might lead to a contrary conclusion, FPL believes that the emission reductions at Port Everglades can and should be considered in determining BACT for the Lauderdale project. The passage quoted in your letter does state that emission reductions from existing sources cannot be used to meet BACT emission limits. However, this statement must be read in the context of the entire policy, which defines when emission trades can be used by existing sources, already subject to emission limitations, to avoid additional regulatory requirements. Nothing in the policy explicitly precludes consideration of such emission reductions in establishing BACT. In our view, the passage quoted in your letter stands for the proposition that once BACT has been established for a particular new or modified source, emission reductions from an existing source cannot be "traded off" to allow emissions above the established BACT limitation. This is not to say, however, that emission reductions from an existing facility cannot be considered when the state originally determines BACT for a new or modified source.

This interpretation is consistent with the intent behind the emissions trading policy. When EPA announced the policy in 1986, the Agency specifically "endorse[d] emissions trading and encourage[d] its sound use by states and industry to help meet the goals of the Clean Air Act more quickly and inexpensively." 51 Fed. Reg. 43814 (Dec. 4, 1986). Moreover, EPA emphasized:

> The policy announced today does not constitute final agency action . . ., and therefore is not judicially reviewable. Rather, it establishes general guidance for reviewing and approving voluntarily submitted trades. . . . Applicants for emission trades remain free, following publication of today's notice, to advance the appropriateness of different trading requirements in the context of rulemaking actions on their individual trades.

Id. at 43815 (emphasis added). In light of this language, we do not believe the emissions trading policy precludes consideration of the Port Everglades emission reductions in establishing BACT for the Lauderdale project.

We find it somewhat ironic that if the notion of low NO_x burners at Port Everglades had been conceived at an earlier stage in the permitting process, FPL could have "netted out" of PSD review of the Lauderdale project altogether. As discussed in our meeting last Friday, the Lauderdale and Port Everglades facilities are located only three and one-half miles apart, and are connected by a major electrical transmission corridor that serves to connect these plants to the FPL grid. As you may know, when EPA promulgated its new source review regulations which authorize the use of "bubbles" to net out of new source review, the Agency specifically disclaimed any intent to treat "long line" operations, such as electrical power lines, separately under all circumstances. The Agency explained that "EPA is unable to say precisely at this point how far apart activities must be in order to be treated separately. The Agency can answer that question only through case-by-case determinations." 45 Fed. Reg. 52695 (Aug. 7, 1980) (emphasis added).

As FDER observed in its BACT determination for the repowering project, the Lauderdale and Port Everglades plants are significantly interconnected in that:

1. The two facilities are in the same airshed.

2. The two facilities are in some way interrelated (dispatching of one affects dispatching of the other).

3. The two facilities are located reasonably close to each other (approximately [3½] miles)."

Given these unique circumstances and the theory behind EPA's emissions trading policy, we see no reason to preclude consideration of the Port Everglades NO_x emission reductions when determining BACT for the Lauderdale project.

When the emission reductions at Port Everglades are considered in conjunction with the inherent environmental benefits of repowering, the air quality strategy contained in FDER's draft PSD permit clearly prevails over other available control strategies. As Ken Kosky explained last Friday, the shutting down of the existing steam generators will result in a net reduction in actual representative NO_x emissions of 2,456 tons per year. When coupled with these emission reductions, the use of steam injection on the repowered units will result in an NO_x emissions rate equivalent to 19.1 ppm at the agreed-upon 87% capacity factor. (See Exhibit "C"). As Exhibit "D" illustrates, FDER's present BACT determination (Bar #4) would result in significantly less total emissions than would SCR at 100%

capacity as originally proposed by FDER (Bar #3), even if reductions at Port Everglades are left out of the equation. When the Port Everglades reductions are considered (Bar #5), total maximum potential emissions drop significantly, and net NO_x emissions are reduced to zero. In light of these significant emission reductions, both the environment and FPL's customers are best served by the air quality strategy contained in the proposed permit.

FDER's BACT Determination

Even if the Port Everglades emission reductions are ignored, the use of steam injection to achieve 42 ppm when firing natural gas and 65 ppm when firing fuel oil is BACT for NO_x. As discussed above, when considered in conjunction with the reductions resulting from the repowering, these emission limits result in an overall emission rate equivalent to 19.1 ppm, well below the applicable New Source Performance Standard (approximately 107 ppm). (See Exhibit "C"). Although FPL's commitment to install low NO_x burners at Port Everglades undoubtedly played a role in FDER's overall decision-making process, the Department independently determined BACT for the project. As proposed by FDER and adopted by the Governor and Cabinet, Condition of Certification II.B.9 provides:

> Under the unique circumstances of this case, the Department has determined that the Best Available Control Technology (BACT) NO_x emissions limit is 65 ppm when burning oil and 42 ppm when burning gas. . .

In addition to applying BACT at the Lauderdale plant, FPL agreed to the emission reductions at Port Everglades as part of the overall air quality strategy for the project. With all due respect, nothing in the record of the site certification hearing supports EPA's conclusion that "in the absence of emissions reductions at the Port Everglades facility, SCR would probably be BACT for the Lauderdale repowering project."

As you know, under its EPA-approved PSD rules, FDER is required to determine BACT for a particular project, on a case-by-case basis, after taking into account energy, environmental and economic impacts. As we discussed last

Friday, the site-specific impacts related to SCR justify FDER's BACT determination for the project. Unlike a greenfield power project, the Lauderdale Repowering Project involves a modification of an existing facility that will actually reduce emission from currently permitted levels. In addition, the Lauderdale site is located only a few hundred feet from a heavily populated residential area. The plant's proximity to nearby residents and workers makes SCR particularly inappropriate for the repowering project. Uncontroverted expert testimony at last fall's site certification hearing conclusively established that SCR would require storage of approximately 500,000 gallons per year of potentially hazardous ammonia only 300 feet from the nearest residence. Any leak or spill at or near the plant could have serious health consequences to nearby workers and residents. The use of SCR also would result in emissions of ammonia and would increase emissions of particulate matter by approximately 900 tons per year. Moreover, the periodic cleaning required for proper maintenance of an SCR system would generate a significant amount of additional wastewater.

In addition to its potential adverse environmental consequences, SCR would have significant energy and economic impacts on the project. The use of SCR would create back pressure on the turbine which reduces overall heat rate and megawatts produced. Because the Lauderdale project will be a critical component of FPL generating system, the resulting loss of megawatts would have to be offset by increased electrical output at other FPL plants, thereby increasing secondary emissions. (See Exhibit "E"). In addition, installation and use of SCR would increase the cost of the project by approximately $9,000 per ton of NO_x removed when the emission reductions resulting from the shutdown of existing units 4 and 5 are considered. Even if these emission reductions are artificially ignored, the cost of removal is $4,500 to $5,700 per ton, depending on the fuel mix used during operation of the repowered units. Moreover, the use of SCR when firing oil has associated technical uncertainties. SCR has never been used on combined cycle units the size and type of those to be used on the Lauderdale site at the stipulated 40% capacity for oil-firing. In light of these site specific environmental, economic and technical factors, SCR is inappropriate and unreasonable for the Lauderdale project.

Conclusion

Although we appreciate EPA's concerns about NO_x emissions in the area, it has been shown that FDER's BACT determination for the project represents the environmentally superior choice. FDER's determination is fully consistent with relevant rules and policies of both EPA and FDER, especially considering the very unique nature of this project. Recognizing the significant environmental benefits of repowering, the Governor and Cabinet adopted FDER's proposed NO_x emission limits when the Siting Board certified the project last month. The air quality strategy recommended by FDER and adopted by the Siting Board evolved after substantial state and county involvement in the permitting process. As discussed on Friday, it is our understanding that FDER also interacted with EPA at both the regional and national levels and affirmed its appropriateness prior to FDER's agreement with FPL in September, 1990.

Once again, thank you for the opportunity to meet with you on Friday, February 22. We appreciate your consideration of this matter. If you have any additional questions, please do not hesitate to call.

Sincerely,

Peter C. Cunningham
Gary V. Perko

Attorneys for Florida Power & Light Company

Attachments
GVP/ltrEPAIV

cc: Brian L. Beals, EPA
Gregg Worley, EPA
Nancy L. Tommelleo, EPA
Angelia R. Souder, EPA
Steve Smallwood, FDER
Clair Fancy, FDER
Barry Andrews, FDER

LAUDERDALE REPOWERING PROJECT

	Existing Steam Units 4 & 5	Proposed Repowered Units 4 & 5[a]	Net Emissions
<u>Maximum Permitted Air Emissions</u>			
Sulfur Dioxide (SO_2)	15,900 TPY (57.8 TPY/MW)	2,410 TPY (2.5 TPY/MW)	-13,490 TPY
Nitrogen Oxides (NO_x)	8,287 TPY (30.1 TPY/MW)	5,230 TPY (5.4 TPY/MW)	-3,057 TPY
Carbon Monoxide (CO)	604 TPY (2.2 TPY/MW)	1,580 TPY (1.6 TPY/MW)	+976 TPY
Particulates	1,445 TPY (5.3 TPY/MW)	540 TPY (0.6 TPY/MW)	-905 TPY
Volatile Organic Compounds (VOCs)[b]	336 TPY (0.3 TPY/MW)	172 TPY (0.2 TPY/MW)	-164 TPY
TOTAL			-16,640 TPY

[a]87% capacity factor (CF)
40% CF on oil

[b]Includes total facility emissions.

Westinghouse
Electric Corporation

Power Generation
Business Unit

Power Generation
Projects Division

The Quadrangle
4400 Alafaya Trail
Orlando Florida 32826-2399

CTW-FPL-91-0005

February 21, 1991

Florida Power & Light Company
Post Office Box 14000
Juno Beach, Florida 33408

Attention Tom Young

Re: FPL
Combustion Turbine Repowering
Lauderdale Units 4 and 5
Lauderdale - Low NO_x

Dear Mr. Young:

The following comments are in response to your memo regarding questions you had on the article in "Gas Turbine World" dated March/April of 1990, titled "Trends in Low-No_x Combustion Design & Operating Experience".

This article mentioned the introduction of the MW501F machine (the "advanced" combustion turbine) and also commented on the MHI development of a hybrid cannular combustor. As discussed below, this low NO_x combustor is not presently available for the MW501F machines now being fabricated for FPL's Lauderdale Repowering Project. Moreover, at the present stage of development the combustor is not a true dual fuel (natural gas/oil) design, as all combustors must be changed out with the unit off-line to allow a switch from one fuel to the other.

Background

Westinghouse has worked on the development and commercialization of advanced combustion turbine burner technology ever since the enactment of the Clean Air Act of 1970. Some of the earliest successful experiments of lean premixed

EXHIBIT
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combustion for low-NO_x burners were conducted by Westinghouse in the early and mid-1970s. Due to a lull in U. S. market activities during the early 1980s, Westinghouse did not continue its own pursuit of practical dry low NO_x burners for utility applications. Rather, all units sold during that timeframe utilize either water or steam injection to meet EPA New Source Performance Standards (approximately 100 ppmvd). Westinghouse W501D units ("conventional" combustion turbines) sold more recently, that is, in the 1987-1990 timeframe are capable of meeting NO_x levels on the order of 40 ppmvd NO_x, on natural gas, using water or steam injection. A 25 ppmvd NO_x level is expected to first be achieved in a commercial W501D5 unit around mid-1991. Four of these "conventional" technology machines with modified, 25 ppmvd NO_x burners (steam injected, gas fuel; 42 ppmvd NO_x on No. 2 oil, steam injected) are now under construction at combined cycle plants in Massachusetts and New Jersey.

<u>Advanced Combustion Turbines</u>

Westinghouse has recently introduced the MW501F machine (150 mw). This advanced machine offers increased output and higher efficiency as compared to conventional models, but also results in higher turbine inlet temperature.

The four combustion turbines ordered by FPL for the Lauderdale Repowering Project will be the first commercial application of the MW501F design. While development efforts on the low NO_x hybrid cannular combustors referenced in the "Gas Turbine World" article are ongoing, these combustors are not presently available for the advanced combustion turbine. Significant additional design, engineering and testing will be needed before development of the combustors for application in the MW501F is complete. The Lauderdale Repowering Project schedule, which requires commercial operation by December 31, 1992, precludes the possibility of installing this low NO_x combustor design in the machines now being fabricated for delivery to FPL.

I would again emphasize that the current specifications for the Lauderdale turbines require on line transferrable dual fuel (natural gas/oil) combustors for operational flexibility and reliability. The hybrid cannular combustors under development are not presently capable of dual fuel operation. With the current design, complete change out of the combustors, requiring the machine to be taken off line, would be necessary to allow a switch from one fuel to the other.

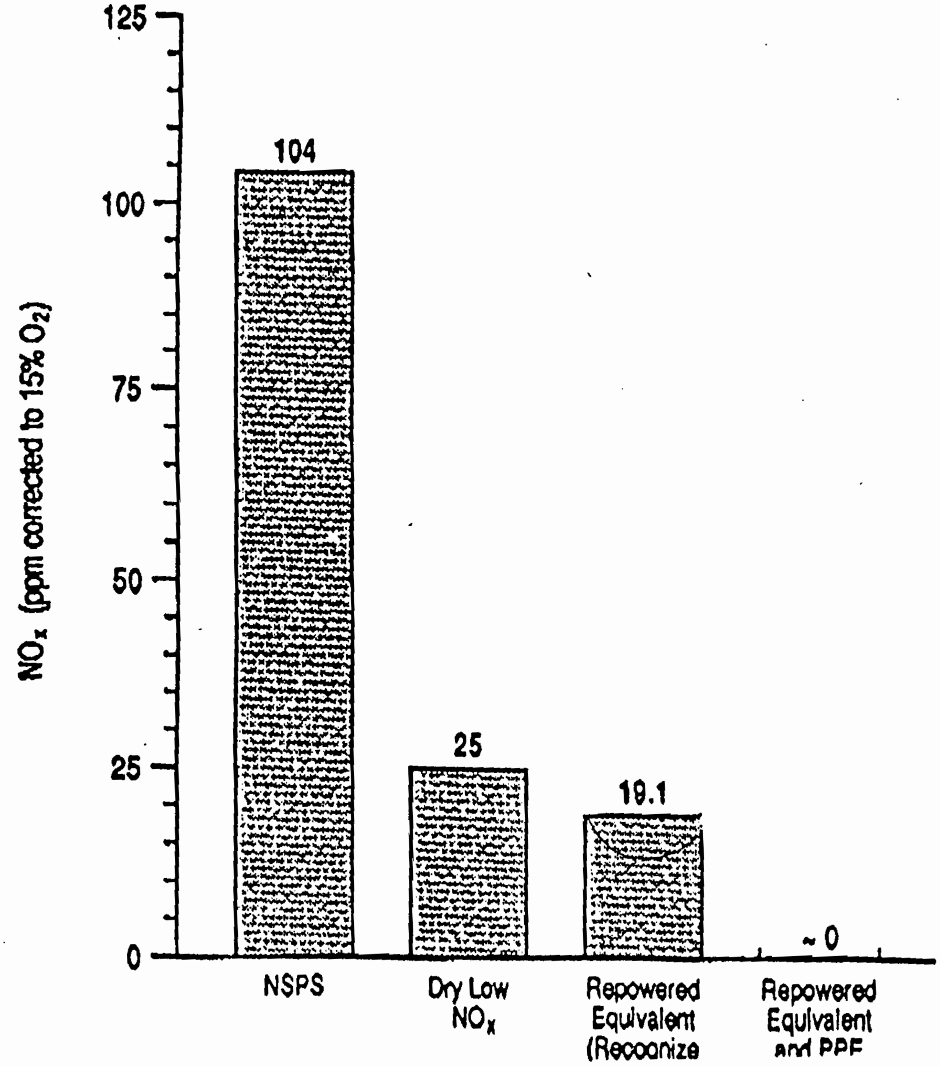
If you should have any questions or comments, please do not hesitate to call.

Best regards,

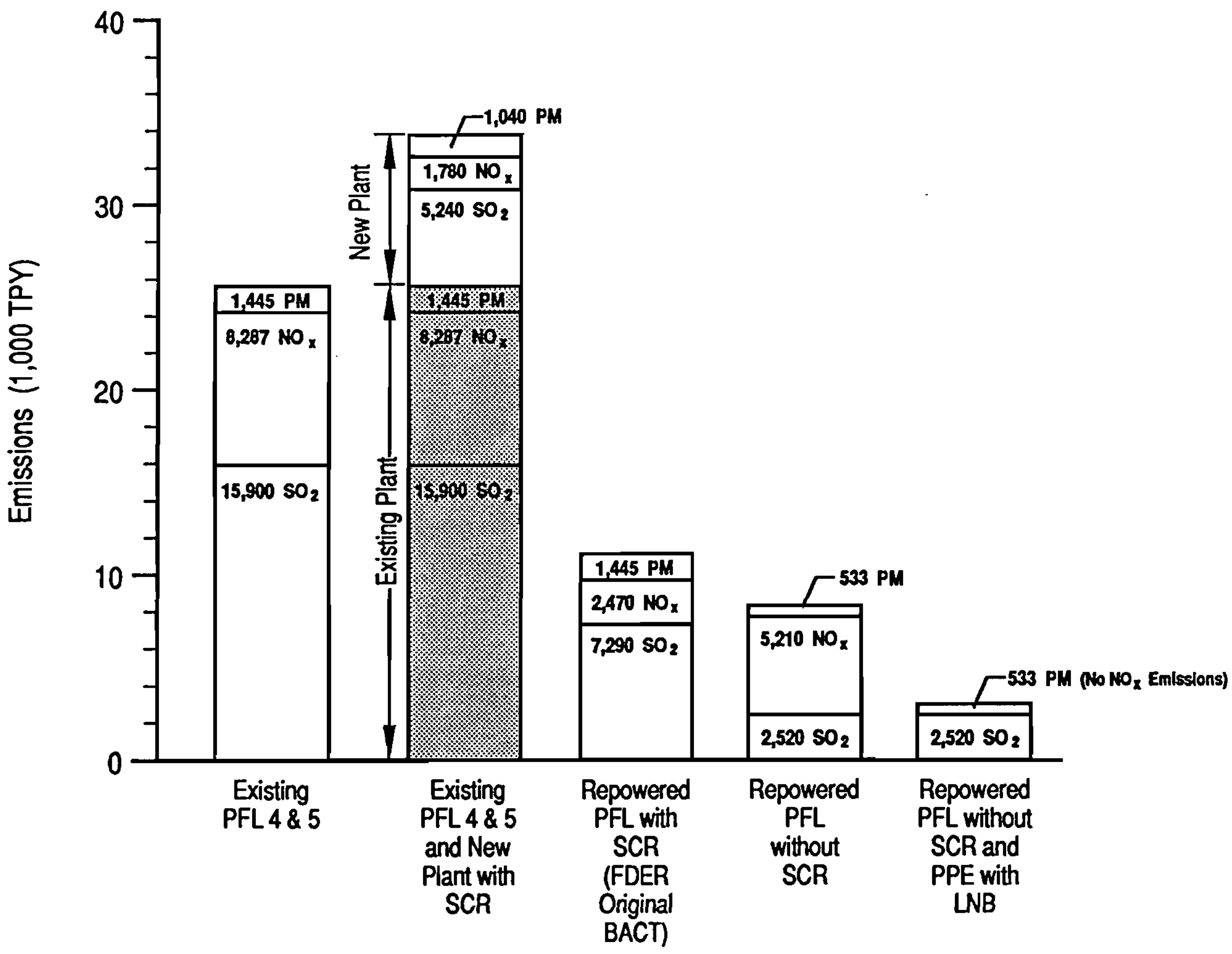
Matt Coffman

Matt Coffman
Project Manager
Lauderdale Project

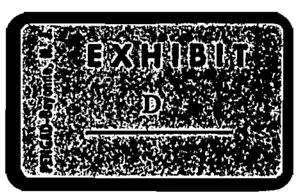
cc: John McManus, Westinghouse/Juno Beach
Charlie Sloan, Westinghouse/Orlando



125
100
75
50
25
0
NO_x (ppm corrected to 15% O_2)
104
25
19.1
~ 0
NSPS
Dry Low NO_x
Repowered Equivalent (Recoanize
Repowered Equivalent and PPF



Emissions (1,000 TPY)
40
30
20
10
0
1,445 PM
8,287 NOx
15,900 SO2
1,040 PM
1,780 NOx
5,240 SO2
New Plant
Existing Plant
1,445 PM
8,287 NOx
15,900 SO2
1,445 PM
2,470 NOx
7,290 SO2
533 PM
5,210 NOx
2,520 SO2
533 PM (No NOx Emissions)
2,520 SO2
Existing PFL 4 & 5
Existing PFL 4 & 5 and New Plant with SCR
Repowered PFL with SCR (FDER Original BACT)
Repowered PFL without SCR
Repowered PFL without SCR and PPE with LNB



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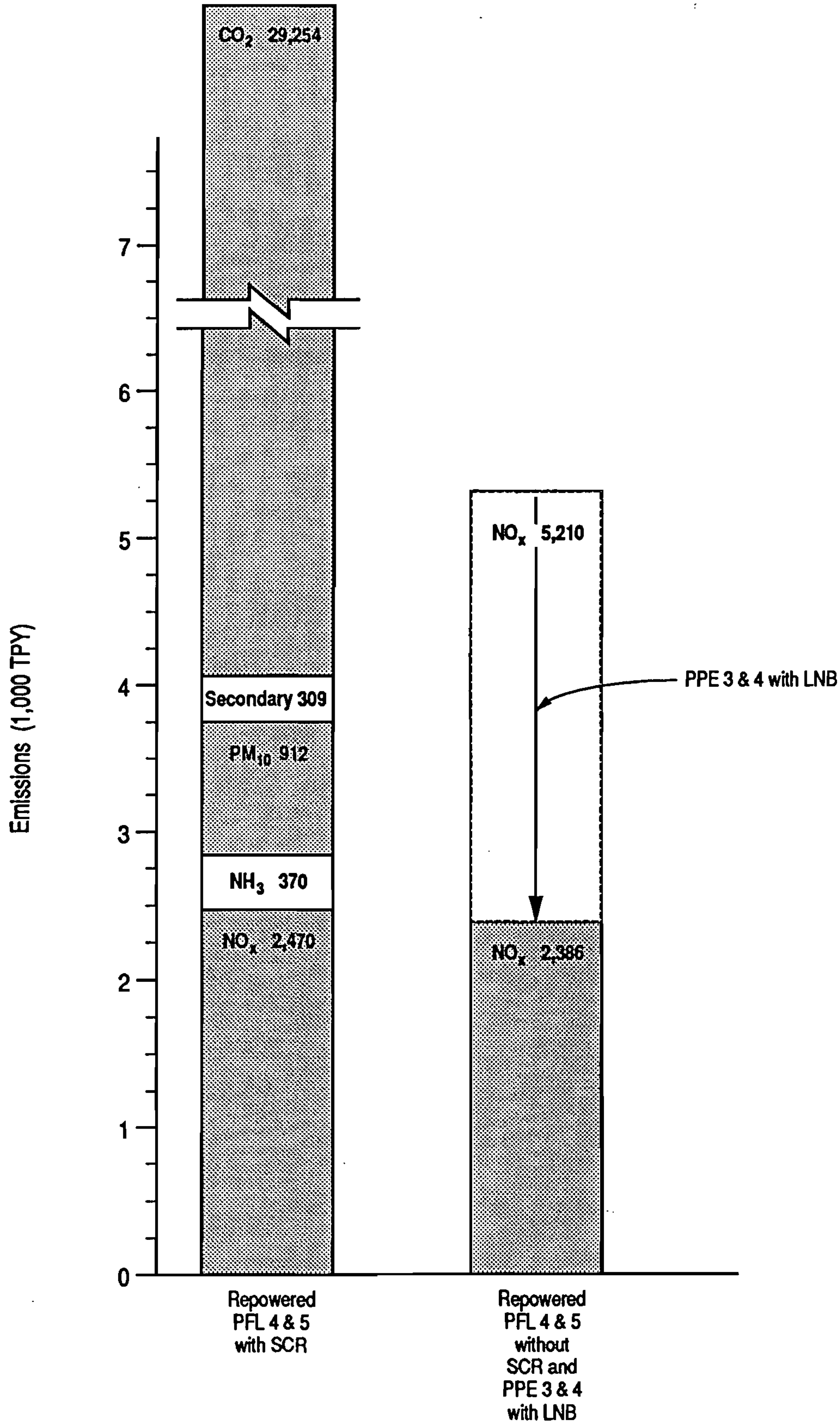
CO_2 29,254
Secondary 309
PM_{10} 912
NH_3 370
NO_x 2,470
NO_x 5,210
PPE 3 & 4 with LNB
NO_x 2,386
Emissions (1,000 TPY)
0
1
2
3
4
5
6
7
Repowered PFL 4 & 5 with SCR
Repowered PFL 4 & 5 without SCR and PPE 3 & 4 with LNB

EXHIBIT
E

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

FEB 19 1991

RECEIVED
FEB 21 1991
DER-BAQM

4APT-AEB

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

RE: Florida Power and Light, Lauderdale Facility (PSD-FL-145)

Dear Mr. Fancy:

This is to acknowledge receipt of your preliminary determination and draft permit for the Florida Power and Light (FPL) Lauderdale Repowering Project dated January 25, 1991. We have reviewed the package as requested and have the following concerns as were discussed between Mr. Barry Andrews of your staff and Mr. Gregg Worley of my staff on February 11, 1991.

This project consists of the addition of 680 MW of nominal power to an existing facility. This addition will be achieved by the shutdown of two fossil fuel-fired units and the construction of two combined cycle combustion turbine units consisting of two combustion turbines (CT) and two heat recovery steam generators (HRSG) each. The net increase in NO_x emissions due to this modification will be 2,758 tons per year with the CT's being limited to 42 ppm firing natural gas and 65 ppm firing fuel oil utilizing water injection. Furthermore, the applicant has proposed to reduce NO_x emissions at a nearby facility by 25% which would be equivalent to a reduction of 2,744 tons per year. FDER has stated a belief that the reductions at the Port Everglades facility would be roughly equivalent to requiring SCR on the new units at the Fort Lauderdale facility. In addition to the amount of pollutant reduction, this decision was based on the following factors:

1. The two facilities are in the same airshed.

2. The two facilities are in some way interrelated (dispatching of one affects the dispatching of the other).

3. The two facilities are located reasonably close to each (approximately 5 miles).

While it is a commendable effort on the part of FPL to minimize the impact of pollutants due to this modification, the reduction of a pollutant at a separate source which is equivalent to the addition of a certain control technology at a new or modified source does not meet the technology based control requirements under PSD regulations. EPA's position on this matter is stated in the final "Emissions Trading Policy Statement" found at 51 FR 43846 (December 4, 1986) as follows:

> e. **Existing-Source Credits Cannot Be Used to Meet Applicable Technology-Based Requirements for New Sources.** Under Clean Air Act section 111 and EPA implementing regulations, new affected facilities must satisfy technology-based New Source Performance Standards (NSPS), regardless of the attainment status of the area in which they are located. Under sections 165 and 173 and EPA implementing regulations, new or modified major sources must also satisfy technology-based control requirements associated with preconstruction permits. These requirements prohibit use of credits from existing sources to meet or avoid applicable NSPS, and <u>bar use of such credits to meet applicable new source review requirements for best available control technology (BACT) in PSD areas</u>, or lowest achievable emission rate control technology (LAER) in nonattainment areas. (emphasis added)

The determination made by your office indicates that in the absence of emissions reductions at the Port Everglades facility, SCR would probably be BACT for the Lauderdale repowering project. In addition, an article entitled "Trends in low-NO_x combustion design and operating experience" from the March-April issue of <u>Gas Turbine World</u> (enclosed) indicates that low-NO_x combustors capable of achieving 25 ppm when firing natural gas are available for the Mitsubishi 501F turbine as well as for the Westinghouse 501F turbine. It is our understanding that the Westinghouse 501F is the turbine selected for this project. Such a burner, coupled with reductions from the Port Everglades facility would actually result in a net improvement to the environment in an area which is currently nonattainment for ozone.

Based on the current status of permitting power projects in Florida, as well as the nation, and considering that emission reduction credits from other sources cannot be used to meet control technology requirements, we do not feel that the proposed emission limits are representative of BACT.

We are keenly aware that FPL has made a concerted effort to minimize adverse impacts to the environment in this project as well as in the Martin and Sanford projects. We look forward to FPL's continued cooperation with FDER and EPA as we work to resolve this issue.

Thank you for the opportunity to review and comment on this package. If you have any questions on these comments or desire further information, please do not hesitate to contact Mr. Gregg Worley of my staff at (404) 347-2904.

Sincerely yours,

Jewell A. Harper, Chief
Air Enforcement Branch
Air, Pesticides, and Toxics
Management Division

cc: Dr. Martin Smith
FPL
B. Andrews
A. Linero, BCNRP
I. Goldman, SE District
C. Shaver, NPS
J. Harper

Trends in low-NOx combustion design and operating experience

An arsenal of techniques including pre-mix and hybrid burners, water injection, steam injection, and selective catalytic reduction is available to control and limit gas turbine NOx emissions — but it is expensive in terms of added equipment and operating costs.

The rate of nitrogen oxide (NOx) formation for gas turbines is directly related to firing temperature and dwell time of air in the combustion zone where the temperature is the highest.

With increases in turbine inlet temperatures over the last 10 years — now up around 1150°C (2100°F) for the latest series of production machines in service and 1250°C (2300°F) for the new generation of 150 MW class 60-Hz machines and 200 MW 50-Hz machines entering the marketplace — NOx control and reduction has become more important than ever

There are basically four methods of suppressing and reducing NOx emissions which have been proven in service:

☐ **Pre-mix and hybrid burners.** These burn fuel with minimum excess air and maintain the fuel air ratio across the load range. The main volume of combustion air is supplied to dilute the flame and inhibit further NOx formation. Gas turbines burning gas can meet very low emission levels, but water injection is needed with liquid fuels.

☐ **Water injection.** Water is introduced with the fuel to cool the flame and inhibit NOx formation. Small efficiency loss is partially offset by gain in mass flow through the turbine stages. Mainly used on smaller simple-cycle gas turbines for peaking and mechanical drive duty, and with premix and hybrid burners running on liquid fuel.

☐ **Steam injection.** Widely used in combined cycle and industrial CHP installations with high annual running hours. Similar in effect to water injection but with greater power boost for gas turbine at the expense of steam turbine output. Requires extra investment in water make-up capacity.

☐ **Selective catalytic reduction (SCR).** Complements above methods by promoting a reaction between NOx in the exhaust gas and ammonia, in the presence of a catalyst. About 80% efficient. Limited use in the United States and Japan where very low emission standards prevail.

To date the most experience in NOx reduction has been gained in the United States, notably in California, and Japan, where extremely low levels have been obtained with the combination of SCR and one of the other methods. For example, 6.9 ppm at an enhanced oil recovery scheme in California, achieved by two ABB GT8's with steam injection and SCR. NOx level at the gas turbine exhaust is 36 ppm from steam injection alone.

In Europe, NOx emission standards are generally higher than in the United States. They are usually expressed in terms of the mass of NOx arising from a unit of energy input. The 135 g/GJ standard introduced this year in the EEC is equivalent to 73 ppm at 15% oxygen, slightly below the EPA benchmark. As in the United States, local limits may be lower.

SCR has yet to appear in Europe. The major gas turbine companies have taken the view that since the problem of NOx arises from the operating conditions in the gas turbine, the solution must be found in the design of the combustion system. Therefore both Siemens and ABB have concentrated their efforts on dry low-NOx combustion systems and have several examples in commercial operation.

Mitsubishi were first to introduce a dry pre-mix combustor, in 1983, to meet stringent limits imposed on new gas-fired power plants. The combustors were installed on six MW701D's forming two 545 MW combined cycle blocks at Tohoku Electric's Higashi Niigata station. This cannular system produced a NOx level between 65 and 70 ppm at 15% oxygen, which was further reduced by SCR to less than the 15 ppm demanded by the Government.

Mitsubishi use a common combustor can for their Models 701, 501 and 251. They also offer it to their licensor, Westinghouse, who have bid it in the United States.

For the new MW501F, a joint development with Westinghouse of a 150 MW machine for the 60 Hz market, Mitsubishi have built on their experience to develop a hybrid cannular combustor. There are 16 on the gas turbine. The combustor has a diffusion flame in the pilot burner and a premix flame in the main burner. The diffusion flame operates in the low load range and stabilizes the pre-mix flame at load rejection.

Mitsubishi say the new combustor can meet 75 ppm dry on gas and with a modest level of water injection can reach 42 ppm on liquid fuel and 25 ppm on gas. The aim of the development program is to reach a 30 ppm target dry on gas.

Siemens' hybrid combustor works in a similar way, but at a lower temperature. On their current production machines 25 ppm is attainable on gas without water or steam injection. The hybrid burners occupy the normal burner positions in the two outboard

Facilities for NOx control on gas turbines used in CHP and combined cycle duty

All currently available gas turbine models can meet official NOx emission standards in Europe, North America and Japan, using one of the three methods of control available. The following table lists the main types used for industrial CHP, mechanical drive and combined cycle duty and the available methods of NOx control.

Generally, industrial CHP installations will opt for steam injection, while mechanical drive units will use water injection. Dry low-NOx combustor systems are confined to the largest combined cycle and utility peaking plants.

In addition to steam injection for NOx control, several models, principally the aero derivatives, can be supplied with steam injection for power boost. These include the GE aero derivatives: LM1600, LM2500, and LM5000 in their STIG versions, and theCheng-cycle plants based on the Allison 501 and 570 Series.

While several countries define national standards for emission levels, there may be local variations to take account of conditions, for example in heavy industrial areas.

Only the original manufacturers of the gas turbines are included in the table. All models listed are in production, except GE Frame 9F, which is a joint development program with GECC-Alsthom.

Where figures of measured NOx output are given these refer to operations on standard natural gas, and are taken at the gas turbine exhaust flange. Liquid fuels require water injection to achieve the same levels.

Gas turbine type	Output MW	Status of NOx control
Allison/Centrax		
501-KB5/CX350-KB5	3.73	Water or steam injection only.
570/CX 570	4.62	Water or steam injection only.
571/CX 571	5.62	Meets EPA benchmark and European standards. Water injection to lower levels.
ASEA Brown Boveri		
GT8	47.10	Dry low-NOx burner for units where gas is only fuel, otherwise steam or water injection.
GT9	34.40	Steam or water injection only.
GT11	71.90	Dry low-NOx burner for gas, plus water injection for liquid fuels.
GT11N	81.60	Steam or water injection. Multi-fuel low-NOx burner available this year.
GT13D	98.90	Dry low-NOx burner for gas plus water injection for liquid fuels.
GT13E	147.90	Dry low-NOx burner for gas plus water injection for liquid fuels.
GT35 (Jupiter)	18.95	Water or steam injection only
GT10	22.60	Water or steam injection only
Dresser Rand Power		
DR 990	4.22	Water or steam injection only
General Electric		
Frame 5	26.30	Water or steam injection only
Frame 6	38.34	Water or steam injection. Multi-fuel low-NOx burner available 1991 for retrofit
Frame 7EA	83.50	Water or steam injection. Multi-fuel low-NOx burner under development.
Frame 7F	150.00	Multi-fuel low-NOx burner available.
Frame 9E	116.90	Water or steam injection. Multi-fuel low-NOx burner currently on field test.
Frame 9F	212.20	Multi-fuel low-NOx burner. Gas turbine not available until 1993.
LM 1600	13.40	Water or steam injection only.
LM 2500	21.23	Water or steam injection only.
LM 5000	33.09	Water or steam injection only.

Gas turbine type	Output MW	Status of NOx control
Mitsubishi		
MF5	6.50	Water or steam injection only
MF111A	12.61	Water or steam injection only
MF111B	14.57	Water or steam injection only
MW 151	21.14	Water or steam injection only
MW 251	36.86	Water or steam injection. Low-NOx premix burner available
MW 501	104.57	Water or steam injection. Low-NOx premix burner available
MW 501F	150.00	Low NOx premix burner gives 25 ppm (gas) or 42 ppm (liquid fuel) with water injection
MW 701	130.55	Low NOx premix burner available. In service gives <15 ppm with SCR
Mitsui		
SB5	1.14	Water or steam injection only
SB15	2.84	Water or steam injection only
SB30	5.59	Water or steam injection only
SB60	14.38	Water or steam injection only
SB90	15.29	Water or steam injection only
SB120	24.07	Water or steam injection only
Nuovo Pignone		
PGT2	2.00	Water or steam injection only
PGT10	9.98	Water or steam injection only
MS1002	4.82	Water or steam injection only
Rolls-Royce/Cooper Rolls		
Avon 1536	14.42	Meets 85 ppm dry, water injection offered for lower limits
RB 211	24.90	Water or steam injection to 42 ppm. Development aims for 25ppm with steam
Ruston Gas Turbines		
TB 5000	3.81	Water or steam injection only
Typhoon	3.79	Water or steam injection only. Low NOx burner under development
Tornado	6.18	Water or steam injection only. Also offered with steam injection for power boost.
Siemens KWU Division		
Model V64	53.30	First unit in commercial service at end of year. Hybrid Low-NOx burner available
Model V84	103.20	Hybrid Low-NOx burner standard in North America. Tunable below 25 ppm
Model V94	150.20	Hybrid Low-NOx burner standard in Europe. Tunable to 25ppm
Solar Gas Turbines		
Saturn	1.08	Water or steam injection only
Centaur T-4500	3.13	Water or steam injection only
Centaur H	3.88	Water or steam injection only
Mars	8.84	Water or steam injection only
Taurus	4.56	First units available this year. Dual fuel version with provision for water injection.
Turbo Power & Marine		
FT8	27.06	Prototype engine. Tests show water injection to 25 ppm on gas, 44 ppm on liquid fuel.
Westinghouse Canada		
CW191	17.70	Water or steam injection only
CW291	42.50	Water or steam injection only
Westinghouse		
W 501D5	104.40	Water or steam injection. Premix low-NOx combustor available
W 501F	145.00	Joint development with Mitsubishi. Premix low-NOx combustor available

In the table NOx reduction targets where mentioned are expressed as parts per million of NOx at 15% excess oxygen in dry flue gas.

silos which are features of these machines.

In the Siemens design the premix burner mixes fuel with combustion air ahead of a ring of swirlers. By adjusting the angle of the swirlers the resulting NOx level can be tuned to the requirements of the site where the gas turbine is installed.

The company regularly set up Model V84 in American, and Model V94 in European contracts, to meet a 25 ppm emission standard. But tests have shown that lower levels are possible with gas fuel.

Two Model V84 gas turbines at Delmarva Power and Light's Hay Road station have been measured at NOx levels as low as 9 ppm based on 15% oxygen in dry exhaust gas under certain base-load operating conditions. Encouraged by this the company aim, with further development work, eventually to be in a position to offer a contract guarantee of NOx levels below 10 ppm for Models V84 and V94.

This would have a significant impact on the economics of gas fired combined cycle and peaking plants. It would eliminate the need for SCR, and since the catalyst operates at over 300°C, it would simplify boiler design.

ABB also have extensive service experience with dry pre-mix combustor systems. This has nearly all been gained in the Netherlands, but the first units in commercial service were two early model GT13 in Stadtwerke Dusseldorf's Lauswaard power station.

This is a fully-fired combined cycle plant governed by the Federal Republic's GFV regulations which set a target NOx emission level for large power plants of 150 g/GJ at 3% oxygen. This equates to 50 ppm at 15% oxygen dry.

Unlike the Siemens and Mitsubishi systems which employ mechanical dampers to maintain the fuel/air ratio across the load range, the ABB combustor relies on fuel distribution to a programmable array of small burners. In the GT13E, for example, there are 54 burners arranged in seven groups. A lambdascope controls the firing sequence of the burner groups as the load builds up.

At start-up, only one group of burners is lit. As the machine accelerates and load is applied, more fuel is added until the fuel/air mixture to that group becomes too rich. Then another group is lit and the fuel redistributed to all the active burners so that combustion is always lean.

The process is repeated as the load increases until, above about 60% load all seven burner groups are firing. NOx levels of less than 50 ppm have been measured on the two GT13E installations in the Netherlands.

ABB are about to introduce their dual-fuel conical premix burner. This will be applied initially to GT11N, for the American market, but eventually will be offered for GT13 and GT13E.

The burner will be applied to an uprated 60 MW GT8 as the standard combustor system. Intimate lean premixing of fuel gas and air and extremely short residence time point to NOx levels around 25 ppm, which satisfies present and planned limits in Europe and much of the United States.

General Electric have had an experimental low-NOx burner running on a Frame 7 in Houston for some years, and since late last year have been testing a combustor on a Frame 9E peaking unit in Dublin.

Depending on the results of these tests, the Irish Electricity Supply Board will convert their combined cycle units for an extended field test. According to GE, a version of the combustor for Frame 6 should be available next year for retrofit.

The importance of dry low-NOx in the United States is growing with the demand for gas turbine peaking capacity. Some of these plants may be converted to combined cycle in the future, but until then they have to meet the prevailing emission standards. Without dry low-NOx, water injection is the only feasible alternative.

Water injection is not without its disadvantages. The operator must purchase water and invest in a treatment plant. The additional mass flow through the power turbine will impart a small increase in power output, but at a loss of efficiency.

Figures from ABB put the requirement for a Type 11N at 9 kg/s to achieve 42 ppm at full load. This will increase the power output by some 4%, say 3.6 MW on the ISO peak rating, but for a loss of 5% in efficiency, say an increased heat rate by some 515 Btu/kWh.

It must be recognized, however, that the low NOx emission levels attainable today will not last. New machines coming into the market operate at higher firing temperatures which makes them inherently more prolific NOx producers. Siemens may be able to meet 25ppm on their two large machines. By way of contrast, for the Model V93 gas turbines on which the initial field trials were conducted, they measured 14 ppm, because of the lower firing temperature in the older machine.

The smaller Model V64 which will go into commercial operation late this year, is the hottest of Siemen's gas turbines. The experience of this machine will be applied to the 200 MW V94.3 which the company are developing, and will operate at the same temperature level.

Neither of these gas turbines will meet the NOx levels attainable with the current models, and will need water injection to match them, but Siemens aim to determine the minimum sustainable level for Model V64 in tests of the operating plant.

The dry low-NOx combustors have all been developed primarily to operate on gas. This is the predominant fuel for combined cycles and large industrial CHP units. Liquid fuels can be used, but water injection is required to bring the NOx emissions down to the same level.

Down below 30 MW, among the aero-derivatives and the small heavy duty gas turbines specifically developed for mechanical drive and industrial CHP duty, it is more difficult to engineer a premix combustor system which will function adequately across the load range. Furthermore, many of the gas turbines sold into this market burn byproduct fuels, waste gases from industrial processes which have different heating values and combustion characteristics.

Availability of steam in many applications has tended to favor steam injection, but not only for NOx abatement. Ruston are now marketing Tornado at 7.0 MW with steam injection for power augmentation (the standard dry engine is rated 6.04 MW ISO). They already have a steam injected Tornado in service in Japan which meets local NOx limits of 50 ppm, and have sold a steam boosted Tornado in England to the University of Birmingham.

Industrial CHP systems are often subject to local emission constraints. For example, the company which installs a gas turbine CHP system to generate electricity and process steam, in place of boilers and purchases from the grid, may be called upon to observe the same NOx levels with the new plant as were achieved by the old plant.

The present generation of gas turbines have been shown to be capable of producing very low emission levels for NOx. This is particularly significant for combined cycles, which account for much of the new generating capacity being built at the present time.

The new machines will operate at higher temperatures, where NOx output is inherently greater. On the other hand, higher temperature means hotter exhaust gas, higher steam conditions, and higher overall efficiency. The challenge to the gas turbine manufacturers is to reconcile these seemingly conflicting demands for low emissions and high efficiency.

40 CFR 60.42 (?) 42 (b) 3
.44 b

BEFORE THE GOVERNOR AND CABINET
OF THE STATE OF FLORIDA

IN RE: Lauderdale Repowering Project, Power Plant Site Certification Application, Florida Power & Light Company PA89-26	)	DOAH CASE NO. 89-6636

FINAL ORDER

BY THE GOVERNOR AND CABINET:

The Governor and Cabinet, sitting as the Siting Board, pursuant to the Florida Electrical Power Plant Siting Act, Sections 403.501-403.518, Florida Statutes (F.S.), having heard presentations by parties; having reviewed the Recommended Order, which is attached hereto as Exhibit A; having reviewed the record below; and otherwise being fully advised herein, issue this Final Order, and, therefore, it is:

ORDERED:

1. The Recommended Order including the attached conditions of certification (dated November 21, 1990) prepared by the Hearing Officer pursuant to Section 403.508(3), F.S., concerning the certification of the proposed Lauderdale Repowering Project is approved and adopted in toto.

2. The Siting Board finds that the proposed Lauderdale Repowering Project shall be certified, subject to the conditions of certification included in the Recommended Order and attached hereto.

Any party to this order has a right to seek judicial review of the order pursuant to Section 120.68, F.S., by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Siting Board, Department of Environmental Regulation, in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within thirty (30) days from the date this Order is filed with the Clerk of the Siting Board.

DONE AND ENTERED this 10 day of January, 1991, in Tallahassee, Florida pursuant to the vote of the Governor and Cabinet, sitting as the Siting Board, at a duly constituted Cabinet meeting January 10, 1991.

BY THE GOVERNOR AND CABINET
SITTING AS THE SITING BOARD

Lawton Chiles

The Honorable Lawton Chiles
Governor

FILING AND ACKNOWLEDGMENT
filed on this date, pursuant to Section 120.52(10), Florida Statutes (1990), with the designated Department Clerk, receipt of which is hereby acknowledged.

Kathy C. Carter
Clerk of the Siting Board
Department of Environmental Regulation

1-11-91
Date

I hereby certify that the attached order was provided by mail on January 11th, 1991 to the following parties:

The Honorable Lawton Chiles
Governor
The Capitol, Room 210
Tallahassee, Florida 32399

The Honorable Jim Smith
Secretary of State
The Capitol, LL-10
Tallahasse, Florida 32399

The Honorable Robert A. Butterworth
Attorney General
The Capitol, Plaza Level
Tallahassee, Florida 32399

The Honorable Bob Crawford
Commissioner of Agriculture
The Capitol, Plaza Level
Tallahassee, Florida 32399

The Honorable Gerald A. Lewis
State Comptroller
The Capitol, Room 2001
Tallahassee, Florida 32399

The Honorable Tom Gallagher
State Treasurer and Insurance Commissioner
The Capitol, LL-27
Tallahassee, Florida 32399

The Honorable Betty Castor
Commissioner of Education
The Capitol, Plaza Level
Tallahassee, Florida 32399

The Honorable Claude B. Arrington
Hearing Officer
Division of Administrative Hearings
1230 Apalachee Parkway
Tallahassee, Florida 32399-1550

Hamilton S. Oven, Jr., P.E.
Florida Department of Environmental Regulation
2600 Blair Stone Road, Room 309L
Tallahassee, Florida 32399-2400

Gary Smallridge, Esquire
Assistant General Counsel
Florida Department of Environmental
Regulation
2600 Blair Stone Road, Room 654
Tallahassee, Florida 32399-2400

Susan M. Coughanour
South Florida Water Management District
Post Office Box 24680
West Palm Beach, Florida 33416-4680

Sarah Nall, Esquire
South Florida Water Management District
Post Office Box 24680
West Palm Beach, Florida 33416-4680

Michael Palecki, Esquire
Division of Legal Services
Florida Public Service Commission
101 East Gaines Street
Fletcher Building, Room 212
Tallahassee, Florida 32399-0850

Kathryn Funchess, Esquire
Senior Attorney
Florida Department of Community Affairs
2740 Centerview Drive
Tallahassee, Florida 32399-2100

Noel M. Pfeffer, Esquire
Deputy County Attorney
Governmental Center, Suite 423
115 South Andrews Avenue
Fort Lauderdale, Florida 33301

Thomas R. Henderson
Broward County Resource Recovery
115 South Andrews Avenue, Room 521
Fort Lauderdale, Florida 33301

Peter C. Cunningham, Esquire
Hopping Boyd Green & Sams
Post Office Box 6526
Tallahassee, FL 32314

Gary C. Smallridge

/kkm:FPLpfo

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

4APT-AEB

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DEC 12 1990

DER-BAQM

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

RE: Florida Power and Light Company (FPL), Lauderdale Repowering Project (PSD-FL-145)

Dear Mr. Fancy:

We acknowledge receipt of the above referenced facility's Technical Evaluation and Final Determination and proposed permits to construct the existing boiler units 4 and 5, gas turbines 1 through 24, 3 fuel tanks, and all other miscellaneous stationary sources of air pollution.

We have reviewed the package and offer no additional comments at this time. Any further technical comments should be directed to Mr. Ahmed Amanulah of my staff at (404) 347-2904.

Sincerely yours,

Jewell A. Harper, Chief
Air Enforcement Branch
Air, Pesticides, and Toxics
Management Division

cc: Mr. A. A. Linero
Broward County Environmental Control Board
500 S. W. 14th Court
Fort Lauderdale, FL 33315
I. Goldman, SE Dist
A. Linero, BCEQCB
CHF/BA

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ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET
ATLANTA, GEORGIA 30365

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Mr. C. H. Fancy
~~Bureau of Air Regulations~~
Florida Department of Environmental
Regulation
Twin Towers Office Building
2600 Blair Stone Rd
Tallahassee, Florida 32399-2400

KBN

October 3, 1990

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

Subject: Air Construction Permit for Florida Power & Light Company's Lauderdale Plant - DER File No. AC 06-179848

Attention: Mr. Barry Andrews, P.E.

Dear Barry.

On behalf of FPL, the following comments are offered on some of the technical aspects of the proposed air construction permit. Comments are provided for the specific conditions only and are listed below according to the condition number:

SPECIFIC CONDITIONS

4. The limitations on the maximum fuel inputs, i.e., millions of cubic feet per hour for natural gas and gallons per hour for oil, should be deleted from the table since actual inputs may vary slightly because of the heating value of the respective fuels. The maximum heat inputs are the most appropriate and are the same as those contained in the existing permit.

11. The VOC emissions in this condition should be 16.5 and 4.49 lb/hr for oil and natural gas, respectively. These values were contained in Table 5 of Attachment A.

19. The VOC emissions in this condition should be 57.28 and 21.06 lb/hr for natural gas and oil, respectively. As discussed above, these values were in the construction permit application.

21. The language "used by each turbine..." should be changed to "used by each bank of turbines (i.e., GTs 1-12 and GTs 13-24)...." This change would make this condition consistent with Specific Condition 19, which establishes limits on VOC emissions from all 24 combustion turbines. In addition, data are currently recorded on this basis at the plant.

23. Annual visible emission testing of each turbine when firing No. 2 fuel oil is both difficult to schedule and expensive. The GTs operate only during peak demand periods and primarily use natural gas. Performing a visible emission test would involve scheduling a GT for a specific period of time and fuel, i.e., oil firing. The low efficiency of these units compared to other

KBN ENGINEERING AND APPLIED SCIENCES, INC.
1034 Northwest 57th Street Gainesville, Florida 32605 904/331-9000 FAX: 904/332-4189

base-load generation and the higher cost for No. 2 fuel oil cause a significant economic impact if each unit is tested each year. Therefore, the language "...from each unit...," should be changed to "...from one CT in each bank of turbines...."

24. This condition limits the use of solvents to no more than 250 gallons per year. While this usage was provided in the permit application, actual usage is expected to vary from year to year. As a consequence, this condition should be changed to "VOC-containing solvents used for maintenance will be included in calculating the total facility VOC emission limitation described in Specific Condition 26."

Your consideration of these comments is greatly appreciated. Please call if you have any questions.

Sincerely,

David A. Buff

David A. Buff, P.E.
Principal Engineer

cc: Martin A. Smith, FPL
Charles D. Henderson, FPL
Winifred Perkins, FPL
Peter Cunningham, Esq.
Kennard K. Kosky, KBN

BEST AVAILABLE COPY

FACSIMILE COVER SHEET

KBN Engineering and Applied Sciences, Inc.

DATE: 10/3/90

TO: Barry Andrews / Willard Hanks

ORGANIZATION: DER

FAX NUMBER: ____________ TELEPHONE NUMBER: 904-488-4805

FROM: Dave Buff

TOTAL NUMBER OF PAGES: 3 (including cover page)

MESSAGE/INSTRUCTIONS:

PROJECT NUMBER: 8A 802 FAX OPERATOR: ____________

( ) The original of the transmitted document will be sent by:

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cc: Project File ________ yes ________ no

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Phone (904) 331-9000 FAX (904) 332-4189

PM
9-27-90
Atlanta, Ga

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
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SEP 26 1990

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, Florida 32399-2400

RE: Florida Power and Light Company (FPL), Lauderdale Repowering Project (PSD-FL-145)

Dear Mr. Fancy:

We acknowledge receipt of the Technical Evaluation and Preliminary Determination and proposed permit to construct the modified boiler units 4 and 5, gas turbines 1 through 24, 3 fuel tanks, and all other miscellaneous stationary sources of air pollution at the above referenced facility.

We have reviewed the package and offer the following comments.

At the outset, we note that this permit action is being processed in advance of the pending modification at FPL involving the addition of new combustion turbines and heat recovery steam generators. We also note that the intended purpose of this permit is to impose federally enforceable permit conditions on FPL designed to limit potential emissions of volatile organic compounds (VOC) to below 100 tons per year (tpy). This action would theoretically make the existing FPL facility a "minor" source for nonattainment new source review (NSR) purposes and thus allow the future planned modification to increase VOC emissions by an additional 99 tpy. This action could easily be misconstrued as a deliberate attempt to circumvent the NSR regulations, and we feel that both "modifications" should normally be included as part of the same permit application. For example, if a company clearly intends to install two new presses at a major VOC facility located in a nonattainment area, it would obviously be considered circumvention for the permitting agency to issue separate permits limiting each unit to 39 tpy. We do feel, however, that there may be situations where limiting a source's potential emissions is valid and can be used to establish "minor source" status.

We recognize that many facilities may have the potential to emit VOC in excess of 100 tpy, but for whatever reason(s), a facility may <u>actually</u> be emitting considerably less than this amount. In these situations, we would not feel that it is inappropriate to limit the facility's potential to emit down to an emissions level indicative of historic actual emissions. To discount previous actual levels of emissions and arbitrarily choose 99 tpy as the appropriate permit limit, however, does not appear to represent good permitting practice and should be discouraged. We strongly suggest that your Agency reconsider this proposed permitting action. We would be happy to discuss this with you in more detail at your convenience.

We appreciate the opportunity to review this package before the issuance of the final permits. Any further technical comments should be directed to Mr. Ahmed Amanulah of my staff at (404) 347-2904.

Sincerely,

Jewell A. Harper, Chief
Air Enforcement Branch
Air, Pesticides, and Toxics
Management Division

cc: Mr. A. A. Linero
Broward County Environmental Control Board
500 S. W. 14th Court
Fort Lauderdale, FL 33315

CC: B. ANDREWS
W. HANKS
S. Brooks, SE District
BA/CHF
10/3/90 RA

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SEP 17 1990
DER-BAQM

BROWARD COUNTY E.Q.C.B.
621 S. ANDREWS AVE.
FORT LAUDERDALE
FLORIDA 33301

Phone # (305) 765-4436 Fax # (305) 765-4109

To: Barry Andrews
FDER /BAR

From: A. A. Linero
Broward Co EQCB

Date: 9/17/90

Project No.:

If you cannot read any portion of this transmission, please contact E.Q.C.B. as soon as possible.

Number of pages including cover sheet 7

Barry - please call. Make a copy of attachment for Clair.

BROWARD COUNTY ENVIRONMENTAL QUALITY CONTROL BOARD

500 S.W. 14th Court
Fort Lauderdale, FL 33315
(305) 765-4900

Air Section
621 S. Andrews Avenue
Ft. Lauderdale, FL 33301
(305) 765-4436

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September 14, 1990

Office of the General Counsel
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

CERTIFIED MAIL-RRR

Re: Petition for Administrative Hearing
DER Intent to Issue Permit AC 06-179848

Dear Sir:

Attached is our Petition for an Administrative Proceeding in the matter of the Intent by DER to Issue a Permit to the FPL Lauderdale Plant.

We note that this permit is intimately related with the Site Certification Application for the Lauderdale Repowering Project for which Public Hearings are scheduled here beginning September 24, 1990.

If you have any questions regarding this matter, please call A. A. Linero at 765-4436.

Yours very truly,

G Carlson for

Victor N. Howard, P.E.
Pollution Control Officer

VNH/AAL/mr

Attachment

cc: FPL - West Palm Beach
BCEQCB Board Members
BCEQCB Staff Attorney
Jewel Harper - EPA Atlanta
Gary Carlson - BCEQCB
Broward County Attorney
Tom Henderson - BC Resource Recovery
Clair Fancy - DER Tallahassee
Isidore Goldman - DER S.E. District

PETITION FOR ADMINISTRATION PROCEEDING IN THE MATTER OF INTENT BY DER TO ISSUE A PERMIT TO FPL LAUDERDALE PLANT

Petitioner

Broward County Environmental Quality Control Board

500 SW 14th Ct
Fort Lauderdale, Fl 33315
(305) 765-4436

DER File NO. AC 06-179848
Broward County

Notification

Broward County Environmental Quality Control Board (EQCB) received a copy on September 4, 1990 of the Intent to Issue a Permit dated August 31, 1990. We were copied as the Local Pollution Control Agency in a county affected by Department Action.

Statement of Interests

The EQCB is affected as the Local Pollution Control Agency responsible (along with the DER) with the maintenance of air quality in Broward County. At the present time the existing facility in question falls under both State and Local Permitting requirements.

With a future planned FPL project at the same site, it is quite likely that this facility will at some point no longer fall under local jurisdiction per previous interpretations by DER Counsel of the Local Role in projects covered by the Site Certification Act (SCA).

Broward County is part of a three - County area within the Southeast Florida interstate Air Quality Control Region (AQCR) designated on December 31, 1982 by EPA as "Non Attainment" with respect to ozone. This designation and the resulting attainment plans affect the material interests of Broward County residents in general and the EQCB in particular. The subject permit is primarily a preparatory administrative step toward the ultimate construction of a project which will affect ozone levels in the County, the attainment plan and hence the material interests of Broward County residents in general and the EQCB in particular. Once the subject permit is granted, the EQCB will have no remedies in effecting the controls desired of the subsequent project short of legal action since it is not a party to the proceedings on that project.

Disputed Material Facts

We dispute the following:

1.) Page 1 of Letter of Intent to Issue.

(a) We dispute that the referenced permit is to construct the existing plant. The Lauderdale plant was constructed or modified many years ago. We dispute that any separate construction permit is required to change the type of fuel stored in existing Tank #3 from No 6 fuel oil to No 2 fuel oil. This action is already described on page 3.3.2 of the FPL Lauderdale Repowering Project Site Certification Application (SCA) as part of the conversion of both Tanks #2 and #3 to "hold No.2 oil for Lauderdale Repowering Project".

(b) We dispute the value of 5.41 Tons Per Year (TPY) as the increase in VOC's from the described actions. We contend that this is an estimate that is no better than single-significant-figure (or even "order-of-magnitude") accuracy based on the limitations inherent in VOC estimates based on AP-42 and the paucity (if not lack) of actual historical measurements. The same goes for all subsequent VOC values given on this page and in subsequent sections of the package. We don't dispute the Sulfur Dioxide estimates and don't dispute the Nitrogen Oxide estimates to the same extent as the VOC estimates.

(c) We dispute even the notion that the DER can impose federally-enforceable practical permit restrictions which would in-fact limit the allowable VOC emissions to less than 100 TPY.

(d) We dispute that "Best Available Control Technology (BACT) or lowest achievable Estimate Rate (LAER) determinations was not required". This is basically the same conclusion as that given in the SCA. When the actions described in the subject draft permit and the SCA are taken together, a BACT or LAER determination is in-fact required.

(e) While we don't dispute that the quantity of VOC emissions (5.41 TPY) given "will not cause a violation... or interfere with reasonable further progress toward attainment of the ozone..", the same cannot be said about issuance of the permit itself.

(f) We dispute that the reasons for the Intent to Issue are stated in the Technical Evaluation and Preliminary Determination. We contend that there are some unstated reasons.

2.) Rest of Package. We dispute all references to the above disputed facts wherever they arise in the package.

Facts Warranting Reversal or Modifications

The relevant facts warranting Reversal or Modifications are:

1.) The matter of the subject draft permit can and should be addressed under the Site Certification Process and not as a separate matter.

2.) The permit requested is not required for FPL to take a (presently unpermitted) tank storing fuel oil No 2 out of service and switch another (presently unpermitted) tank from fuel oil No 6 to fuel oil No 2 service.

3.) Nothing was submitted with the Permit Application indicative if a "Construction". For example there were no engineering drawings, pollution control equipment descriptions, nor site work plans, etc.

4.) For the reasons given in the previous sections, the permit will not result in federally enforceable permit restrictions which can be shown in any practical manner to actually limit VOC emissions to less than 100 TPY.

5.) Issuance of this permit will facilitate avoidance by FPL of a Non-Attainment New Source Review (NSR) for Ozone in the Lauderdale Repowering Project. This avoidance should not be facilitated. The review should in-fact be encouraged in every way.

6.) Avoidance of NSR prevents discussion of power plant impacts on Ozone. These were previously believed to be due to VOC emissions, but are now known to be affected by Nitrogen Oxides (which the Lauderdale project will emit in very substantial quantities).

7.) FPL is trying to avoid implementing the BACT determinations (Selective Catalytic Reduction - SCR) of EPA which FPL implied were "capricious" and "arbitrary". This avoidance of SCR will increase Nitrogen Oxides in Broward County.

8.) The increase in Broward County of Nitrogen Oxides interferes with "Reasonable Further Progress (RFP)" towards Ozone Attainment. It may also cause or contribute to violations of the Ozone standard.

9.) The residents of this County all will be subjected to very strict measures under the Motor Vehicle Inspection Program to control both Nitrogen Oxides and VOC's the purpose of which is to reduce Ozone formation.

10.) Among the unstated reasons for the draft subject permit are the expectation that NSR for Ozone will result in (expensive) LAER requirements for VOC's and the lack of VOC Offsets in Broward County. We note that Implementation of "Stage II" VOC controls at service stations in Broward County would provide sufficient offsets. Also per 40 CFR 51 S.IV.D the location of the offsets can be anywhere in the AQCR (Dade, Broward, Palm Beach, etc.) The implementation of SCR for Nitrogen Oxides will further promote RFP toward Ozone attainment. These latter considerations are sound bases for exemption from LAER. The apparently contradictory controls of SCR for Nitrogen Oxides and Catalytic Oxidation for VOC's will add further rationale for exemption from LAER. Thus there is no reason to facilitate avoidance of NSR for the Lauderdale Repowering Project.

11.) Issuance of the subject draft permit will lead to or even cause the scenario described above.

12.) The implication that no PSD/BACT nor NSR/LAER issues are involved, unfairly limits the time for Public Comment to less than the 30-day requirement when such issues are involved.

<u>Rules or Statutes Requiring Reversal or Modification</u>

1.) Chapter 17.2.200 Rules of the FDER, Statement of Intent. The subject source does indeed pose the possibility of degrading ambient air quality. Issuance of the Permit will facilitate in avoidance of New Source Review in the Lauderdale Repowering Project. The proponent has not yet given reasonable assurances that BACT for Nitrogen Oxides (which will help limit Ozone formation) will be a part of that project. Therefore DER cannot be sure that the scenario facilitated or caused by issuance of the subject draft permit will not occur.

2.) We will research other specific DER Rules and Policies which will support our position with respect to this specific permit. We consider the subject draft permit to have little merit and our arguments above to stand on their merits.

3.) We have researched and found specific Federal Rules, Regulations and Decisions which will require FPL to perform the NSR for Ozone for the subsequent Repowering Project if the draft subject permit is denied. We do not need to enumerate those here. Approval can be seen as part of an effort to circumvent those Rules, Regulations and Decisions.

Statement of Relief Sought

1.) We request that DER deny the permit and make the issue part of the Site Certification Procedure for the Lauderdale Repowering Project.

2.) If DER will not deny the permit then get commitments that Selective Catalytic Reduction will be part of the Lauderdale Repowering Project.

3.) Advise FPL that VOC offsets do exist and can be obtained by implementation of stage II in Broward County or anywhere in the non-Attainment part of the AQCR.

4.) Require New Source Review for Ozone for the Lauderdale Repowering Project as should have been required initially.

5.) Evaluate feasibility (or infeasibility) of VOC LAER requirements given that Nitrogen Oxide/BACT will promote RFP towards Ozone Attainment.

6.) Submit the entire matter of draft permit application and Repowering Project to EPA for an NSR "Non Applicability Determination."

FPL

Lauderdale Repowering Project

SITE CERTIFICATION APPLICATION

Responses to Agency Comments

Submitted By:

FPL

an FPL Group Company

April 19, 1990

BROWARD COUNTY ENVIRONMENTAL QUALITY CONTROL BOARD

500 S.W. 14th Court
Fort Lauderdale, FL 33315
(305) 765-4900

February 6, 1990

Mr. Hamilton S. Oven, Jr., P.E.
Administrator, Office of Siting Coordination
Division of Air Resources Management
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399

Re: Florida Power and Light Company
Fort Lauderdale Repowering Project
Power Plant Site Certification Application, PA 89-26

Dear Mr. Oven:

Per your request, we have reviewed the subject Site Certification Application. By and large, we consider the document sufficient from an environmental point of view, but feel that an Ozone Nonattainment Review should be done.

In recent years, this area has been marginally in a nonattainment status for ozone at a time when the existing FPL facility has operated at an historically low level. Despite some of the beneficial aspects of the proposed project, it is evident that (notwithstanding present permits) Future Potential Emissions of VOC's will be greater than present Actual Emissions and thus will affect ozone levels. BCEQCB-1

At present, our nonattainment status has a high priority and has resulted in measures such as gasoline station vapor control inspections, new automobile catalytic converter anti-tampering laws, and planned motor vehicle emissions inspections. Thus, we feel that the matter needs to at least be better addressed in the SCA. We don't think that creation of a "Synthetic Minor Source" by limiting emissions of VOC's to 99.9 TPY is the appropriate way to handle the matter. It might also unnecessarily limit FPL's operation flexibility in order to avoid evaluating an effect that might even be small. In any case, we are interested in their quantification of just what that effect might be. BCEQCB-2

We note that, per FPL's analysis, the maximum 24-hour SO_2 concentration will be 97 percent of the allowable standard. We plan to look at how this can affect possible long-term expansions of our Resource Recovery Project. BCEQCB-3

Attached is our review of requirements in the areas of Wastewater, Storage Tanks, Surface Water, and Dredge and Fill. New licenses will be required or need to be modified in these areas. Also attached are some further comments on air quality aspects.

If you have any questions regarding the air quality review, please call Ms. Daniela Banu at (305)765-4436. Please contact Mr. Glenn Malmstrom at (305)537-2960 if you have questions regarding the other reviews.

Sincerely,

AA Linero

A. A. Linero, P.E.
Chief, Air Program

AAL/mr

Attachments

cc: I. Goldman, DER, W. Palm Beach, w/Attachments
F. Henderson, EQCB, w/o Attachments
G. Carlson, EQCB "
L. George, DER, Tallahassee, "

Further Comments on Air Quality
Ft. Lauderdale Repowering Project
Site Certification Application

1. It is difficult to evaluate the effects from the project due to the widely varying operational history of the existing plant. However, it is clear that recently it has operated much closer to its historical minimum than maximum. Thus, it has operated at a fairly low rate during the times of our ozone nonattainment status. BCEQCB-4

2. FPL's analysis shows that, under the scenario they modeled, the maximum 24-hour sulfur dioxide concentration will be 97 percent of the standard. We understand that this conclusion is based on the apparently conservative case wherein 0.5 percent sulfur oil will be used all the time, rather than only as backup fuel. We also recommend looking at this scenario from a probability point of view, considering the frequency with which oil will likely be burned. This will allow us to better evaluate impacts from potential future expansions of our Resource Recovery Facility and avoid Nonattainment Status in sulfur dioxide. BCEQCB-5

3. We agree that sulfur controls built into the Combustion Turbines are not feasible and that the only feasible alternative is clean fuels. The use of 0.5 percent sulfur oil is not equivalent to what can be achieved with BACT on conventional units. Even lower sulfur oil is a viable consideration in the section where BACT is discussed. The infrequent use of this oil is worth mentioning in this section. BCEQCB-6

4. The technical work on the air modeling appears to be of high quality and in line with the Plan of Study. However, there are some significant typos on pages 5.6.6-7 which need to be corrected. They relate to PSD II increment analysis. Three of the four values are way off, although they are correct in Appendix 10.1.5. We also recommend visual representation in some manner of the modeling results for critical cases. BCEQCB-7

5. Verification of Tables 6-2, 6-3, 6-4, and 6-5 indicates that the following changes may be needed: BCEQCB-8

<u>Tables 6-2 and 6-3, Facilities located within 15 km of the FPL-Lauderdale Plant:</u>

DELETE: Weekley Asphalt Paving, APIS #50BRO060046
(Facility was dismantled in July 1988.)

ADD: East Coast Asphalt, APIS #50BRO060014
154 tons SO_2/yr maximum potential emissions.

National Resource Recovery, APIS #50BRO062070
160 tons NO_x/yr maximum potential emissions.

<u>Tables 6-4 and 6-5, Facilities located within 15 to 50 km of the FPL-Lauderdale Plant:</u>

ADD: Weekley Asphalt Paving, APIS #50BRO060072
874 tons SO_2/yr maximum potential emissions from two asphalt plants.

APIS printouts for all the above facilities are attached.

```
:R020 50BR0062070    _  AIR POLLUTANT INFORMATION SYSTEM              02/01/90
                          FACILITY INFORMATION SCREEN                  09:52:06
                                                          LAST UPDATED: 03/17/88

 STATUS: A = ACTIVE    DATE OF PERMANENT SHUTDOWN: __ / __ / __    # OF SRC: 002
 IN/COMP: NATIONAL RESOURCE RECOVERY
 IME/LOC: 3250 FIELDS RD                                    LOC CODE: 33314
    CITY: DAVIE                           CITY CODE: 0910   MAJOR FAC? Y (Y OR N)
    TYPE: 05 = OTHER INCINERATION                           SYN MINOR? _ (Y OR N)
 TM ZONE: 17  EAST: 579 . 3  (KM)    NORTH: 2884 . 5  (KM)
 ATITUDE: 26 : 04 : 45               LONGITUDE: 80 : 12 : 25
     CDS: 2 = A1P   VOC: 0 = NOT          RFP? _ (Y OR N)

   DATE OF FINAL COMPLIANCE: 04/20/89

 COMMENT: __________________________________________________________



:REATE HISTORY RECORD ? _
                                            ACTION TAKEN: _ TRANSMIT HERE: _
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AIR020 50BR0060014    _  AIR POLLUTANT INFORMATION SYSTEM              02/01/90
                           FACILITY INFORMATION SCREEN                 09:53:52
                                                          LAST UPDATED: 01/22/90

 STATUS: A = ACTIVE    DATE OF PERMANENT SHUTDOWN: __ / __ / __    # OF SRC: 001
OWN/COMP: EAST COAST ASPHALT
NAME/LOC: 1790 NW 27 ST                                     LOC CODE: 33310
    CITY: OAKLAND PARK                    CITY CODE: 3100   MAJOR FAC? N (Y OR N)
    TYPE: 22 = ASPHALT PLANT                                SYN MINOR? _ (Y OR N)
UTM ZONE: 17  EAST: 583 . 5  (KM)    NORTH: 2893 . 6  (KM)
LATITUDE: 26 : 09 : 42               LONGITUDE: 80 : 09 : 49
     CDS: 3 = A2P   VOC: 0 = NOT          RFP? _ (Y OR N)

   DATE OF FINAL COMPLIANCE: 02/14/89

 COMMENT: ASPHALTIC_CONCRETE_BATCH_PLANT___________________________



CREATE HISTORY RECORD ? _
                                            ACTION TAKEN: _ TRANSMIT HERE: _
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)20 50BR0060046   _  AIR POLLUTANT INFORMATION SYSTEM                02/01/90
                        FACILITY INFORMATION SCREEN                  09:54:36
                                                     LAST UPDATED: 09/12/89

TATUS: I = INACTIVE  DATE OF PERMANENT SHUTDOWN: 07 / 30 / 88   # OF SRC: 001
/COMP: WEEKLEY ASPHALT PAVING
E/LOC: SR 84 W/O DAVIE RD                                LOC CODE: 33317
 CITY: DAVIE                      CITY CODE: 0910   MAJOR FAC? N (Y OR N)
 TYPE: 22 = ASPHALT PLANT                           SYN MINOR? _ (Y OR N)
! ZONE: 17  EAST: 576 . 9  (KM)   NORTH: 2886 . 1  (KM)
:ITUDE: 26 : 05 : 37           LONGITUDE: 80 : 13 : 52
  CDS: 3 = A2P   VOC: 0 = NOT           RFP? _ (Y OR N)

DATE OF FINAL COMPLIANCE: 05/11/88

OMMENT: FACILITY_DISMANTLED____________________________________


:EATE HISTORY RECORD ? _
                                        ACTION TAKEN: _ TRANSMIT HERE: _
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:020 SOBR0060072   _  AIR POLLUTANT INFORMATION SYSTEM              02/01/90
                         FACILITY INFORMATION SCREEN                 10:01:10
                                                      LAST UPDATED: 11/09/89

STATUS: A = ACTIVE    DATE OF PERMANENT SHUTDOWN: __ / __ / __   # OF SRC: 002
N/COMP: WEEKLEY ASPHALT PAVING
ME/LOC: 1451 SW 185TH AVE                                 LOC CODE: 33029
  CITY: HOLLYWOOD                     CITY CODE: 1840   MAJOR FAC? N (Y OR N)
  TYPE: 22 = ASPHALT PLANT                              SYN MINOR? _ (Y OR N)
M ZONE: 17  EAST: 560 . 5  (KM)   NORTH: 2875 . 0  (KM)
.TITUDE: 25 : 59 : 38             LONGITUDE: 80 : 23 : 44
   CDS: 3 = A2P   VOC: 0 = NOT          RFP? _ (Y OR N)

 DATE OF FINAL COMPLIANCE: 05/11/88

COMMENT: 2_UNITS_______________________________________________


REATE HISTORY RECORD ? _
                                         ACTION TAKEN: _ TRANSMIT HERE: _
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BROWARD COUNTY ENVIRONMENTAL QUALITY CONTROL BOARD

500 S.W. 14th Court
Fort Lauderdale, FL 33315
(305) 765-4900

M E M O R A N D U M

TO: AL LINERO - AIR SECTION
ENVIRONMENTAL QUALITY CONTROL BOARD

FROM: GLENN MALMSTROM - PROGRAM DEVELOPMENT GM
ENVIRONMENTAL QUALITY CONTROL BOARD

SUBJECT: FLORIDA POWER & LIGHT COMPANY
FORT LAUDERDALE REPOWERING PROJECT
POWER PLANT SITE CERTIFICATION APPLICATION

DATE: FEBRUARY 2, 1990

Having reviewed the above-referenced power plant siting application, the following comments are offered:

1). Industrial Wastewater Aspects BCEQCB-9

Florida Power & Light Company - Lauderdale Plant presently operates under the Environmental Quality Control Board (EQCB) License No. IWH-102-89, License To Operate A Direct Discharge Industrial Wastewater Treatment Facility, which addresses their industrial wastewater discharges and the use, handling, and storage of hazardous materials at the facility. Modification of this license will be required to reflect the proposed construction and changes to the facility, specifically, the changes in wastewater flow rates, treatment, and disposal as well as the construction of a new stores warehouse for parts storage.

2). Storage Tank Aspects BCEQCB-10

An EQCB Storage Tank Closure License will be required. The repowering project will result in the removal of the No. 4 above-ground light-oil storage tank (55,000 bbl.) and foundation, the relocation of underground gasoline storage tanks, pump, and piping, and the relocation of a metal cleaning sump.

3). Domestic/Sanitary Wastewater Aspects BCEQCB-11

An EQCB Collection System License will be required prior to the construction of the new collection system discharging to the City of Hollywood POTW. The proposed system includes an underground gravity collection system, pumping stations, and force main connecting to the City of Hollywood sanitary sewer system at Edgewater Road. The expected average flow rate will be 45 gpm (65,000 gpd) with a maximum flow rate of approximately 115 gpm. The collection system will serve a portion of the Florida Power & Light (FP &L) property with the remainder of the site utilizing existing septic tanks.

4). Surface Water Management Aspects BCEQCB-12

An EQCB Surface Water Management License will be required. The project proposed a new stormwater discharge point to the Dania Cut-Off Canal, removal of the existing east parking lot, and addition of a new parking lot in the area north of the old intake canal.

5). Dredge and Fill Aspects BCEQCB-13

An EQCB Dredge and Fill License will be required. The project includes the excavation and/or filling of various areas of the site such as the wastewater treatment area, power block area, water treatment area, old intake canal, and the stub canal. In addition, a 3.5 acre disturbed area of red maple, royal palm, and wetland vegetation not currently impacted by the existing facility will be cleared. Mitigation of this area may be required which may include the removal of exotic species such as melaleuca, Brazilian pepper, and Australian pine from the entire FP & L site since these provide possible seed sources for surrounding urban wilderness and mitigation areas.

GM/faw

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

FEB 12 1990

4APTMD-APB-cdw

Ms. Patricia G. Adams, Planner
Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RE: Florida Power and Light Company (FPL), Lauderdale Repowering Project (PSD-FL-145)

Dear Ms. Adams:

This is to acknowledge receipt of the above referenced facility's application for a prevention of significant deterioration (PSD) construction permit, transmitted by your letter dated January 6, 1990. As discussed between Mr. Barry Andrews of FDER and Ahmed Amanulah of my staff on February 7, 1990, we have the following comments regarding this application.

FPL is proposing a Combustion Turbine Repowering Project at the Lauderdale Plant site, which will consist of replacing the existing steam generators for Units 4 and 5 with combustion turbines (CTs) and heat recovery steam generators (HRSGs) operating as a combined cycle plant.

Each repowered unit will consist of two CTs each with its own HRSG. This combined cycle power plant is projected to burn natural gas as the primary fuel and No. 2 fuel oil as an alternate fuel. Each repowered unit will have a nominal generating capacity of 480 MW.

Our major point of concern is in regards to the BACT determinations for NO_x. The applicant proposed wet injection as the control technology for NO_x, rejecting the use of Selective Catalytic Reduction (SCR). The basis for rejection, according to the applicant, was significant adverse energy, economic and environmental impacts.

The major environmental concerns raised by the applicant appear to be the possibility of ammonia slip, the possibility of the formation of SO_3 and ammonium bisulfate, the deactivation of the catalyst due to plugging from sulfur oxides, and the disposal problems related to changing out any vanadium pentoxide catalysts - a hazardous waste under RCRA regulations. What the applicant fails to point out, however, is that there are SCR systems on the market which do not use vanadium pentoxide, or any other metal, as a catalyst. For example, one SCR system makes use of a ceramic molecular sieve to promote the reaction. The ceramic catalyst system has been applied on gas turbines and diesel engines. The system does not promote the conversion of SO_2 to SO_3 and has virtually no catalyst poisoning, plugging or masking problems. The ammonia slip is also limited. In addition, the catalyst is not considered a hazardous waste.

The energy impacts described by the applicant are not those which would put a strain on the local energy supply or which appear to be significantly different than typical plant energy usage.

The economic impacts provided by the applicant consist of a incremental cost effectiveness of $6,424 per ton of NO_x removed. Apparently the number is derived from dividing the total annualized costs by the incremental reduction from wet injection to SCR. This analysis does not provide the total cost per ton of NO_x removed.

The applicant's argument regarding the adverse effects of SCR usage while firing #2 fuel oil also appears to be unjustified. We have contacted other Regions where similar types of combustion turbines are currently operating with SCR controls. Most of these turbines use natural gas as the primary fuel and No. 2 fuel oil as a backup fuel.

Information from Region I also indicates that a SCR system is continuously being utilized, even while the turbine fires oil.

Also, a feasibility study by the Stationary Source Committee of the Northeast States for Coordinated Air Use Management (NESCAUM) on emission limits for gas turbines (October 1988) revealed that sulfur containing fuels could present somewhat of a problem in promoting the use of SCR in the Northeast. However, information recently obtained from Japan and Europe show that as of April 1986, SCR experience extends back eight and a half years on oil-fired boilers, eight years on gas, and six and a half on coal. Japan currently has at least 22 SCR units for coal-fired boilers, 55 SCR units for oil-fired boilers, and 13 SCR units for liquid natural gas (LNG) boilers. In general, figures show that with coal, SCR catalyst life is 2-3 years; 4-7 years with oil; and with LNG or gas, catalyst life is in excess of 6 years. During the initial installations of SCR units, NO_x reductions averaged 30 percent. With operating experience, more recent installations show reductions in most cases of 70-80%.

In any case, the justifications presented by the applicant for rejecting SCR as a control technology do not appear to be convincing. There are SCR technologies on the market which do not have a hazardous waste by-product. SCR has been applied in the United States on gas and fuel oil fired turbines and diesel engines. It would seem, then, that technical feasibility is not an issue, and, achieving a lower NO_x emission limit than the proposed 42 ppm and 65 ppm for a combined cycle unit is not improbable.

Thank you for the opportunity to review these packages. If you have any questions regarding these comments, please contact Ahmed Amanulah of my staff at (404) 347-2864.

Sincerely yours,

Wayne J. Aronson / for

Bruce P. Miller, Chief
Air Programs Branch
Air, Pesticides, and Toxics
Management Division

cc: Clair Fancy, FDER
Barry Andrews, FDER

Florida Department of Environmental Regulation

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

Bob Martinez, Governor | Dale Twachtmann, Secretary | John Shearer, Assistant Secretary

February 16, 1990

Mr. Claude Arrington
Division of Administrative Hearing
The Desota Building
1230 Apalachee Parkway
Tallahassee, Florida 32399-1550

Dear Mr. Arrington:

RE: FPL Lauderdale Repowering Project Power Plant Site Certification Application PA 89-26, DOA # Case No. 89-00636

The Department has reviewed the above referenced power plant siting application for the Lauderdale Repowering Project for sufficiency as required by Chapter 17-17, Florida Administrative Code. The Department hereby finds the application insufficient in the following areas:

1. Lack of verification of the quantity of natural gas fired in unit 5 (Table 2-11) FDER-1
2. Lack of historical data of actual VOC emissions/fuel usage for CTs (done for Units 4 and 5 in tables 2-10, 2-11). FDER-2
3. Will the proposed fuel/heat input restrictions on the CTs and repowered units 4 and 5 be temporary in nature, or will they be permanent? FDER-3
4. Explain the compliance verification procedure to be used to demonstrate daily or weekly compliance with the restriction mentioned in 3 above, which will be based on 75 ^{o}F ambient conditions. FDER-4
5. Submit a construction permit application to document the existing facility as minor for VOCs. FDER-5
6. Please provide more detailed specifications for equipment details specifications. FDER-6
7. The thermal discharge of the cooling water to the surface water may have certain impact on the temperature of the on-site ground water in the surficial aquifer; although it may not be of hazardous nature, yet it should be addressed. FDER-7

8. The Surface Water Quality data presented in 2.3, Tables 2.3-9 & 2.3-10 did not include results for Cyanide, Bromine and Bromates which are listed in FAC Rule 17-3.121 (Class III Surface Water Standards). FDER-8

9. The results for Table 2.3-9 & 2.3-10 showed violations for Dissolved Oxygen, pH, Copper, Iron, Selenium and Mercury as compared to FAC Rule 17-3.121. It is assumed that results from station 1, located at Lauderdale Plant intake structure on the Dania Cut-Off Canal, are background valves and were subtracted from the Stations 2, 3, 4 and 5 results, if the background results were in violation of the Class III standards. The following table(s) present the violations of the Class III Water Quality Standard. (see attached) FDER-9

10. The above violations of Class III Standards need to be explained. The source(s) of contamination and or the cause of the violations need to be determined. Additional details above and beyond the footnote, need to be presented to document the suspected contamination for Mercury. FDER-10

11. FP&L's current permit, Permit/Certification Number 10-06-158722 Specific Condition #1 reads as follows: FDER-11

    1. "The water quality at the perimeter of the Zone of discharge and the Mixing Zone shall be consistent at all times with the water quality standards set forth in Chapter 17-3, Florida Administrative Code (FAC). Should conditions of the waters within the Zone of discharge or the Mixing Zone warrant, the permittee may be required by the Department to upgrade, reduce or cease the discharge of effluent into the Zone of discharge and adopt an laternate method of disposal."

    Due to the noted violation, Specific Condition #1 should be implemented or FP&L should petition the Deptartment for site specific alternative water quality criteria through use of FAC Rule 17-3.031.

12. Section 5.2.3 Measurement Programs Subsection 5.2.3.2 Ground Water stated that "After the use of the SSB/EPP is discontinued, the ground water monitoring program will be discontinued." The Ground Water Monitoring Program should be continued for one year after the SSB/EPP is discontinued, at the time a review of the data will indicate if the program should be continued or discontinued. FDER-12

13. Section 3.5.4 Process Water System indicated many waste stream being treated in a on-site process water treatment system then discharged to the cooling FDER-13

canal/pond system. The treated effluent should be tested for all the parameters listed in FAC 17-3.061 and 17-3.121 annually.

14. Surface water monitoring stations 1 through 5 should be monitored quarterly for the parameters listed in Sections 17-3.061 and 17-3.121, F.A.C. FDER-14

15. A limitation on heat input to duct burners per last sentence of Section 4.2 (page 4-3) of PSD APP to 90.62 x 10^6BTU/hr may be needed. The facility may escape NSPS subpart Db because it is less than 100 x 10^6 BTU/hr FDER-15

16. It appears that repowering this plant can be accomplished without filling hte finger canal connected to the Dania Cut-Off Canal and the South New River Canal. Please justify the need for the canal filling. FDER-16

17. Please be aware that mitigation may be needed to offset the loss of open water and fringe area. FDER-17

18. Ft. Lauderdale FPL Repowering RO Discharge is Probably in Violation of Pre Treatment Requirements. FDER-18

19. How are the following waste streams to be handled: Combustion turbine wash water, Chemical lab wastes, what Biocide, where is discharge of proposed process water treatment system, and R.O. reject? FDER-19

20. Why not tie rest of the septic tanks in to a central sewer; Via low pressure sewers if necessary. FDER-20

21. Please provide breakdown of fuel consumption between HRSG's and gas turbines. FDER-21

22. Please provide economics of using SCR for oil firing. Molecular sieve catalysts have been proven on oil fired operations. FDER-22

23. Please address the possibility of using HRSG's with low NOx burners. A review of previous permits indicates HRSG's capable of meeting 0.1 lb/MMBtu for NOx emissions. FDER-23

24. The non-regulated pollutants antimony, barium, cobalt, radionuclides, zinc, and chlorine are identified for gas/oil combustion in the publication "Control Technologies for Hazardous Air Pollutants." These pollutants should be addressed a part of the BACT. FDER-24

25. Application should address the possibility of using "improved combusters" which are capable of limiting NOx to 25 ppm. FDER-25

26. Provide basis for using capable recovery factor with 12 percent interest over 30 years for annualized capital cost on Tables 4-4, 4-5, and 4-6. FDER-26

27. Provide basis for using levelizing factor with 12 percent interest, 30 years, and 5 percent escalation rate levelized annual cost on Tables 4-4, 4-5, and 4-6. FDER-27

28. Provide responses to EPA Region IV's comments regarding BACT (copy of letter attached). FDER-28

Also attached are letters from the South Florida Regional Planning Council, EPA and the South Florida Water Management District.

Sincerely,

Hamilton S. Oven, Jr.

Hamilton S. Oven, Jr., P.E.
Administrator Office of Siting Coordination
Division of Air Resources Management

HSO

Attach:

cc: Gary Smallridge
Sheppard Moore

Enclosure

South
Florida
Regional
Planning
Council

RECEIVED
JAN 23 1990
DER - BAQM

January 18, 1990

Mr. Buck Ovens
Power Plant Siting Coordinator
Florida Department of Environmental Regulation
2600 Blairstone Road
Tallahassee, Florida 32399

RE: Sufficency of Florida Power and Light Application for the Lauderdale Repowering Project

Dear Mr. Ovens:

Council staff offers the following comments on the above referenced application.

1. Staff would find it helpful if the application indicated whether a zoning change or variance is necessary to comply with the local code. Portions of the Broward County Zoning Code are included in Section 10 of the application. The M-1 and M-3 zoning categories are listed as the existing approved zoning; however, they do not specifically allow utilities. SFRPC-1

2. Figure 4.1.1 is described as illustrating the areas of construction under this proposal. Section 4 also states that only 3 acres of disturbed wetlands will be affected, thereby not creating a significant impact to aquatic resources. SFRPC-2

   Please illustrate which portions of the new construction area are in wetlands (disturbed or otherwise). Please describe a mitigation proposal that is commensurate with the quality of the resource lost.

3. What is the net drawdown effect to the water level at the site and in nearby SFWMD canals from the proposed activities? SFRPC-3

4. Section 3 discusses using light oils for the plant. Please explain to what extent recycled fuels or oil can be utilized as a fuel source. SFRPC-4

If you have any questions please call.

Sincerely, CAO for,

Anita Tallarico

Anita Tallarico
Senior Planner

AT/bh

cc: Paul Darst

3440 Hollywood Boulevard, Suite #140, Hollywood, Florida 33021
Broward (305) 961-2999, Dade (305) 620-4266, FAX (305) 961-0322

South Florida Water Management District

P.O. Box 24680 • 3301 Gun Club Road • West Palm Beach, FL 33416-4680 • (407) 686-8800 • FL WATS 1-800-432-2045

February 8, 1990

Mr. Hamilton S. Oven, Jr., P.E.
Administrator, Office of Siting Coordination
Division of Air Resources Management
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Re: FP&L Fort Lauderdale Repowering Project
Power Plant Site Certification Application PA 89-26

Dear ~~Mr. Oven:~~ Buck

District staff have reviewed the above referenced document as required by the Florida Electrical Power Plant Siting Act, Section 403.501-.519, F.S., and Chapter 17-17, F.A.C. As a result of that review, a number of outstanding issues and sufficiency questions have been identified which must be addressed in order for the District to complete it's required agency report. Please include the attached list of questions/comments in your sufficiency letter on this project.

We appreciate this opportunity to comment. Please give me a call if any of the attached questions/comments require additional clarification.

Sincerely,

Susan Coughanour

Susan M. Coughanour
Senior Review Coordinator
Regulation Department

cc: Charles D. Henderson
Sheppard N. Moore
Winifred Perkins
Peter Cunningham
Betsy Hewitt
Carla Stanford
Suzanne Brownless
Tom Henderson
Roy Reynolds
Jack Osterholt
Steve Holmes
Bruce Offord
Paul Darst

Mr. Hamilton S. Oven, Jr.
February 8, 1990
Page 2

bcc: Jeanne Hall
Steve Light
Dave Unsell/Ed Yaun
Steve Lamb/Greg Rawl
Stuart Bradow/Terrie Bates
Steve Anderson
Arlan Pankow
Jeff Needle
Jeff Giddings
Debbie Goss
Eduardo Lopez
Sarah Nall
Steve Walker
Dick Rogers
Jim Jackson
Joe Schweigart
Rusty Huckabee
Bill Malone
Tom Fratz
Pam Peckham
Pete Rhoads

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

SUFFICIENCY QUESTIONS/COMMENTS

FP&L FORT LAUDERDALE REPOWERING PROJECT

2.1.2 Existing Site Uses SFWMD-1

1. As a point of information, the references to right-of-way permits on pages 2.1-6 and 2.1-8 (Table 2.1-2) should be corrected to read right-of-way occupancy permits. Additional District comments/questions on the status of these permits can be found under Section 2.2.4 (Easements, Titles, Agency Works) and in Appendix 10.4 (Existing Permits).

2.1.6 Property Delineation SFWMD-2

2. The legal description of the repowering project provided in Figure 2.1-6 excludes portions of the South New River and Dania Cutoff Canal rights-of-way which appear to be used by the existing power plant as well as some of the facilities associated with the repowering project. Since the canals will continue to be used as part of the cooling water system for the repowered facilities, the legal description and accompanying drawing should include these canals. For the same reason, the discharge canal to the South Fork New River should also be identified as part of the repowering project.

2.2.4 Easements, Titles, Agency Works SFWMD-3

This section should be revised to address the following questions/comments:

3. Based on a review of the information provided in the application, it appears that there are roads, cooling ponds, and possibly other existing uses on the District's rights-of-way which have never received the appropriate right-of-way occupancy permits from the District. A request to have those uses authorized should be made as soon as possible. While this can be done as a modification to this certification application, it can also be done through the District's right-of-way occupancy permitting process. This would allow the certification application to deal only with those modifications, if any, associated with the repowering project itself while using the right-of-way occupancy permitting process to handle those modifications which should have occurred prior to the submittal of the certification application. Due to the timetables associated with these two processes, the right-of-way occupancy permit modifications would most likely be completed by the time of the certification hearing on the repowering project.

4. The information contained in Appendix 10.4-65 should be replaced with copies of the right-of-way occupancy permits issued to FP&L which clearly identify the authorized uses of the District's rights-of-way. As a result of reviewing our files, we have identified a number of potential discrepancies between permitted and existing uses which should be resolved, including permitted facilities which are not included in the list of permits in Table 2.1-2. These items are discussed in more detail under Appendix 10.4. SFWMD-4

5. Any subsequent changes made to the originally authorized uses and/or facilities should be clearly identified as modifications in this application if the permit(s) have not yet been modified, pursuant to Section 40E-6.331, F.A.C., to reflect these changes. This would include previously authorized uses and/or facilities which are no longer in use. If any new changes in the existing uses and/or facilities are proposed as a result of the repowering project, those changes should also be clearly identified in the certification application as a modification to the existing permit(s). SFWMD-5

2.3.3 <u>Site Water Budget and Area Users</u> SFWMD-6

As a result of current saltwater intrusion patterns in the vicinity of the power plant, District staff are concerned about the relationship between the existing and future groundwater and surface water withdrawals by FP&L and the continuing inland migration of saline waters in this area. It is important that the following questions be adequately addressed by FP&L if the District is to perform the required analyses regarding reasonable-beneficial use. It is recommended that FP&L consult with District staff prior to initiating any field or modelling activities in order to ensure that the proposed methodologies are compatible with District permitting criteria and practices.

6. Please provide a figure equivalent to Figure 3.5-1 (Proposed Water Uses Simplified Flow Diagram) for all existing plant water uses.

7. District staff are concerned that the two-dimensional model (PLASM) used by FP&L in its analysis of drawdown impacts may not be adequate in view of existing site conditions. While the PLASM model included the surrounding canals as constant head boundaries, District analysis of the lithologic data and the results from the slug test conducted at the site indicates that the canal may not act as a fully penetrating barrier. In addition, there is probably a fair amount of silt on the bottom of the canals which would further reduce the amount of water the canals supply to the aquifer. Please provide additional data which will address these concerns and more adequately validate this assumption. SFWMD-7

8. If the above assumption cannot be supported by field or other data, additional documentation on the existing and potential impacts associated with the existing and proposed withdrawals must be provided by FP&L. It is the District's opinion that the most appropriate means of providing that documentation is a model which will account for the brackish nature of the canal while recognizing that they do not function as fully penetrating constant head boundaries. The model must be designed to address the potential for saline intrusion into existing adjacent wells as well as FPL's on-site wells, potential upconing of saline water, and impacts to on-site and off-site wetland communities. It should also take into account the proposed reductions in ground water withdrawals from FP&L's existing on and off-site wells. SFWMD-8

9. In order to quantify aquifer parameters to be incorporated into the model, it is requested that FPL conduct an aquifer performance test (APT) to determine aquifer parameters and to obtain canal leakance values. SFWMD-9

10. Please provide any additional salinity data available to FP&L that is not included in the certification application for all surface water quality stations in the Dania Cut-off Canal, cooling canal/pond system, South New River Canal, and South Fork New River. SFWMD-10

11. Please provide past pumpage records or pump operation records for the on-site wells and all surface water withdrawals. SFWMD-11

12. Please complete the enclosed Table A for all existing wells. SFWMD-12

13. Please complete the enclosed Table B for all existing and proposed surface water pumps. SFWMD-13

14. Please develop a monitoring well network located between the canal and the production wells at multiple depths which will generate water quality and water level data sufficient to assess the impacts of the existing/proposed on-site withdrawals. To the extent it is available, this data can be used in the modeling efforts discussed above in questions 7 and 8. This monitoring network will also be required by the District as a condition of certification and it is strongly recommended that it be implemented as soon as possible rather than waiting for the completion of the certification process. SFWMD-14

3.3 Fuel SFWMD-15

15. In addition to the earthen dike which surrounds the fuel tanks, what kind of liner or other types of measures are in place or proposed to prevent groundwater contamination in the event of a fuel spill?

3.5 Chemical and Biocide Waste SFWMD-16

16. What type of liner will used with the equalization pond?

3.5 Plant Water Use SFWMD-17

17. Figure 3.5-1 (Proposed Water Uses Simplified Flow Diagram) indicates that, on an average annual basis, 1085 gpm will be needed from the existing on-site wells for pretreatment and demineralizing purposes. Does the requested volume include the amount of water lost during the reverse osmosis process? If not, please adjust the requested on-site ground water withdrawals to include the RO losses.

18. Figure 3.5-1 also indicates that, on an average annual basis, a total of 226,000 gpm is withdrawn from surface waters (presumably the Dania Cut-off Canal based on the text) for auxiliary and condenser cooling purposes. If there are any losses associated with this diversion of water (for example, evaporation), Figure 3.5-1 should be revised to reflect these uses. SFWMD-18

19. Although returned to the South New River Canal via the on-site cooling canal/pond system, the existing and proposed surface water withdrawals from the Dania Cutoff Canal for cooling purposes are considered a consumptive use under the District's current water use permitting criteria since the Dania Cut-off Canal water does not meet the definition for seawater (19,000 ppm). Please revise Table 3.5-5 to reflect this consumptive use. SFWMD-19

3.8 On-Site Drainage SFWMD-20

20. Please provide an acreage breakdown for the following existing and proposed uses of the site: pervious area, water management area, building (roofed) area, other impervious (parking, etc.) area.

21. Please revise Figures 3.8-1, 3.8-2 and 3.8-3 (Site Drainage - Western, Eastern, Northern Portions of Site) to reflect existing and proposed on-site flows of runoff. How will runoff from impervious surfaces be conveyed (i.e., culverts, swales, etc.) to the proposed water management area(s)/runoff pond? Please clarify how the "restored" areas (after construction of the repowering project is completed) will be incorporated into the proposed surface water management system? Please provide locations, design details, and dimensions for all existing and proposed drainage structures on the plans and/or in text form. SFWMD-21

22. Please provide flood routings so that staff can verify allowable discharge. This project should be limited to pre-development discharge rates during the 25-year, 3-day design event. SFWMD-22

23. District criteria (paragraph 3.2.2.2.b of the Basis of Review, Volume IV, S.F.W.M.D. Permit Information Manual) requires that commercially or industrially zoned projects provide at least one half inch of dry detention or retention pretreatment as part of the required retention/detention, unless reasonable assurances can be offered that hazardous materials will not enter the project's surface water management system. Please redesign your system to meet this criteria. Please elaborate on the measures which are proposed to prevent surface and/or groundwater contamination that may result from normal operation and/or maintenance activities. SFWMD-23

24. Please provide additional details on the Water Quality Best Management Practices to be incorporated in the existing/proposed surface water management system in the text and on the plans provided as Figures 3.8-1, 3.8-2 and 3.8-3. Also, please elaborate further on the best management practices (described in Section 3.8.3) which will be used to prevent or minimize off-site discharges and any potential off-site impacts due to the various on-site construction activities. SFWMD-24

25. Please provide cross sections of the proposed detention/retention area(s) including bottom and inlet grate elevations. In order for a retention/detention area to be considered dry, the bottom elevation must be at least 1 inch above the control elevation. SFWMD-25

26. Please provide water quality calculations which verify that the proposed detention/retention volume meets District criteria (paragraph 3.2.2.a.1, 2, or 3 of the Basis of Review, Volume IV, Permit Information Manual). SFWMD-26

27. Please note that all wet detention/retention areas must meet dimensional criteria specified in paragraph 3.2.4.4.1.b of the Basis of Review, Volume IV, Permit Information Manual. Storage for water quality and/or quantity purposes may not be claimed in areas that do not meet this criteria (for example, the proposed discharge swale around the parking lot). SFWMD-27

28. District criteria (paragraph 3.2.2.8, Basis of Review, Volume IV, Permit Information Manual) require that above ground pond dikes shall not be located within 200 feet of water bodies or 100 feet of dry retention/detention areas. Please provide documentation which demonstrates that the proposed separation between the existing/proposed sewage treatment and equalization ponds and the retention pond/dry retention areas of the proposed surface water management system meets these criteria. SFWMD-28

29. District criteria (paragraph 3.2.2.1, Basis of Review, Volume IV, Permit Information Manual) require that "Projects shall be designed so that discharges will meet State water quality standards, as set forth in Chapter 17-3, Florida Administrative Code." Please elaborate on how those standards will be met. SFWMD-29

4.3 <u>Groundwater Impacts</u> SFWMD-30

30. Please provide a site plan for the proposed dewatering operations which shows the location of the well points and indicate the maximum depth of the dewatering operations. These dewatering operations should also be incorporated into the model discussed in question 8 in order to assess any impacts associated with the construction activities. Should it be found that impacts will occur as a result of the proposed dewatering activities, please indicate what measures will be taken to offset any potential impacts.

4.4 <u>Ecological Impacts</u> SFWMD-31

31. What mitigative measures are proposed to compensate for the existing wetlands which will be lost due the proposed construction activities associated with the repowering project in the area east of the existing solid settling basins and evaporation/percolation ponds?

4.7 <u>Impact on Landmarks and Sensitive Areas</u> SFWMD-32

32. Depending on the response to question 8 under section 2.3.3 (Site Water Budget and Area Users), this section may need to be revised.

4.11 <u>Variances</u> SFWMD-33

33. As a result of the responses to the foregoing questions, please identify any variances to District right-of-way, water use and/or surface water management criteria which may be required as a result of the proposed construction activities.

5.3 <u>Impacts on Water Supplies</u> SFWMD-34

34. Depending on the responses to the questions listed under section 2.3.3 (Site Water Budget and Area Users), the sections under 5.3.2 (Groundwater) and 5.3.3 (Drinking Water) may need to be revised to reflect the results from additional data and analysis.

35. Please supply details of the numerical salinity modeling used to generate the data presented in Table 5.3-1. Why was there a marked salinity change in the simulation between 1000 and 2000 feet downstream of the plant intake instead of between the plant intake and 1000 feet downstream? SFWMD-35

36. Once construction is complete, will additional groundwater withdrawals for irrigation purposes be required to service the proposed repowering project in addition to those authorized by the existing General Water Use Permit issued to FP&L on April 21, 1988? If so, please provide a map showing the location of the proposed withdrawal facilities and complete the enclosed Table A and/or Table B regarding withdrawal facility specifications. The proposed/existing irrigation withdrawals should also be incorporated into the modeling conducted in response to question 8 above. SFWMD-36

37. Please note that, depending on the outcome of the District's analyses of the proposed water withdrawals and surface water management system design, additional monitoring requirements may be requested through the sufficiency review process for this application and/or through the District's recommended certification conditions for the proposed repowering project. At a minimum, water quality monitoring at each outfall structure for the surface water management system will be required due to the industrial nature of the site. SFWMD-37

5.4 Solid/Hazardous Waste Disposal Impacts SFWMD-38

38. What contingency provisions are planned in the event of a fuel or other type of hazardous material spill?

5.11 Resources Committed SFWMD-39

39. Depending on the responses to the questions listed under section 2.3.3 (Site Water Budget and Area Users), this section may need to be revised.

5.12 Variances SFWMD-40

40. As a result of the responses to the foregoing questions, please identify any variances to District right-of-way, water use and/or surface water management permitting criteria which may be required as a result of the operation of the proposed repowering project.

Appendix 10.4 Existing Permits SFWMD-41

41. Following is a discussion of the existing right-of-way occupancy permits issued by the District for the uses/facilities associated with the FP&L Ft. Lauderdale Power Plant where possible discrepancies between authorized, existing and proposed uses may exist. As noted earlier, these potential discrepancies should be addressed prior to and/or concurrent with the certification process for the proposed repowering project.

Permit Number 1927-5. The correct permit number is 1927-15. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. If the authorized use will support the new repowering project, then any changes required in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 1939-4. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. In addition, if the facilities authorized are no longer being used, they should be removed. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 1941-22. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. If the facilities authorized are no longer being used, they should be removed. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 482. The correct permit number is 483. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. If the facilities authorized are no longer being used, they should be removed. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 502. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. If there are additional existing, but unauthorized facilities, such as an oil line, at this site, a permit modification should be requested. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 532. The correct permit number is 552. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 6564. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 6720. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 7055. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

42. In addition, the following right-of-way occupancy permit authorizations are missing from this list: SFWMD-42

Permit Number 1941-21. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 83. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 1943. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 2269. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Form [illegible]

TABLE A
DESCRIPTION OF WELLS

WELL NUMBER				
MAP DESIGNATION				
EXISTING OR PROPOSED				
DIAMETER (INCHES)				
TOTAL DEPTH				
CASED DEPTH				
SCREENED INTERVAL				
PUMPED OR FLOWING				
WORKING VALVE, IF ARTESIAN (YES OR NO)				
PUMP MANUFACTURER AND MODEL NUMBER				
PUMP TYPE (CENTRIFUGAL, JET, DEEP JET, TURBINE, ETC.)				
INTAKE DEPTH (NGVD)				
PUMP OR FLOW CAPACITY (GPM AT _______ FT OF HEAD AT _____ PSI)				
ACTIVE (YES OR NO)				
YEAR DRILLED				
TYPE OF METER				

Form [illegible]-041

TABLE B
DESCRIPTION OF SURFACE WATER PUMPS

DRAINAGE DISTRICT				
PUMP NUMBER				
MAP DESIGNATION				
SURFACE WATER BODY				
EXISTING OR PROPOSED				
PUMP MANUFACTURER AND MODEL NUMBER				
PUMP TYPE				
PUMP CAPACITY (GPM)				
PUMP HORSEPOWER				
PUMP DIAMETER				
ELEVATION OF INTAKE (NGVD)*				
IS PUMP A TWO WAY PUMP?				

TABLE C
DESCRIPTION OF IRRIGATION CULVERTS

CULVERT NUMBER				
MAP DESIGNATION				
WATER BODY				
EXISTING OR PROPOSED				
DIAMETER**				
HEIGHT***				
WIDTH***				
TYPE OF CULVERT****				
CULVERT LENGTH				
INVERT ELEVATION (NGVD)*				
TYPE OF CONTROL DEVICE				

* NGVD IS APPROXIMATELY EQUAL TO MEAN SEA LEVEL
** FOR CIRCULAR CULVERTS
*** FOR ELLIPTICAL CULVERTS
**** CORRUGATED METAL, REINFORCED CONCRETE, ETC.

FPL

Lauderdale Repowering Project

SITE CERTIFICATION APPLICATION

Responses to
BCEQCB
Comments

BCEQCB-1

<u>Comment</u>: In recent years, this area has been marginally in a nonattainment status for ozone at a time when the existing FPL facility has operated at an historically low level. Despite some of the beneficial aspects of the proposed project, it is evident that (notwithstanding present permits) Future Potential Emissions of VOC's will be greater than present Actual Emissions and thus will affect ozone levels.

<u>Response</u>: The proposed heat input limitations would restrict potential VOC emissions from the Lauderdale Repowering Project to less than 214.9 TPY compared to the existing potential emissions of 326 TPY. Of the 199.8 TPY, only 99.9 TPY could be directly attributable to the Lauderdale Repowering Project. This emission level is specifically exempted from the FDER nonattainment requirements because it is a relatively minor quantity compared to emissions from other sources (see Chapter 17-2.510(2)(d)3, F.A.C.). Indeed, the total estimated VOC emissions for 1988 in Broward County were 65,032 TPY. Even if the actual emissions for the Lauderdale Repowering Project equalled its potential emissions, the project would only increase total emissions by 0.15 percent, a negligible amount.

BCEQCB-2

Comment: At present, our nonattainment status has a high priority and has resulted in measures such as gasoline station vapor control inspections, new automobile catalytic converter anti-tampering laws, and planned notor vehicle emissions inspections. Thus, we feel that the matter needs to at least be better addressed in the SCA. We don't think that creation of a "Synthetic Minor Source" by limiting emissions of VOC's to 99.9 TPY is the appropriate way to handle the matter. It might also unnecessarily limit FPL's operation flexibility in order to avoid evaluating an effect that might even be small. In any case, we are interested in their quantification of just what that effect might be.

Response: The requested emission limitations on the existing Lauderdale Plant confirm that the plant has always been a minor source of VOCs (see response to FDER-2). The limitations for the repowered units would be for oil firing only and would allow the plant to operate up to 7,052 hours per year at 100-percent load. The restrictions on the existing and repowered units would not limit FPL's ability to provide reliable electric power.

BCEQCB-3

Comment: We note that, per FPL's analysis, the maximum 24-hour SO_2 concentration will be 97 percent of the allowable standard. We plan to look at how this can affect possible long-term expansions of our Resource Recovery Project.

Response: This comment is associated with the worst-case prediction of air quality impacts presented in the Air Permit Application (Appendix 10.1.5 in the SCA). In the application, the worst-case impacts were 97 percent of the sulfur dioxide (SO_2) ambient air quality standard. This concentration is localized and primarily due to aerodynamic downwash of two small existing gas turbines located at the Lauderdale Plant. The repowering project contributes only 10.7 percent to this maximum value; the South Broward County Resource Recovery (SBCRR) Project is unaffected by this concentration. The localized nature of this impact can be seen in Figures BCEQCB3-1 through BCEQCB3-4, which clearly show that the impact is an extremely small area located in the Dania Cut-Off Canal, to the southwest of the site.

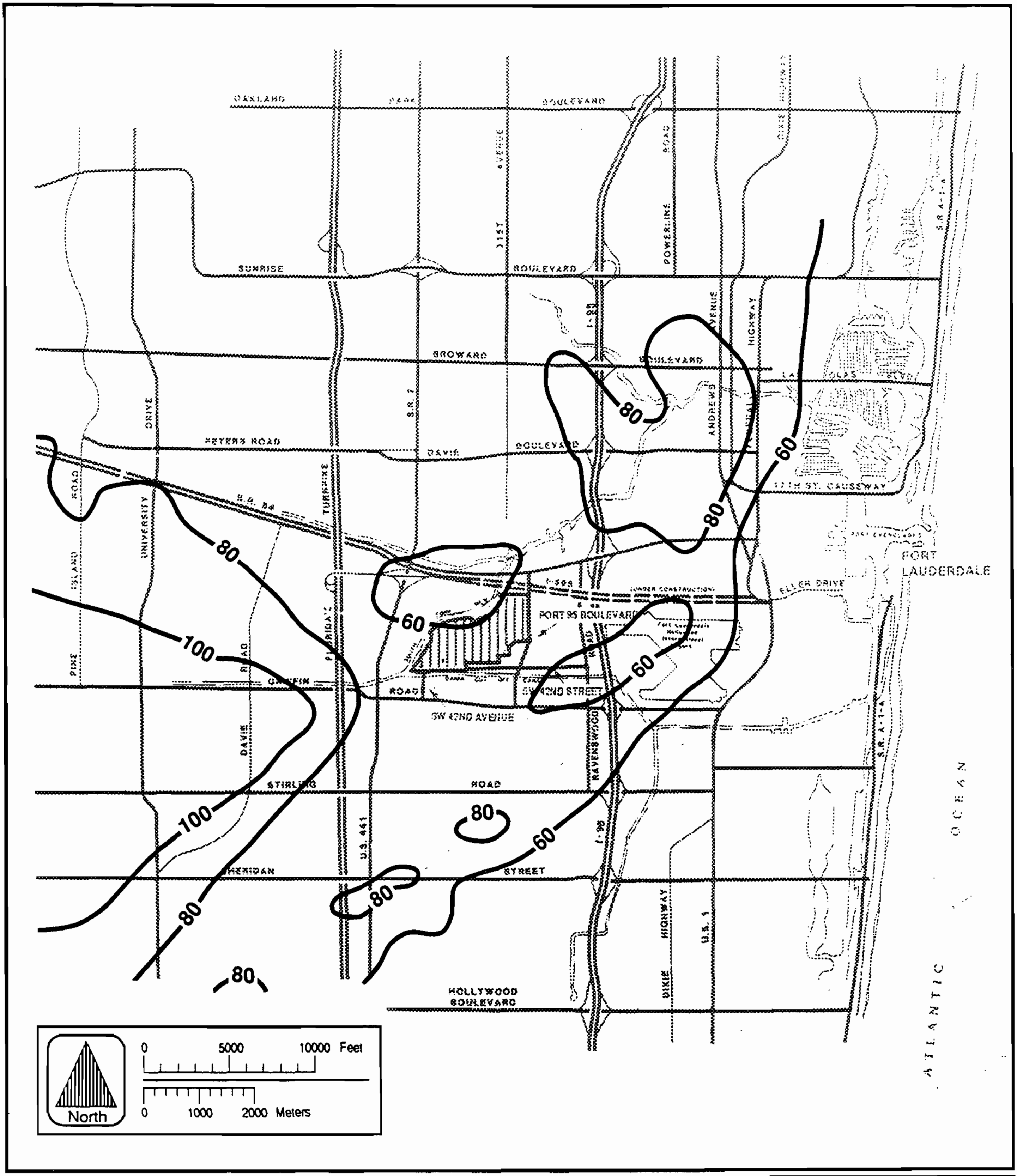

Figure BCEQCB3-1

HIGHEST SECOND-HIGHEST 24-HOUR SO_2 CONCENTRATION (EXCLUDES BACKGROUND OF 42 $\mu g/m^3$)

NOTE: FLORIDA AMBIENT AIR QUALITY STANDARD IS 260 $\mu g/m^3$.

Lauderdale Repowering Project

FPL

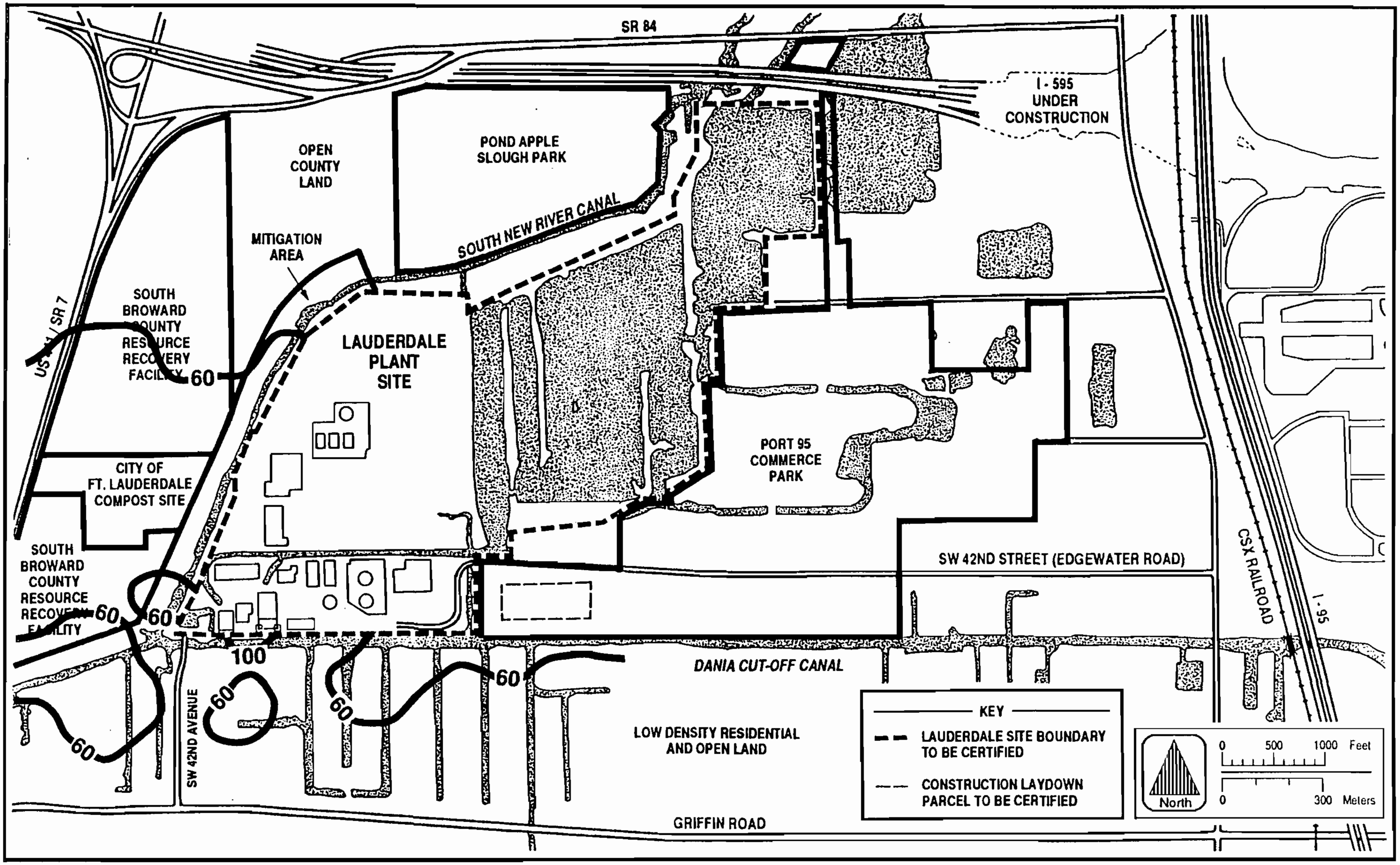

Figure BCEQCB3-2
HIGHEST SECOND-HIGHEST 24-HOUR SO_2 CONCENTRATION
(EXCLUDES BACKGROUND OF 42 $\mu g/m^3$)

NOTE: FLORIDA AMBIENT AIR QUALITY STANDARD IS 260 $\mu g/m^3$.

Lauderdale
Repowering
Project

FPL

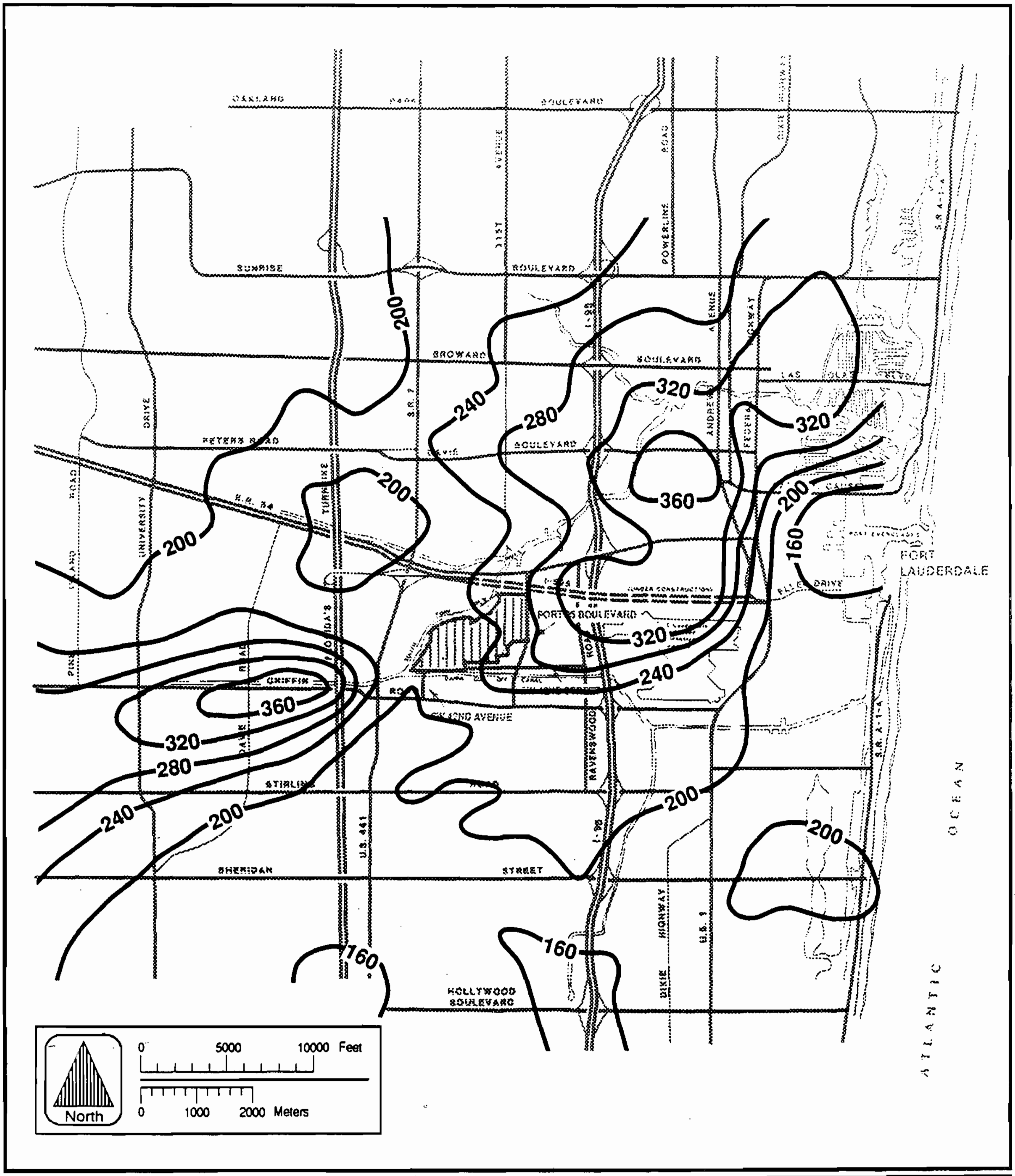

Figure BCEQCB3-3

HIGHEST SECOND-HIGHEST 3-HOUR SO_2 CONCENTRATION (EXCLUDES BACKGROUND OF 138 μg/m^3)

NOTE: FLORIDA AMBIENT AIR QUALITY STANDARD IS 1,300 μg/m^3.

Lauderdale Repowering Project

FPL

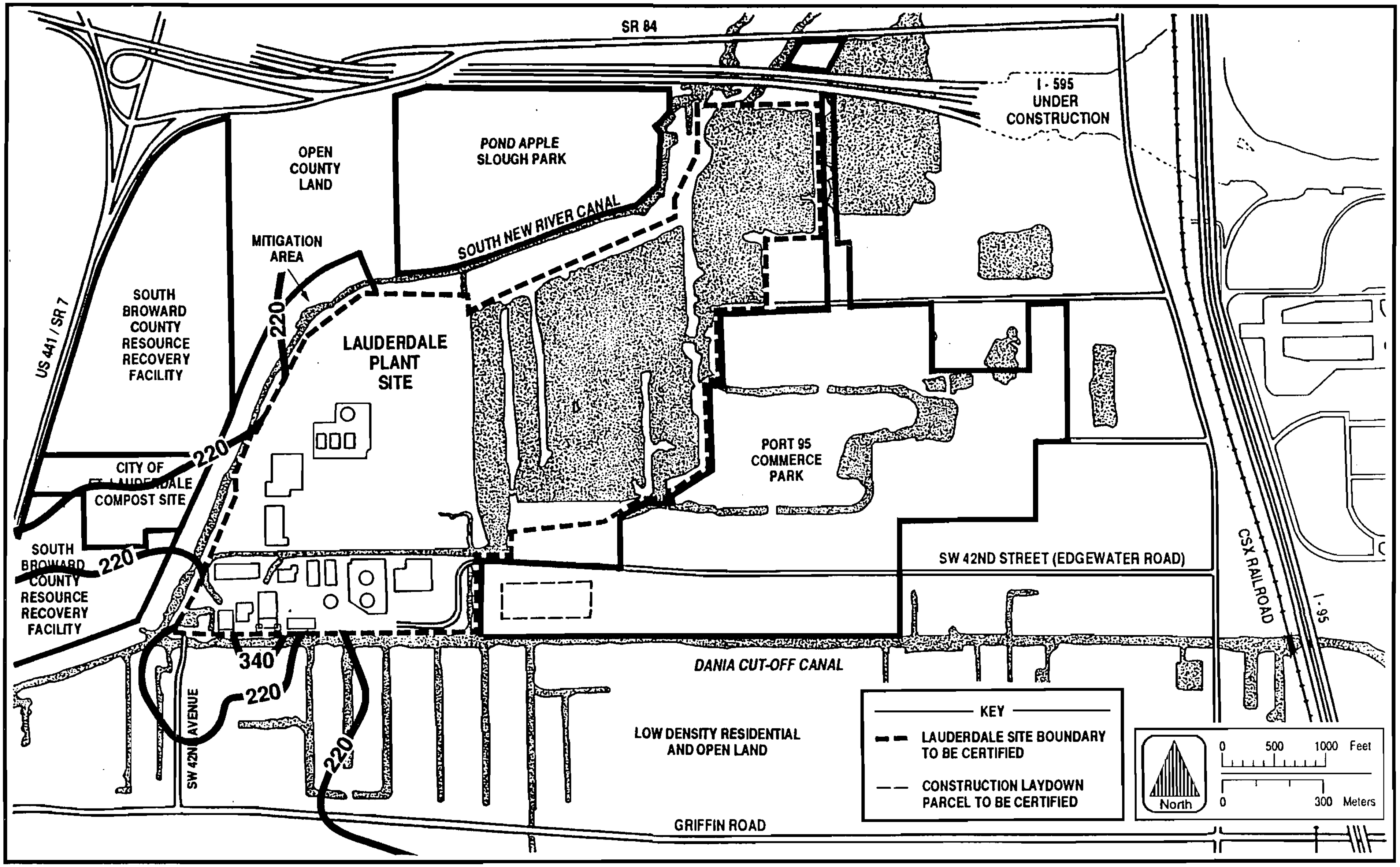

Figure BCEQCB3-4

HIGHEST SECOND-HIGHEST 3-HOUR SO_2 CONCENTRATION (EXCLUDES BACKGROUND OF 138 $\mu g/m^3$)

NOTE: FLORIDA AMBIENT AIR QUALITY STANDARD IS 1,300 $\mu g/m^3$.

Lauderdale Repowering Project

FPL

BCEQCB-4

<u>Comment</u>: It is difficult to evaluate the effects from the project due to the widely varying operational history of the existing plant. However, it is clear that recently it has operated much closer to its historical minimum than maximum. Thus, it has operated at a fairly low rate during the times of our ozone nonattainment status.

<u>Response</u>: As stated in the reponses to BCEQCB-1 and FDER-2, the Lauderdale Plant has actually been a minor source for the last 20 years, both before and after the designation of nonattainment for the area.

BCEQCB-5

Comment: FPL's analysis shows that, under the scenario they modeled, the maximum 24-hour sulfur dioxide concentration will be 97 percent of the standard. We understand that this conclusion is based on the apparently conservative case wherein 0.5 percent sulfur oil will be used all the time, rather than only as a backup fuel. We also recommend looking at this scenario from a probability point of view, considering the frequency with which oil will likely be burned. This will allow us to better evaluate impacts from potential future expansions of our Resource Recovery Facility and avoid Nonattainment Status in sulfur dioxide.

Response: The maximum 24-hour SO_2 impacts are presented in the response to BCEQCB-3. It should be noted that the SBCRR facility was modeled to include its planned expansion for the fourth unit. Also, as noted in the comment, the SO_2 impacts are a function of the frequency of oil being burned. When natural gas is burned, the SO_2 impacts are negligible. Moreover, the impacts were determined by assuming that the maximum sulfur content specification of 0.5 percent would be in the oil fired. However, experience indicates that the actual percent sulfur in No. 2 oil will be much less.

The fuel specification for the Lauderdale Repowering Project will be for a No. 2-GT grade as defined in the Standard Specification for Gas Turbine Fuel Oils ASTM designation 2880-88. This distillate fuel oil, which contains low ash and other potential contaminants, is suitable for conbustion turbines and is inherently low in sulfur. Through the refining process, this fuel can have a maximum sulfur content of up to 0.5 percent. In order to assure that the Lauderdale Repowering Project meets this specification, the maximum assumed sulfur limit of 0.5 percent was used in all analyses, including the calculation of maximum emissions and in the impact analyses.

As discussed in the PSD application, the typical sulfur content of this fuel is around 0.3 percent. However, sulfur content can fluctuate, with some shipments having over 0.4 percent sulfur. EPA recognized the fluctuations in sulfur content by increasing the maximum sulfur for very low sulfur oils in its Subpart Db regulations from 0.3 percent to 0.5 percent (see 54 Federal Register 28447-28448 for rationale).

The precise probability of oil firing cannot be accurately predicted at this time. It is the intent of the project to use natural gas as the primary fuel and No. 2 fuel oil as an alternate fuel. However, the facility must be capable of using No. 2 fuel oil on a continuous basis to supply electrical power.

BCEQCB-6

<u>Comment</u>: We agree that sulfur controls built into the Combustion Turbines are not feasible and that the only feasible alternative is clean fuels. The use of 0.5 percent sulfur oil is not equivalent to what can be achieved with BACT on conventional units. Even lower sulfur oil is a viable consideration in the section where BACT is discussed. The infrequent use of this oil is worth mentioning in this section.

<u>Response</u>: The use of No. 2 fuel oil with 0.5-percent sulfur is equivalent to or less than that established as BACT for conventional units. The BACT limitations for Tampa Electric Company's Big Bend 4, Jacksonville Electric Authority's St. Johns River Power Park, and Orlando Utilities Commission's Stanton Energy Center were 0.84, 0.76, and 1.14 lb $SO_2/10^6$ Btu heat input, respectively.

As noted in the response to BCEQCB-5, the actual emissions are expected to average 0.3 lb $SO_2/10^6$ Btu when burning oil and be negligible when burning natural gas.

BCEQCB-7

Comment: The technical work on the air modeling appears to be of high quality and in line with the Plan of Study. However, there are some significant typos on pages 5.6.6-7 which need to be corrected. They relate to PSD II increment analysis. Three of the four values are way off, although they are correct in Appendix 10.1.5. We also recommend visual representation in some manner of the modeling results for critical cases.

Response: Typographical errors on Page 5.6-7 of the SCA have previously been corrected in Errata 1 dated 03/20/90. Isopleths of the maximum SO_2 impacts are presented in the response to BCEQCB-3.

BCEQCB-8

<u>Comment</u>: Verification of Tables 6-2, 6-3, 6-4, and 6-5 indicates that the following changes may be needed:

<u>Tables 6-2 and 6-3, Facilities located within 15 km of the FPL-Lauderdale Plant</u>:

DELETE: Weekley Asphalt Paving, APIS #50BRO060046
(Facility was dismantled in July 1988.)

ADD: East Coast Asphalt, APIS #50BRO060014
154 tons SO_2/yr maximum potential emissions.

National Resource Recovery, #50BRO062070
160 tons NO_x/yr maximum potential emissions.

<u>Tables 6-4 and 6-5, Facilities located within 15 to 50 km of the FPL-Lauderdale Plant</u>:

ADD: Weekley Asphalt Paving, APIS #50BRO060072
874 tons SO_2/yr maximum potential emissions from two asphalt plants.

APIS printouts for all the above facilities are attached.

<u>Response</u>: Tables 6-2 through 6-5 have been revised and are attached to this response.

Table 6-2. SO_2 Sources (>25 TPY) Within 15 km of the FPL-Lauderdale Plant

APIS Facility Identification Number	Facility	County	UTM Coordinates (km)		Relative Location (km) To Proposed Site[a]		Distance From Proposed Site (km)	Direction From Proposed Site (degrees)	Maximum Allowable SO_2 Emissions[b] (TPY)
			East	North	X	Y			
50BRO060036	FPL-Port Everglades	Broward	587.4	2,885.3	7.1	2.0	7.4	74	76,239
50BRO06????	South Broward County Res. Rec.	Broward	579.6	2,883.3	-0.7	0.0	0.7	270	1,318
50BRO060014	East Coast Asphalt	Broward	583.5	2,893.6	3.2	10.3	10.8	343	154
TOTAL									77,711

[a] The UTM coordinates of the proposed combined cycle unit are 580.3 km East and 2883.3 km North.
[b] Maximum facility emissions are based on information on emissions found in APIS, or specific operation permits and PSD applications.

Note: ???? indicates no APIS number was provided.

Source: FDER, 1989.

Table 6-3. NO_x Sources (>25 TPY) Within 15 km of the FPL-Lauderdale Plant

APIS Facility Identification Number	Facility	County	UTM Coordinates (km)		Relative Location (km) To Proposed Site[a]		Distance From Proposed Site (km)	Direction From Proposed Site (degrees)	Maximum Allowable NO_x Emissions[b] (TPY)
			East	North	X	Y			
50BRO060036	FPL-Port Everglades	Broward	587.4	2,885.3	7.1	2.0	7.4	74	45,570
50BRO06????	South Broward County Res. Rec.	Broward	579.6	2,883.3	-0.7	0.0	0.7	270	2,383
50BRO062070	National Res. Rec.	Broward	579.3	2,884.5	-1.0	1.2	1.5	321	160
TOTAL									48,113

[a] The UTM coordinates of the proposed combined cycle unit are 580.3 km East and 2883.3 km North.
[b] Maximum facility emissions are based on information on emissions found in APIS, or specific operation permits and PSD applications.

Note: ???? indicates no APIS number was provided.

Source: FDER, 1989.

Table 6-4. SO_2 Sources (>100 TPY) Within 15 to 50 km of the FPL-Lauderdale Plant

APIS Facility Identification Number	Facility	County	UTM Coordinates (km) East	UTM Coordinates (km) North	Relative Location (km) To Proposed Site X	Relative Location (km) To Proposed Site Y	Distance From Proposed Site (km)	Direction From Proposed Site (degrees)	Maximum Allowable SO_2 Emissions[a] (TPY)
50DAD130003	FPL-Turkey Point[b]	Dade	567.2	2,813.2	-13.1	-70.1	71.3	191	36,192
50DAD130004	General Portland	Dade	551.7	2,843.4	-28.6	-39.9	49.1	216	10,546
50DAD130348	Metro Dade Resource Recovery	Dade	564.3	2,857.4	-16.0	-25.9	30.4	212	1,831[c]
50DAD130020	Tarmac Florida	Dade	562.9	2,861.7	-17.4	-21.6	27.7	219	2,792
50BRO06????	North Broward County Res. Rec.	Broward	583.6	2,907.6	3.3	24.3	24.5	8	896
50DAD130001	FPL-Cutler	Dade	570.4	2,834.9	-9.9	-48.4	49.4	192	488
50BRO060015	East Coast Asphalt	Broward	584.9	2,902.2	4.6	18.9	19.5	14	230
50DAD130015	Rinker Materials	Dade	558.2	2,851.3	-22.1	-32.0	38.9	215	218 A
50PMB500015	Boca Raton Hotel and Club, LTD	Palm Beach	592.0	2,913.7	11.7	30.4	32.6	21	208 E
50BRO062094	Waste Management	Broward	583.2	2,908.0	2.9	24.7	24.9	7	187
50DAD130483	General Asphalt Portable Plant	Dade	561.5	2,853.2	-18.8	-30.1	35.5	212	103
50BRO060072	Weekley Asphalt Paving	Broward	560.5	2,875.0	-19.8	-8.3	21.4	247	874
TOTAL									54,565

[a]Maximum facility emissions are based on emissions found in APIS, or specific operation permits and PSD applications.
[b]FPL-Turkey Point will be included in the modeling due to its relative emissions and potential impact.
[c]Based on SO_2 source test conducted in January 1983.

Note: A = Emission rate based on ACTUAL emission information in APIS, because no information was available on allowable emissions.
E = Emissions rate based on ESTIMATED emission information in APIS, because no information was available on allowable or actual emissions.

???? indicates no APIS number was provided.

Source: FDER, 1989.

Table 6-5. NO_x Sources (>100 TPY) Within 15 to 50 km of the FPL-Lauderdale Plant

APIS Facility Identification Number	Facility	County	UTM Coordinates (km)		Relative Location (km) To Proposed Site		Distance From Proposed Site (km)	Direction From Proposed Site (degrees)	Maximum Allowable NO_x Emissions[a] (TPY)
			East	North	X	Y			
50DAD130003	FPL-Turkey Point[b]	Dade	567.2	2,813.2	-13.1	-70.1	71.3	191	16,521
50DAD130001	FPL-Cutler	Dade	570.4	2,834.9	-9.9	-48.4	49.4	192	4,796
50DAD130020	Tarmac Florida	Dade	562.9	2,861.7	-17.4	-21.6	27.7	219	4,191 A
50BRO06????	North Broward County Res. Rec.	Broward	583.6	2,907.6	3.3	24.3	24.5	8	2,225
50DAD130014	Rinker Portland	Dade	559.0	2,852.2	-21.3	-31.1	37.7	214	702 E
50DAD130004	General Portland	Dade	551.7	2,843.4	-28.6	-39.9	49.1	216	616
50DAD130348	Metro Dade Resource Recovery	Dade	564.3	2,857.4	-16.0	-25.9	30.4	212	511
50BRO062094	Waste Management	Broward	583.2	2,908.0	2.9	24.7	24.9	7	236
50DAD130470	South Florida Cogeneration	Dade	580.5	2,850.9	0.2	-32.4	32.4	180	217
50BRO062081	Ryan Sales and Service	Broward	560.7	2,876.5	-19.6	-6.8	20.7	251	200 E
TOTAL									30,215

[a]Maximum facility emissions are based on information on emissions found in APIS, or specific operation permits and PSD applications.
[b]FPL-Turkey Point will be included in the modeling due to its relative emissions and potential impacts.

Note: A = Emission rate based on ACTUAL emission information in APIS, because no information was available on allowable emissions.
E = Emission rate based on ESTIMATED emission information in APIS, because no information was available on allowable or actual emissions.

???? indicates no APIS number was provided.

Source: FDER, 1989.

BCEQCB-9

Comment: Industrial Wastewater Aspects--Florida Power & Light Company - Lauderdale Plant presently operates under the Environmental Quality Control Board (EQCB) License No. IWH-102-89, License To Operate A Direct Discharge Industrial Wastewater Treatment Facility, which addresses their industrial wastewater discharges and the use, handling, and storage of hazardous materials at the facility. Modification of this license will be required to reflect the proposed construction and changes to the facility, specifically, the changes in wastewater flow rates, treatment, and disposal as well as the construction of a new stores warehouse for parts storage.

Response: Licensing for the construction and operation of the Lauderdale Repowering Project is being pursued under the Florida Electrical Power Plant Siting Act, Sections 403.501 et seq., Florida Statutes. The certification issued under this Act "shall constitute the sole license of the state and any agency as to the approval of the site and the construction and operation of the proposed electrical power plant...§403.511(1), Florida Statutes." Consequently, no separate permits or modifications of existing permits from state, regional, or local agencies are required for the Lauderdale Repowering Project.

Compliance of the project with substantive standards of BCEQCB will be addressed in the site certification process, however.

For activities that are not part of the Lauderdale Repowering Project, such as construction of a new stores warehouse at the Lauderdale Plant, FPL intends to obtain any applicable Broward County permits or approvals independent of the site certification process.

BCEQCB-10

Comment: Storage Tank Aspects--An EQCB Storage Tank Closure License will be required. The repowering project will result in the removal of the No. 4 aboveground light-oil storage tank (55,000 bbl.) and foundation, the relocation of underground gasoline storage tanks, pump, and piping, and the relocation of a metal cleaning sump.

Response: The No. 4 aboveground light-oil storage tank (55,000 bbl) and foundation are part of FPL's Lauderdale Plant Registered Terminal Facility (Page 10.4-70 of SCA) and are therefore, by reference in 27-10.14 (of the EQCB Code of Regulations) to 27-3.03(e), exempt from the Closure License requirement.

Relocation of underground gasoline storage tanks, pump, and piping will be performed under the appropriate county licenses which are being applied for. This work is not part of the Lauderdale Repowering Project.

The metal cleaning sump is part of FPL's Lauderdale Plant Industrial Wastewater Treatment System and is therefore, by reference in 27-10.14 (of the EQCB Code of Regulations) to 27-3.03(b), exempt from the Storage Tank License requirements.

BCEQCB-11

Comment: Domestic/Sanitary Wastewater Aspects--An EQCB Collection System License will be required prior to the construction of the new collection system discharging to the City of Hollywood POTW. The proposed system includes an underground gravity collection system, pumping stations, and force main connecting to the City of Hollywood sanitary sewer system at Edgewater Road. The expected average flow rate will be 45 gpm (65,000 gpd) with a maximum flow rate of approximately 115 gpm. The collection system will serve a portion of the Florida Power & Light (FP&L) property with the remainder of the site utilizing existing septic tanks.

Response: See response to BCEQCB-9.

BCEQCB-12

Comment: Surface Water Management Aspects--An EQCB Surface Water Management License will be required. The project proposed a new stormwater discharge point to the Dania Cut-Off Canal, removal of the existing east parking lot, and addition of a new parking lot in the area north of the old intake canal.

Response: See response to BCEQCB-9.

BCEQCB-13

Comment: Dredge and Fill Aspects--An EQCB Dredge and Fill License will be required. The project includes the excavation and/or filling of various areas of the site such as the wastewater treatment area, power block area, water treatment area, old intake canal, and the stub canal. In addition, a 3.5 acre disturbed area of red maple, royal palm, and wetland vegetation not currently impacted by the existing facility will be cleared. Mitigation of this area may be required which may include the removal of exotic species such as melaleuca, Brazilian pepper, and Australian pine from the entire FP&L site since these provide possible seed sources for surrounding urban wilderness and mitigation areas.

Response: Regarding the need for a BCEQCB dredge-and-fill license, see response to BCEQCB-9.

Approximately 2.5 acres of existing forested wetlands will be filled for construction of the wastewater treatment facility. As mitigation for this impact to wetlands, FPL proposes to create approximately 2.5 acres of forested wetlands on-site. Four potential areas have been identified. These include:

1. Restoration of an artificially deepened area just north of the discharge canal and east of the isolated wetland to be filled.
2. Restoration of the artificially deepened dead-end finger canal at the southeast property boundary.
3. Creation of approximately 0.5 acre of wetland from existing upland located northeast of the proposed wastewater treatment facility. This would be performed after use of the existing uplands during construction.
4. Creation of a forested wetland buffer from existing uplands southeast of the existing plant access road.

Initial removal and maintenance removal of exotic plant species such as melaleuca, Brazilian pepper, and Australian pine will be performed in the mitigation areas. As mitigation for the loss of open-water habitat resulting from the filling of the old intake canal and potential endangered species impacts from the repowering project, FPL proposes to construct a manatee resting shelf and shallow open-water area in the cooling pond system.

A detailed mitigation proposal is being developed, taking into consideration the suggestions made by the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Florida Department of Environmental Regulation, and the South Florida Water Management District during a site visit on April 11, 1990.

FPL

Lauderdale Repowering Project

SITE CERTIFICATION APPLICATION

Responses to
EPA
Comments

TECHNICAL RESPONSE
TO THE COMMENTS
OFFERED BY THE
U.S. ENVIRONMENTAL PROTECTION AGENCY ON THE
LAUDERDALE REPOWERING PROJECT

EPA offered comments to the Florida Department of Environmental Regulation (FDER) on the Site Certification Application for the Lauderdale Repowering Project in a letter dated February 12, 1990. In this letter, EPA presents several issues related to the application of selective catalytic reduction (SCR) on the Lauderdale Repowering Project. This section presents responses and additional information on various topics related to SCR that were presented in the EPA letter. For continuity, the responses and additional information contained in this section are generally organized according to the requirements of evaluating best available control technology (BACT), i.e., technical feasibility, economic, environmental, and energy impacts.

TECHNICAL FEASIBILITY

EPA suggests that SCR may be technically feasible for the Lauderdale Repowering Project for three reasons:

1. Catalysts are available that do not promote the formation of SO_3 and are nonhazardous; thus catalyst poisoning and the formation of ammonium bisulfate are not promoted, and catalyst disposal is not a significant problem;
2. Use of fuel oil will be for backup purposes only and therefore the Lauderdale Repowering Project is similar to other combined cycle projects; and
3. Japanese and European experience with SCR on oil- and coal-fired boilers is directly applicable to combined cycle plants.

The EPA suggestion that there are catalysts that are made of nonhazardous materials, do not promote formation of SO_3 from SO_2, and have reduced contamination problems does not accurately reflect the present state of development of those systems. The nonhazardous catalysts, principally made of zeolite-coated ceramic material, have only limited operational experience. These systems have been applied only to small gas turbines (i.e., less than about 5 MW with three applications in the United States) and internal combustion engines (one application in the United States). These applications are primarily on gas-fired facilities and have been installed where other catalyst proved ineffective. These catalysts have not been demonstrated on combined cycle plants which fire oil or combined cycled plants of the size proposed for the Lauderdale Repowering Project. Indeed, of the 17 projects currently operating or in startup with SCR and more than 40 permitted projects installing SCR, none has a nonmetallic catalyst. Until these systems are demonstrated commercially, the potential environmental impacts of hazardous waste disposal for catalysts must be included in the BACT evaluation.

Notwithstanding the eventual benefit of those systems when they are demonstrated, there are significant problems associated with oil firing not related to catalyst poisoning and SO_3 formation. EPA fails to recognize that the primary problem with oil firing is the formation of ammonium bisulfate and resultant corrosion of the low-pressure steam boiler tubes in the heat recovery steam generator (HRSG). These tubes are located after the catalyst and in the temperature range for ammonium sulfate formation (see Attachment A). Even if no additional SO_3 was formed in the catalyst, there would be sufficient SO_3 formed in the combustion turbine to promote the formation of ammonium bisulfate. The manufacturer supplying the combustion turbines for the Lauderdale Repowering Project has estimated that about 8 percent of the SO_2 will be converted to SO_3 or H_2SO_4 (these have been quantified as H_2SO_4 in the Air Permit Application, SCA Appendix 10.1.5, Table A-3). Even without any additional SO_3 formation in the catalyst, as much as 128 lb/hr/HRSG of ammonium bisulfate could be formed and potentially deposited in the back end of the HRSG (assuming all H_2SO_4 is converted to ammonium bisulfate). If only half of the sulfate in the combustion turbine exhaust gas was converted to ammonium bisulfate, it would amount to 64 lb/hr/HRSG.

EPA incorrectly assumes that the Lauderdale Repowering Project is designed for using No. 2 fuel oil only as a backup fuel. The Lauderdale Repowering Project is being designed for full-load operation on either natural gas or No. 2 fuel oil (see Section 3.3.1 in the SCA). Unlike the cogeneration projects which have accepted SCR in permit conditions, the repowered units must be capable of using fuel oil, regardless of the natural gas availability, at any time to meet electrical demands of the FPL system. In contrast, cogenerators (i.e., qualifying facilities) can simply stop power production. In fact, many of the facilities permitted with SCR limit the hours of oil operation and, in some cases, have considerably higher NO_x limits when burning oil (e.g., the Ocean State Power permit allows the SCR to be bypassed during oil operation, and oil operation is limited to 1,200 hours per year).

EPA's inference that the Japanese and European experience with SCR on oil- and coal-fired power plants is directly applicable to combined cycle plant is not totally valid. As stated above, the principal problem for combined cycle plants is the corrosion in the back end of the HRSG when firing oil. For coal- and oil-fired power plants, the SCR is placed after the last steam tube bundle, i.e. the economizer. Thus, there are no boiler tubes to corrode. In addition, the gas flow rates for a combined cycle power plant are higher by a factor of at least two compared to a similar sized oil- and coal-fired steam electric power plant.

<u>ECONOMIC IMPACTS</u>

EPA suggests that the analysis does not provide the total cost per ton of NO_x removed. The cost effectiveness for SCR is the total costs for achieving this level of NO_x control for natural gas firing. The base level of control for the advanced machine being purchased is 42 ppmvd and 65 ppmvd (both corrected to 15-percent oxygen) for natural gas and oil firing, respectively. Steam injection is integral to the combustor design for both power production and NO_x control. This advanced machine has not been constructed or operated at any higher levels on NO_x control in the United States. Indeed, the machine being purchased is the first machine being manufactured for installation in the United States. Therefore, the costs provided in the Air Permit Application are the total costs for NO_x control.

ENVIRONMENTAL IMPACTS

The primary EPA comment on environmental impacts was related to catalyst disposal. Until nonhazardous material catalyst systems are developed and demonstrated, the potential environmental impacts of disposing of hazardous material catalysts must be considered in the BACT analysis. Furthermore, EPA fails to mention that other environmental impacts must be considered by its own regulations, guidelines, and policy. FDER rules also require consideration of environmental impacts in determining BACT on a case-by-case basis.

As presented in the Air Permit Application (Appendix 10.1.5 in the SCA), the Lauderdale Repowering Project will involve removing two existing steam units and replacing them with four CT/HRSG combinations. The overall environmental benefits of such a project must be considered in the BACT analysis. In fact, there will be lower potential NO_x emissions with the Repowering Project than without it; 6,640 TPY of NO_x from the existing Units 4 and 5 compared to 5,954 TPY from the repowered units. Moreover, the maximum potential air quality impacts due to the Repowering Project were estimated to be insignificant for NO_2. The maximum predicted annual NO_2 concentration caused by the Lauderdale Repowering Project is 2.3 $\mu g/m^3$. When emission reductions from the existing Units 4 and 5 are considered, the predicted impact is 0.9 $\mu g/m^3$ (see Table 5.6-1 in the SCA). In terms of the prevention of significant deterioration (PSD) increment and ambient air quality standards (AAQS), the maximum predicted NO_2 impact is less than 4 percent of the PSD increment and 1 percent of the AAQS.

FDER must also consider the additional PM and PM10 emissions caused by the formation of ammonium sulfate and ammonium bisulfate. If only the sulfate formed during the combustion process was converted to ammonium sulfate or ammonium bisulfate, the PM/PM10 emissions would increase by 128 to

144 lb/hr/CT or from 1,805 to 2,037 TPY for the project. This emission increase is more than 2 times the maximum estimated PM/PM10 emissions that are presented in the Air Permit Application (see Table 2-2).

ENERGY IMPACTS

EPA comments that the energy impacts would not put a strain on the local energy supply or appear to be typical of plant energy usage. EPA does not support these statements with any factual data.

The energy impacts of operating SCR on the Lauderdale Repowering Project were presented in detail in Section 4.3.1.4 of the Air Permit Application. While the energy impacts are not a large percentage of the total capacity of the plant, the energy impacts are significant in and of themselves. As stated in the application, the energy penalty will be 0.58 percent, or about 4.3 MW. This is equivalent to a generation loss of 32,009,004 kWh. Adding the energy usage for the SCR, the generation loss could have served 3,200 residential customers. This lost energy would have to be replaced by other less efficient plants. In addition, annual natural gas usage would increase by 325,900,000 cubic feet.

As stated previously, the Lauderdale Repowering Project is replacing existing, less efficient steam generating units. The overall energy benefit of the project should be considered in making the case-by-case BACT determination. For the Lauderdale Repowering Project, the chemical-to-electrical energy conversion will be 7.9 million Btu per MWH generated. In contrast, the existing units' energy conversion is 12.5 million Btu per MWH generated. This efficiency directly translates to significantly lower emissions for the energy produced by the Lauderdale Repowering Project. The NO_x emissions for the repowered units will be 6.6 TPY per MW of installed generating capacity, whereas the existing units are currently emitting 24 TPY per MW of installed generating capacity. Thus, the repowered units will emit almost 4 times less than the existing units for each MW produced.

CONCLUSION

The EPA comments do not support the installation and operation of SCR on the Lauderdale Repowering Project. The information contained in the Air Permit Application supports the proposed emission limits by rejecting the additional control technology based on project-specific technical feasibility and environmental, economic, and energy impacts. It is clear from EPA regulations, guidelines, and policy and FDER regulations that such factors must be considered (see Attachment B which summarizes these requirements). When these factors are taken into account, it must be concluded that the BACT emission levels proposed by the applicant for the Lauderdale Repowering Project are appropriate and reasonable.

ATTACHMENT A

SUPPLEMENT INFORMATION ON SCR OPERATION

<u>EFFECTS OF SULFUR-BEARING FUELS ON SCR SYSTEM OPERATION</u>

Sulfur contained in fuel will oxidize during combustion to form SO_2 and SO_3. In the SCR reactor, SO_3 will react with water and ammonia to form ammonium bisulfate, NH_4HSO_4, and ammonium sulfate, $(NH_4)_2SO_4$. The formation of ammonium bisulfate will lead to the rapid fouling and corrosion of the HRSG. Both compounds will result in high levels of PM10 emissions.

Ammonium bisulfate is an extremely corrosive and sticky substance that forms in the low-temperature portion of the HRSG where it deposits on the walls and heat transfer surfaces downstream. The deposits on the tube surfaces cause increased pressure drop with reduced power output and lower cycle efficiency. More importantly, the unit must be shut down and water-washed (to prevent corrosion damage), resulting in lower availability. Ammonium sulfate is not corrosive, but its formation will also contribute to plugging of the heat transfer system, leading to reduced efficiency and also contributing to higher particulate emissions.

The formation of ammonium bisulfate and sulfate downstream of the SCR reactor is a complex function of gas composition and temperature. This problem was evaluated in a study recently conducted by Exxon for General Electric Company. The results of Exxon's calculations are shown in Figures EPA-1 and EPA-2. Both calculations used an exhaust gas composition based on firing 0.2-percent sulfur distillate oil. In Figure EPA-1, the unreacted ammonia leaving the SCR was assumed to be 6.5 ppm, and in Figure EPA-2 it was 13 ppm. In Figure EPA-1, ammonium bisulfate begins to form at temperatures below 380°F; and below 360°F, ammonium sulfate forms as well. By the time the gas reaches 260°F, all of the sulfur present as either SO_3 or as H_2SO_4 has reacted, consuming all of the excess ammonia as well. Figure EPA-2 shows that at the higher level of unreacted ammonia,

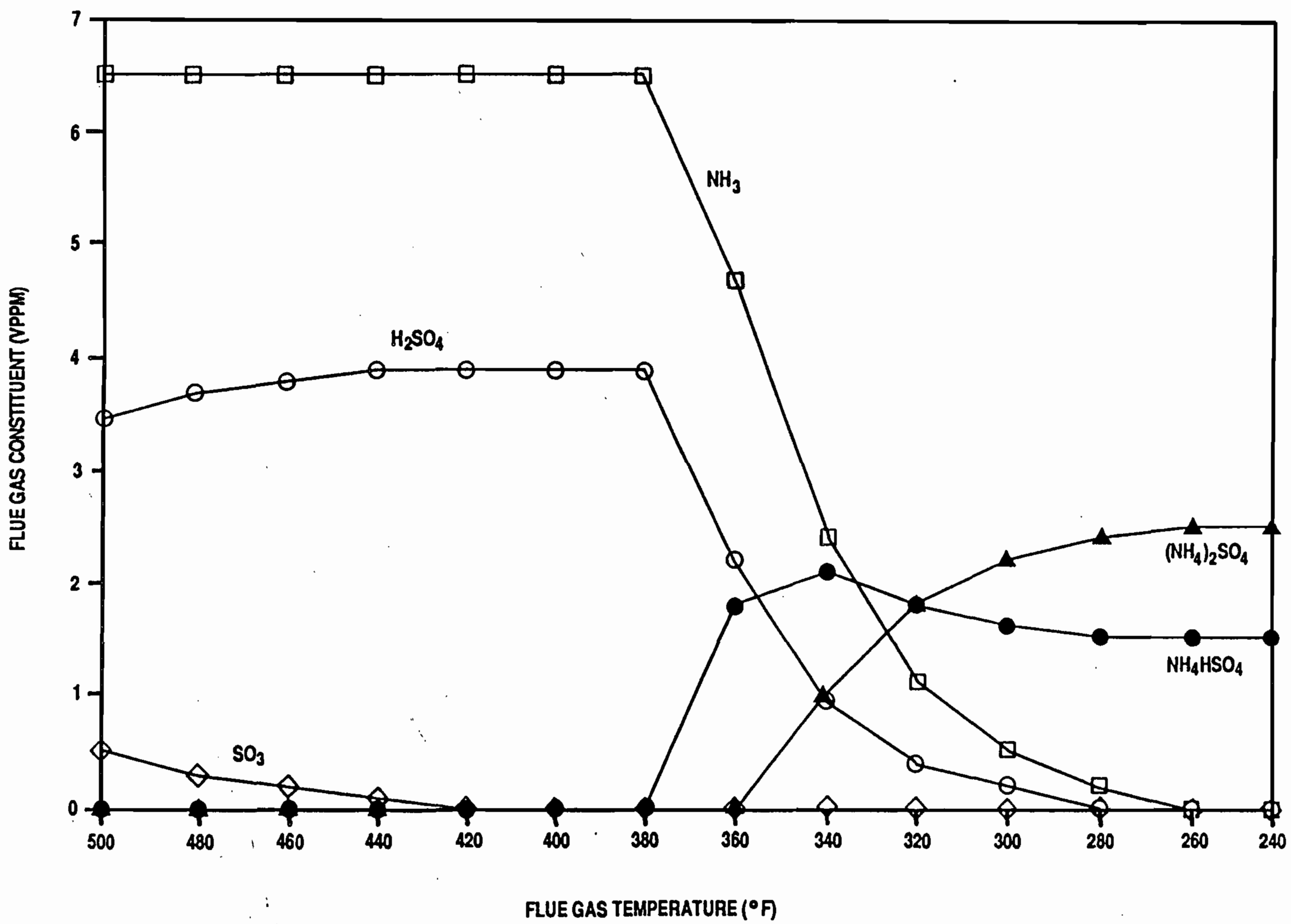

Figure EPA-1

FLUE GAS EQUILIBRIUM COMPOSITIONS - GAS NO. 2

Lauderdale Repowering Project

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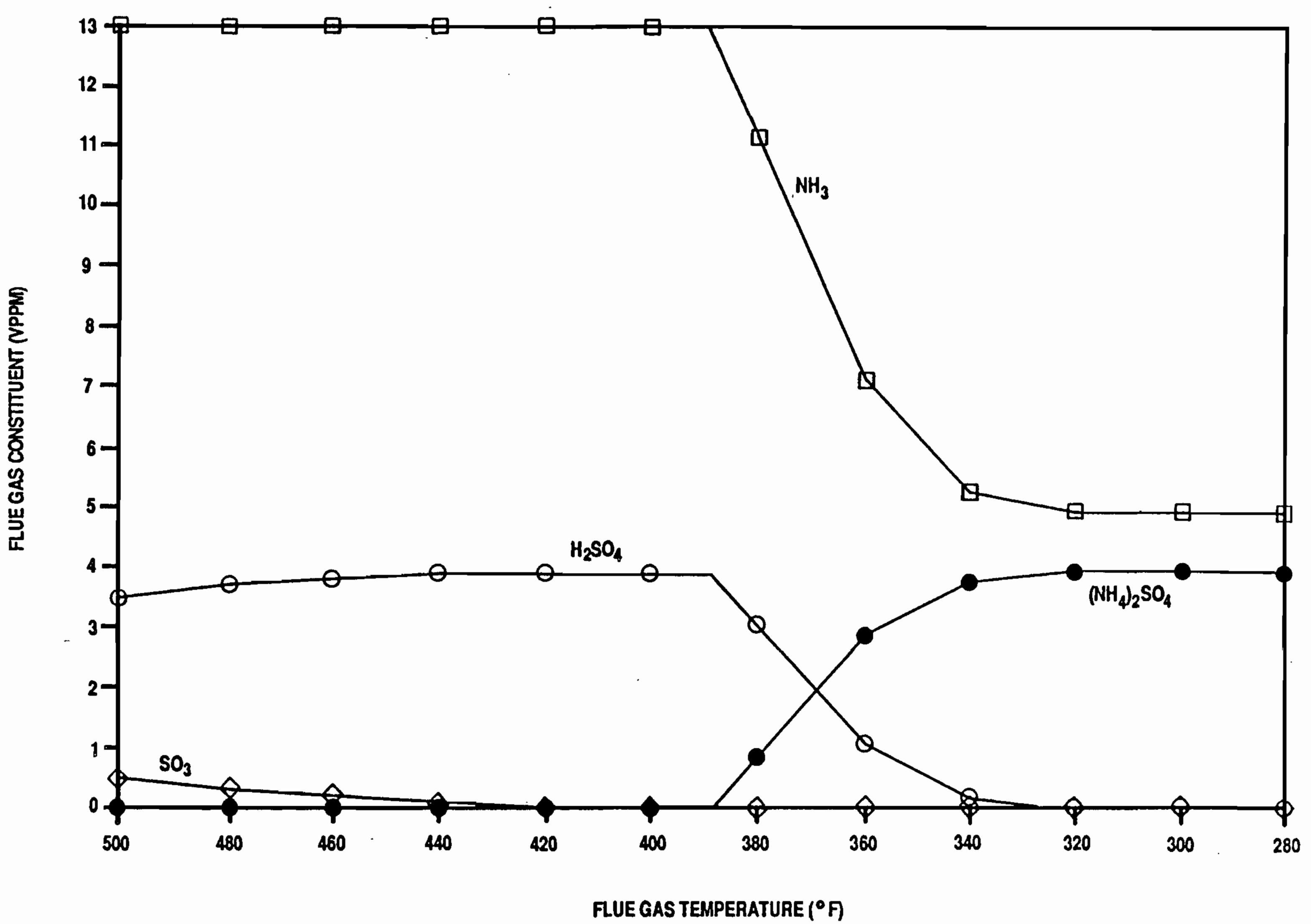

Figure EPA-2

FLUE GAS EQUILIBRIUM COMPOSITIONS - GAS NO. 1

Lauderdale Repowering Project

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only ammonium sulfate forms but excess ammonia in the stack gases would be 5 ppm.

The Exxon study was intended to illustrate that the formation of ammonium bisulfate is a complex function of the gas chemistry and temperature. These types of calculations are necessary but impractical on a real-time basis, and thus control of ammonium bisulfate over the full range of the Lauderdale Repowering Project operating conditions is not practical.

The acidic nature of ammonium bisulfate is shown in Figure EPA-3, which was developed from published disassociation constants but not corrected for ionic strength. Under the conditions that would occur in the HRSG, ammonium bisulfate would be highly concentrated and exhibit a pH of about 1. Figure EPA-4 presents similar data for ammonium sulfate. As shown in this figure, ammonium sulfate is as acidic but considerably less acidic than ammonium bisulfate.

The only effective means for limiting the formation of ammonium bisulfate is to limit the sulfur content of fuel. Pipeline-quality natural gas has negligible sulfur content. However, the lowest sulfur content of the distillate oil available to the Lauderdale Repowering Project is not low enough to prevent formation of ammonium bisulfate.

A further problem for SCR operation associated with firing sulfur-bearing fuels is the formation of particulate matter in the SCR. For the example shown in Figures EPA-1 and EPA-2, the sulfate particulates would increase the PM10 emissions by 49 and 55 lb/hr for each gas turbine, respectively.

In summary, there are two severe problems associated with the firing of fuels containing sulfur in a combustion turbine system with an SCR. First, a highly corrosive substance tends to form which rapidly deteriorates the system leading to reduced power generation efficiency and high maintenance costs. Second, measures taken to prevent formation of corrosives will lead

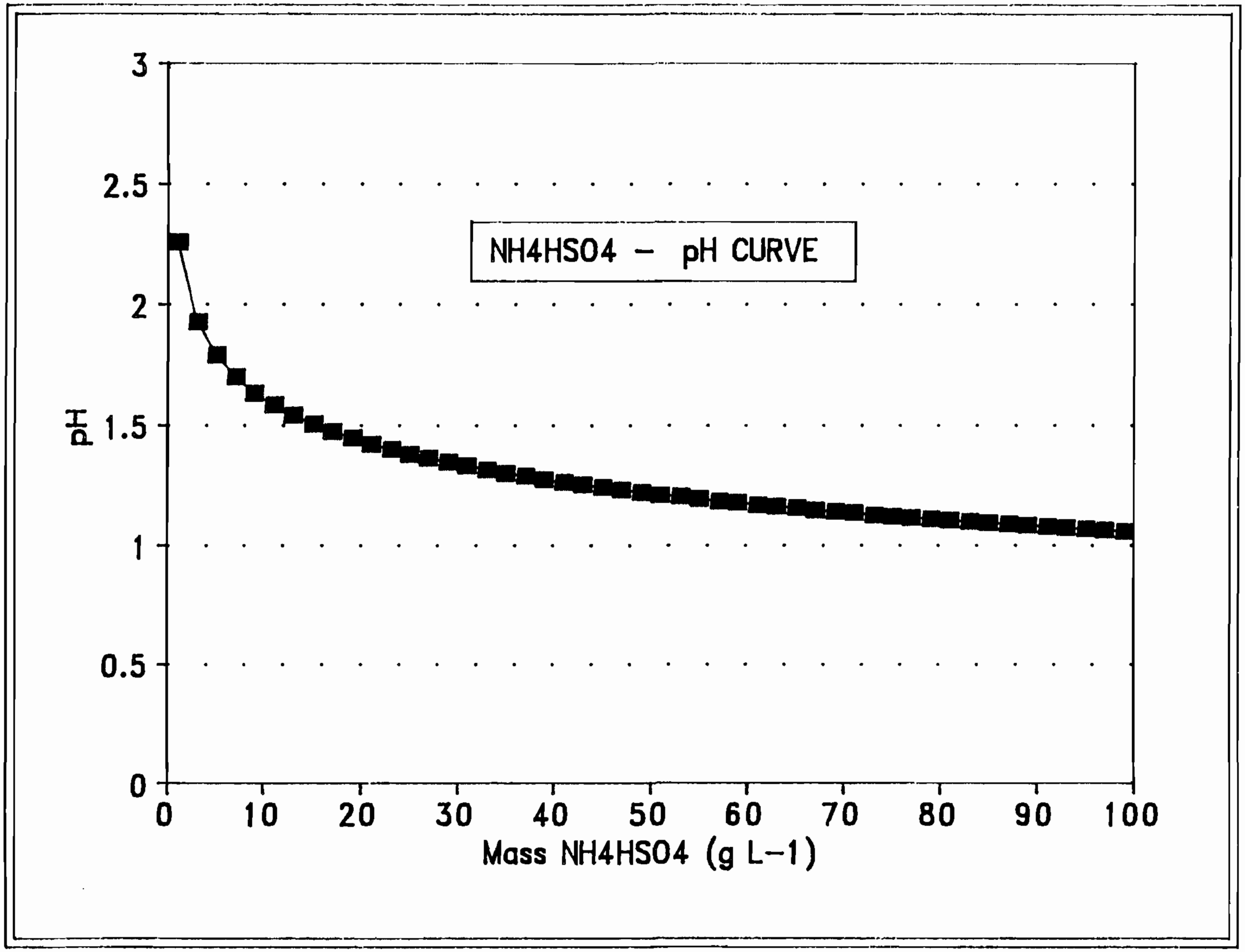

Figure EPA-3
pH OF AMMONIUM BISULFATE AS A FUNCTION OF CONCENTRATION IN WATER

Lauderdale Repowering Project

FPL

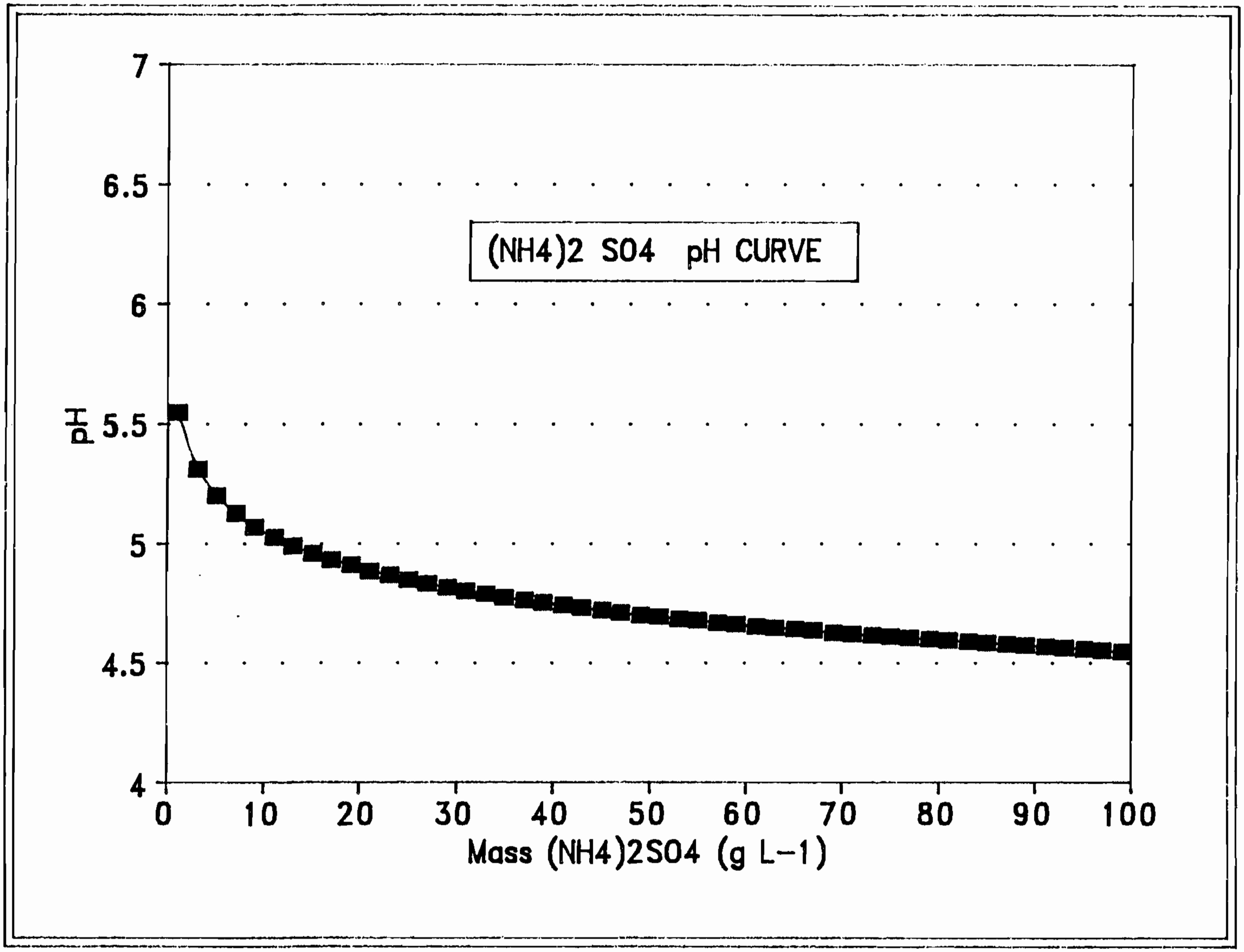

Figure EPA-4
pH OF AMMONIUM SULFATE AS A FUNCTION OF CONCENTRATION IN WATER

Lauderdale Repowering Project

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to higher emissions of either NO_2 or NH_3 and the PM10 emissions will be higher by a factor of 5 or 6.

OPERATING EXPERIENCE

Combustion turbine operating experience with SCR in the United States has been limited to natural gas firing, except in one case, the United Airlines unit, which is discussed below. There are several facilities which have been licensed to operate using liquid fuel as a backup fuel; in all but the one case, however, those facilities have been permitted to shut down the SCR system during the periods that oil firing takes place, or they have simply never fired oil at all. As an example, in California, out of 41 permitted SCRs, only 11 have been licensed to fire oil as a backup fuel. Of those 11, only 3 are now in operation, and only one (United Airlines) has ever fired oil.

The only SCR-controlled combustion turbine system to have fired oil is the United Airlines cogeneration plant at the San Francisco, California, airport. This plant, which is required to meet a NO_2 limit of 16 ppmvd using SCR, is fired on natural gas with Jet-A fuel as a backup. Jet-A fuel has a much lower sulfur content (i.e., 0.05 percent) and ash content, and is much more expensive and less available that distillate oil. The plant experienced a number of problems in its operations. During the first year of operation, the catalyst failed and was replaced three times. The cause of the catalyst failure was attributed both to poisoning of the catalyst by ammonium bisulfate and to gas pressure surges caused by automatic switching to jet fuel. The operators of the facility have stated that they will no longer operate the system on liquid fuel.

The only other combustion turbine facility with SCR known to have fired liquid fuel is the Japanese National Railways (JNR) Kawasaki Power Station Unit No. 1 in Tokyo, Japan. This unit, a GE Frame 98 system, has operated successfully on liquid fuel for over 40,000 hours. The NO_x emission limit for this unit, however, is 25 ppmvd, which is higher than the 9/13 ppmvd limit which has been applied to other combined cycle facilities. In addition, it should be noted that the JNR system differs from the proposed Lauderdale Repowering Project system in the following important ways.

The JNR system is fired with kerosene. Kerosene is lighter, costlier, and contains a lower level of sulfur that the lowest-sulfur distillate oil available to the Lauderdale Repowering Project. In the United States, sulfur levels in kerosene are on the order of 0.04 percent, compared to the average 0.3 percent for distillate oil. Sulfur levels in Japanese kerosene are unknown.

As an overseas facility, the JNR system is subject to an entirely different set of regulatory and economic conditions than the Lauderdale Repowering Project facility. For example, in terms of regulatory restrictions, the JNR facility is required to limit NO_x with its SCR to 25 ppmvd.

In addition, JNR is not required to limit ammonia slip as the Lauderdale Repowering Project would, and it is unknown whether JNR is required to limit CO or particulate emissions, as the Lauderdale Repowering Project would. In terms of economic restrictions, it should be noted that JNR is a quasi-government-owned firm and is therefore likely to be subject to much lower economic constraints than the Lauderdale Repowering Project facility. (Note: at the time the facility was built, JNR was a government-run firm; more recently, some "privatization" of the firm has occurred.)

Finally, the JNR system is operated much differently than the proposed Lauderdale Repowering Project system. The JNR system operates 14 to 16 hours per day, 6 days per week to supply electric power for railway operation in a metropolitan area. The unit is shut down at night and restarted in the morning. When in operation, the system is fired at one level continuously (i.e., it is not operated at varying load levels). In contrast, the Lauderdale Repowering Project will be operated at varying load levels. Varying load levels result in changing temperatures at the SCR and the back end of the HRSG, which could cause formation of ammonium bisulfate, even at constant levels of ammonia and SO_2.

SCR manufacturers have stated that their systems have operated controlling oil and even coal-fired sources. SCR experience with oil and coal fuels has, however, been demonstrated only in conventional boiler plants where the SCR is not followed by heat transfer tubes which can be corroded by ammonium bisulfate. Conventional boilers also have much less variation in exhaust gas temperature than HRSGs, facilitating a design which will avoid formation of ammonium bisulfate. Nevertheless, regenerative air heaters in some of these plants have experienced severe deposition/plugging and corrosion problems.

In summary, therefore, there is no clear example of technically demonstrated SCR performance for control of an oil-fired combustion turbine system such as that proposed for the Lauderdale Repowering Project.

RISKS ASSOCIATED WITH CATALYST HANDLING AND DISPOSAL

Employment of an SCR would require the handling and disposal of spent catalyst materials. Spent catalyst materials typically contain a heavy metal oxide such as titanium or vanadium that can leach into groundwater. Recently, California agency officials declared that such materials should be considered hazardous. As such, the handling and disposal of spent catalyst would pose a certain level of risk to human health and the environment.

Many catalyst suppliers will agree to provide material removal and disposal services as part of their overall service contract. While this may remove an environmental problem for the Lauderdale Repowering Project, it does not eliminate the problem because hazardous materials will be handled at, and transported to and from, the site. Further, it should be noted that such contracts do not guarantee that such services can be provided for the lifespan of the facility. Either a change in the status of the catalyst supplier or a change in the regulations affecting such an activity could result in the burden of catalyst removal and disposal being placed upon the Lauderdale Repowering Project. For example, regulations are being developed in several states prohibiting or greatly restricting the importation or transportation of hazardous materials. Since Florida does not have a facility where spent SCR catalyst material may be disposed, the project would have no place in the state to send its spent catalyst.

Zeolite-coated ceramic catalysts (nonhazardous) have been installed and operated only on a limited basis to small gas turbines (i.e., less than about 5 MW; three in the United States) and internal combustion engines (1 in the United States). The applications in the United States are primarily on gas-fired facilities. This technology has not been demonstrated on large combustion turbines.

It is concluded, therefore, that handling and disposing of spent catalyst material constitutes an additional environmental impact that should be considered in the BACT decision.

ATTACHMENT B

SUMMARY OF REQUIREMENTS FOR MAKING A BACT DETERMINATION

The control technology review requirements of the federal and state PSD regulations require that all applicable federal and state emission-limiting standards be met and that best available control technology (BACT) be applied to control emissions from the source [Chapter 17-2.500(5)(c), F.A.C.]. The BACT requirements are applicable to all regulated pollutants for which the increase in emissions from the facility or modification exceeds the significant emission rate (see Table 500-2, Chapter 17-2, F.A.C.).

BACT is defined in Chapter 17-2.100(25), F.A.C., as:

> An emissions limitation, including a visible emission standard, based on the maximum degree of reduction of each pollutant emitted which the department, on a case by case basis, taking into account energy, environmental, and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques (including fuel cleaning or treatment or innovative fuel combustion techniques) for control of such pollutant. If the Department determines that technological or economic limitations on the application of measurement methodology to a particular part of a source or facility would make the imposition of an emission standard infeasible, a design, equipment, work practice, operational standard or combination thereof, may be prescribed instead to satisfy the requirement for the application of BACT. Such standard shall, to the degree possible, set forth the emissions reductions achievable by implementation of such design, equipment, work practice, or operation.

The requirements for BACT were promulgated within the framework of PSD in the 1977 amendments of the CAA [Public Law 95-95; Part C, Section 165(a)(4)]. The primary purpose of BACT is to optimize consumption of PSD air quality increments and thereby enlarge the potential for future economic growth without significantly degrading air quality (EPA, 1978; 1980). Guidelines for the evaluation of BACT can be found in EPA's Guidelines for Determining Best Available Control Technology (BACT), (EPA, 1978) and in the PSD Workshop Manual (EPA, 1980). These guidelines were promulgated by EPA to provide a consistent approach to BACT and to ensure that the impacts of alternative emission control systems are measured by the same set of parameters. In addition, through implementation of these guidelines, BACT in one area may not be identical to BACT in another area. According to EPA (1980):

> BACT analyses for the same types of emissions unit and the same pollutants in different locations or situations may determine that different control strategies should be applied to the different sites, depending on site-specific factors. Therefore, BACT analyses must be conducted on a case-by-case basis.

The BACT requirements are intended to ensure that the control systems incorporated in the design of a proposed facility reflect the latest in control technologies used in a particular industry and take into consideration existing and future air quality in the vicinity of the proposed facility. BACT must, as a minimum, demonstrate compliance with NSPS for a source (if applicable). An evaluation of the air pollution control techniques and systems, including a cost-benefit analysis of alternative control technologies capable of achieving a higher degree of emission reduction than the proposed control technology, is required. The cost-benefit analysis requires the documentation of the materials, energy, and economic penalties associated with the proposed and alternative control systems, as well as the environmental benefits derived from these systems. A decision on BACT is to be based on sound judgment, balancing environmental benefits with energy, economic, and other impacts (EPA, 1978).

More recently, EPA has recommended the use of the "top-down" approach as the appropriate procedure for determination of BACT. Notwithstanding the appropriateness of the top-down approach, EPA's overall policy has not substantially changed.

EPA guidance is clear concerning the top-down BACT approach. Specifically, EPA states in its June 13, 1989, Background Statement on the Top-Down Policy, regarding the factors of technical feasibility and economic, environmental, and energy impacts:

> ... the final weighing of those factors and the final BACT decision, are made by the permitting authority. Rejection of a control technology by a reviewing agency must have a rationale arrived at after full consideration of data determined in a consistent and sound manner. Such decisions may not be arbitrary, capricious, or contrary to law.

Further, in EPA's draft document entitled Top-Down Best Available Control Technology: A Summary (May 25, 1989), it is stated:

> However, when supported by a complete and objective review, technologies that can be demonstrated to be infeasible, unreasonable, or otherwise not achievable considering source-specific energy, economic, environmental, or technological reasons can be set aside.

Thus, in making a BACT determination, FDER must:

1. Consider project-specific technical feasibility, and environmental, economic, and energy impacts.
2. Provide consistent and sound rationale for the BACT determination for each of the pollutants;
3. Not arbitrarily reject the applicant's source-specific technical and economic data or use data from completely different projects; and
4. Make decisions that are neither capricious, arbitrary, or contrary to law.

FPL

Lauderdale Repowering Project

SITE CERTIFICATION APPLICATION

Responses to FDER Comments

FDER-1

<u>**Comment**</u>: Lack of verification of the quantity of natural gas fired in unit 5 (Table 2-11).

<u>**Response**</u>: Tables 2-10 and 2-11 were updated in Errata 1, which was distributed to all recipients of the SCA with a cover letter dated March 20, 1990.

FDER-2

Comment: Lack of historical data of actual VOC emissions/fuel usage for CTs (done for Units 4 and 5 in Tables 2-10, 2-11).

Response: Historical fuel usage and corresponding VOC emissions data for the Lauderdale Plant's gas turbines (GTs) 1-12 and 13-24 are presented in Table 2-10a. Historical data provide information about these units since they were constructed in the early 1970s.
Table 2-10 has been updated to include fuel usage for 1989 as well as providing corresponding VOC emissions for each year.

The maximum VOC emission rate for GTs 1-24 plus Units 4 and 5 was 54 TPY which occurred in 1973; maximum VOC emissions including breathing and working losses from tanks were 56.3 TPY. Indeed, for each of the last 10 years, the VOC emission rate from GTs 1-24 plus Units 4 and 5 has been less than 40 TPY in any year (see Table 2-10b). This emission level is considerably below the 100 TPY rate which designates a source as major based on potential emissions.

Inclusion of 1989 in the database for Units 4 and 5 necessitates changes in Tables 2-11 and 3-3 which use these data as creditable emission reductions.

Table 2-10. Hours of Operation and Fuel Usage for Lauderdale Units 4 and 5

Year	Unit 4 Operation (hours)	Unit 4 Natural Gas (10^6 ft^3)	Unit 4 No. 6 Fuel Oil (10^3 gal)	Unit 5 Operation (hours)	Unit 5 Natural Gas (10^6 ft^3)	Unit 5 No. 6 Fuel Oil (10^3 gal)	VOC Emissions (TPY)
1989	3,345	2,451	6,272	1,437	868	3,283	5.89
1988	1,623	1,279	3,460	2,317	1,937	3,948	5.02
1987	2,086	2,110	993	2,173	2,089	1,785	3.98
1986	1,615	1,857	0	2,113	2,356	468	3.12
1985	1,876	2,103	983	1,289	1,309	1,343	3.26
1984	1,724	938	6,268	1,574	818	5,498	5.62
1983	1,943	1,049	7,208	1,677	792	6,871	6.55
1982	1,899	1,611	3,397	2,587	1,957	5,481	6.81
1981	2,895	402	16,884	3,100	259	20,803	14.53
1980	4,376	2,161	20,301	4,208	1,788	21,098	18.22
1979	5,341	2,796	22,605	4,925	1,870	25,203	21.12
1978	4,871	1,937	20,983	6,461	4,046	20,849	19.81
1977	4,273	2,220	15,103	5,342	3,900	11,147	14.15
1976	5,821	2,958	18,766	7,360	4,991	18,472	19.47
1975	6,593	3,160	23,507	6,126	3,609	19,736	20.88
1974	6,669	2,756	29,413	6,576	2,367	31,794	26.44
1973	8,151	2,281	43,285	8,295	1,799	48,808	37.24
1972	8,764	5,979	36,036	7,311	4,434	32,928	33.04
1971	6,671	4,525	403	8,414	5,610	22,384	15.06
1970	8,449	6,015	18,358	8,681	6,769	328	15.92
1969	7,030	3,753	13,440	6,984	3,811	11,970	14.79
Average	4,572	2,588	14,651	4,712	2,737	14,962	14.78

Note: Calculations based on maximum heat input of Units 4 and 5 of 1,725 x 10^6 Btu/hr/unit; VOC emissions on natural gas and No. 6 fuel oil were based on AP-42, i.e., 1.4 lb/10^6 ft^3 of natural gas and 0.76 lb/10^3 gal of No. 6 fuel oil burned; heat content of natural gas and No. 6 fuel oil was 1,050 Btu/ft^3 and 152,625 Btu/gal, respectively.

10^6 ft^3 = million cubic feet.
10^3 gal = thousand gallons.
TPY = tons per year.

Table 2-10a. Hours of Operation, Fuel Usage, and VOC Emissions for Lauderdale GTs 1-24

	GTs 1-12			GTs 13-24			
Year	Operation (hours)	Natural Gas (10^6 ft^3)	No. 2 Fuel Oil (10^3 gal)	Operation (hours)	Natural Gas (10^6 ft^3)	No. 2 Fuel Oil (10^3 gal)	VOC Emissions (TPY)
1989	376	812	1795	501	1,097	3,144	3.85
1988	590	169	276	1,077	372	435	1.03
1987	714	265	82	3,159	1,256	702	2.78
1986	292	69	29	742	229	414	0.57
1985	861	296	283	1,704	555	534	1.59
1984	1,079	384	169	708	263	138	1.18
1983	834	281	375	519	188	265	0.89
1982	1,472	539	151	532	188	158	1.33
1981	299	488	1,323	487	1,080	1,418	3.04
1980	1,045	2,289	4,716	1,786	5,566	3,782	14.78
1979	1,216	2,760	3,354	1,650	3,273	7,953	11.77
1978	803	1,355	2,405	1,775	3,841	4,333	9.87
1977	480	861	1,817	1,104	2,534	4,176	6.59
1976	332	493	1,205	851	1,834	2,225	4.46
1975	893	1,156	7,296	455	421	3,727	3.80
1974	986	4,872	1,735	525	3,984	586	16.01
1973	1,471	2,763	5,032	2,242	6,064	6,338	16.77
1972	2,094	1,841	719	2,139	4,440	505	11.32
1971	2,103	4,910	360	0	0	0	8.80
1970	1,335	3,708	0	0	0	0	6.62
Average	964	1,516	1,656	1,220	2,066	2,269	6.34

Note: Calculations based on a maximum heat input for GTs of 702 x 10^6 Btu/hr/GT; VOC emissions on natural gas and No. 2 fuel oil determined from test to be 0.0034 and 0.0013 lb/10^6 Btu, respectively; heat content of natural gas end No. 2 fuel oil was 1,050 Btu/ft^3 and 136,800 Btu/gal, respectively.

10^6 ft^3 =million cubic feet.
10^3 gal = thousand gallons.
TPY = tons per year.

Table 2-10b. Actual VOC Emissions for Lauderdale Units 4 and 5 and GTs 1-24

Year	Units 4 and 5 VOC Emissions (TPY)	GTs 1-24 VOC Emissions (TPY)	Total VOC Emissions[a] (TPY)
1989	5.89	3.85	9.74
1988	5.02	1.03	6.05
1987	3.98	2.78	6.76
1986	3.12	0.57	3.69
1985	3.26	1.59	4.85
1984	5.62	1.18	6.80
1983	6.55	0.89	7.44
1982	6.81	1.33	8.14
1981	14.53	3.04	17.57
1980	18.22	14.78	33.00
1979	21.12	11.77	32.89
1978	19.81	9.87	29.68
1977	14.15	6.59	20.74
1976	19.47	4.46	23.93
1975	20.88	3.80	24.68
1974	26.44	16.01	42.45
1973	37.24	16.77	54.01
1972	33.04	11.32	44.36
1971	15.06	8.80	23.86
1970	15.92	6.62	22.54
1969	14.79	0	14.79
Average	14.78	6.04	20.82

[a]Maximum actual VOC emissions from storage tanks during this period were 2.3 TPY which occurred in 1973.

Table 2-11. Actual Representative Emissions of Regulated Pollutants, Lauderdale Units 4 and 5

Parameter	Unit No. 4 Natural Gas	Unit No. 4 No. 6 Fuel Oil	Unit No. 5 Natural Gas	Unit No. 5 No. 6 Fuel Oil	Total
Natural Gas Burned (10^6 ft^3/yr)	2,588		2,737		
No. 6 Fuel Oil					
(gal/yr)		14,651,000		14,962,000	
(% sulfur)		0.964		0.964	
Emission Factor	lb/10^6 scf	lb/1,000 gal	lb/10^6 scf	lb/1,000 gal	
PM	3	12.64[a]	3	12.64[a]	
PM10	3	8.97[a]	3	8.97[a]	
Sulfur Dioxide	0.6	151.3[b]	0.6	151.3[b]	
Nitrogen Oxides	550	67	550	67	
Carbon Monoxide	40	5	40	5	
Volatile Organic Compounds (methane)	0.3	0.28	0.3	0.28	
(non-methane)	1.4	0.76	1.4	0.76	
Lead	Neg.	0.0042	Neg.	0.0042	
Fluoride	Neg.	0.052	Neg.	0.052	
Mercury	0.011	0.00048	0.011	0.00048	
Beryllium	Neg.	0.00063	Neg.	0.00063	
Arsenic	Neg.	0.0029	Neg.	0.0029	
Sulfuric Acid	Neg.	5.8	Neg.	5.8	
Emission Rate (TPY)					
PM	3.88	92.59	4.11	94.56	195.14
PM10	3.88	65.74	4.11	67.14	140.87
Sulfur Dioxide	0.776	1,108.70	0.821	1,132.23	2,242.53
Nitrogen Oxides	711.70	490.81	752.68	501.23	2,456.41
Carbon Monoxide	51.76	36.63	54.74	37.41	180.53
Volatile Organic Compounds (methane)	0.39	2.05	0.41	2.09	4.94
(non-methane)	1.81	5.57	1.92	5.69	14.98
Lead	Neg.	0.0308	Neg.	0.0314	0.0622
Fluoride	Neg.	0.381	Neg.	0.389	0.770
Mercury	0.0142	0.00352	0.01505	0.00359	0.03639
Beryllium	Neg.	0.00462	Neg.	0.00471	0.00933
Arsenic	Neg.	0.0212	Neg.	0.0217	0.0429
Sulfuric Acid	Neg.	42.49	Neg.	43.39	85.88

Note: 10^6 ft^3/yr = million cubic feet per year.
gal/yr = gallons per year.
lb/10^6 scf = pounds per million standard cubic feet.
Neg. = negligible.
TPY = tons per year.

[a] Based on equation: 10 S + 3, where S = sulfur content. PM10 is 71 percent of PM emissions.
[b] Based on equation: 157 S, where S = sulfur content.

Table 3-3. Net Increase in Emissions Due to the Lauderdale Repowering Project Compared to the PSD Significant Emission Rates

	Emissions (TPY)				
Pollutant	Potential Emissions From Proposed Units 4 & 5[a]	Reductions From Existing Units 4 & 5	Net Increase in Emissions	Significant Emission Rate	PSD Review
Sulfur Dioxide	12,142	2,243	9,899	40	Yes
Particulate Matter (TSP)	819	195	624	25	Yes
Particulate Matter (PM10)	819	141	678	15	Yes
Nitrogen Dioxide	5,954	2,456	3,498	40	Yes
Carbon Monoxide	1,871	181	1,690	100	Yes
Volatile Organic Compounds	114.9	15.0	99.9	NA	No[b]
Lead	0.21	0.062	0.15	0.6	No
Sulfuric Acid Mist	1,513	85.9	1,427	7	Yes
Total Fluorides	0.75	0.77	<0.1	3	No
Total Reduced Sulfur[c]	NEG	NEG	NEG	10	No
Reduced Sulfur Compounds[c]	NEG	NEG	NEG	10	No
Hydrogen Sulfide[c]	NEG	NEG	NEG	10	No
Asbestos[c]	NEG	NEG	NEG	0.007	No
Beryllium	0.058	0.0093	0.05	0.0004	Yes
Mercury	0.35	0.036	0.31	0.1	Yes
Vinyl Chloride[c]	NEG	NEG	NEG	1	No
Benzene[c]	NEG	NEG	NEG	0	No
Radionuclides[c]	NEG	NEG	NEG	0	No
Inorganic Arsenic	0.10	0.043	0.06	0	Yes

Note: NEG = Negligible.

[a]See Table 2-6.
[b]Nonattainment pollutant; PSD review does not apply.
[c]Emissions of these pollutants considered not to have any emission rate increase.

FDER-7

FDER-3

<u>Comment</u>: Will the proposed fuel/heat input restrictions on the CTs and repowered units 4 and 5 be temporary in nature, or will they be permanent?

<u>Response</u>: It is the intent of FPL that the proposed fuel/heat input restrictions would be permanent unless the certification or construction permits are modified.

FDER-4

Comment: Explain the compliance verification procedure to be used to demonstrate daily or weekly compliance with the restriction mentioned in 3 above, which will be based on 75°F ambient conditions.

Response: Compliance with annual limits will be determined each year based on annual fuel usage of natural gas and No. 2 fuel. These limits will be demonstrated by submitting to FDER end-year fuel usage, heat input, and VOC emissions tabulated monthly. Progress toward compliance will be available for FDER inspection monthly. These monthly records will be developed from daily fuel use logs recorded by the plant.

The requested annual VOC emission limitation for the repowered units is the sum of all VOC emissions based on natural gas and oil firing in the CTs and natural gas firing in the HRSGs. In equation form, the emission limitation is:

$$(HI_{CTNG} \cdot VOC_{CTNG}/MAHI_{CTNG}) + (HI_{HRSGNG} \cdot VOC_{HRSGNG}/MAHI_{HRSGNG}) + (HI_{CTOIL} \cdot VOC_{CTOIL}/MAHI_{CTOIL}) \leq 110.1 \text{ TPY}$$

where: HI_{CTNG} = actual annual heat input (Btu) of all CTs with natural gas firing

VOC_{CTNG} = maximum annual potential VOC emissions of CTs when firing natural gas; this value is 22.3 TPY for four CTs (5.58 TPY/CT • 4 CTs)

$MAHI_{CTNG}$ = maximum annual potential heat input (Btu) of all CTs when firing natural gas; this value is 59.04×10^{12} Btu ($1,685 \times 10^6$ Btu/hr/CT • 4 CTs x 8,760 hr/yr)

HI_{HRSGNG} = annual heat input (Btu) of all HRSGs with natural gas firing

VOC_{HRSGNG} = maximum annual potential VOC emissions of HRSG when firing natural gas; this value is 35.0 TPY for four HRSGs (8.76 TPY/HRSG • 4 HRSGs)

$MAHI_{HRSGNG}$ = maximum annual potential heat input (Btu) of all HRSGs when firing natural gas; this value is 3.18×10^{12} Btu (90.72×10^{6} Btu/hr/HRSG • 4 HRSGs x 8,760 hr/yr

HI_{CTOIL} = annual heat input (Btu) of all CTs with oil firing

VOC_{CTOIL} = maximum annual potential VOC emissions of CT when firing oil; this value is 136.8 TPY (34.2 TPY/CT • 4 CTs)

$MAHI_{CTOIL}$ = maximum annual potential heat input (Btu) of all CTs when firing oil; this value is 57.7×10^{12} Btu ($1{,}646.9 \times 10^{6}$ Btu/hr/CT • 4 CTs x 8,760 hr/yr)

With appropriate units included in the above equation, the emission limitation is:

$$(HI_{CTNG} \cdot 22.3/59.04 \times 10^{12}) + (HI_{HRSGNG} \cdot 35/3.18 \times 10^{12}) + (HI_{CTOIL} \cdot 136.8/57.7 \times 10^{12}) \leq 110.1$$

where: HI_{CTNG} = annual heat input of CTs with natural gas firing (Btu)

HI_{HRSGNG} = annual heat input of HRSG duct burners with natural gas firing (Btu)

HI_{CTOIL} = annual heat input of CTs with No. 2 fuel oil firing (Btu)

The value 110.1 represents a limit of 99.9 TPY, plus creditable emission decreases from Units 4 and 5 of 15 TPY and subtracting net tank emissions (13.9 - 9.1 = 4.8 TPY). The calculation is as follows: 99.9 TPY + 15 TPY - 4.8 TPY = 110.1 TPY. The discussion of tank VOC emissions and appropriate limitations is presented in changes to

Pages 2-8 through 2-20 of the Air Permit Application (Volume 2 of the SCA).

Initial VOC emission rates for the repowered units will be validated through the initial compliance test using EPA Method 25A. This will provide assurance that the emission factors used are appropriate for calculating VOC emissions. VOC emissions will be calculated monthly based on heat input at 75°F as the base condition. Since heat input to the CTs changes concomitantly with ambient temperature, a base temperature of 75°F (the average annual temperature in Fort Lauderdale) is proposed for calculating annual emissions.

Section 3.4.2 of the Air Permit Application (Volume 2 of the SCA) has been revised to be consistent with this response.

Lowest exhaust gas volumetric flow from the repowered units occurs under 95°F operation. Since this condition results in the lowest plume rise of the exhaust gases and potentially higher impacts than the maximum emission rate case (40°F), stack data for this case were used in the air quality impact analysis.

The CTs will be subject to federal New Source Performance Standards (NSPS) for gas turbines. The NSPS, described in Section 4.2, limit emissions of sulfur dioxide and nitrogen oxides.

Prior to Repowering Units 4 and 5, the existing 150,000-barrel (bbl) tank (Tank No. 3), which was used for No. 6 fuel oil storage, will be converted for storage of No. 2 fuel oil. Tank No. 4, a 55,000-bbl tank which currently is used to store No. 2 fuel oil for the GTs, will be removed. Two other existing tanks with capacities of 80,000 and 75,000 bbl will continue to be used for No. 6 and No. 2 fuel oil storage, respectively. These tanks are identified as Tanks No. 2 and No. 5, respectively. Table 2-5 presents the maximum estimated emissions of volatile organic compounds (VOCs) from these storage tanks; VOCs are the only pollutant emitted by working and breathing vapor losses.

After repowering, Tank No. 2 will be converted from using No. 6 fuel oil to using No. 2 fuel oil. Tanks No. 2, 3, and 5 will be interconnected and used for No. 2 fuel oil for the Repowered Units and GTs 1-24. The potential increase in VOC emissions before and after repowering is 4.8 tons/year (TPY) (13.9 TPY from Table 2-5a minus 9.1 TPY from Table 2-5).

Table 2-6 presents a summary of the maximum potential air emissions from the repowering project. Emission rates in TPY are shown for four CTs, four HRSGs, the storage tank, and the total for both repowered Units 4 and 5. The total CT emissions for all pollutants except VOCs are based on full load operating conditions at 75°F ambient

Table 2-5. Maximum Emissions of VOCs From Storage Tanks Before Repowering Units 4 and 5

Description	No. 3 Tank New[a]	No. 3 Tank Old[b]	No. 2 Tank Potential[c]	No. 4 Tank Removed[d]	No. 5 Tank Potential[e]
Type of Liquid Stored	No. 2 Fuel Oil	No. 6 Fuel Oil	No. 6 Fuel Oil	No. 2 Fuel Oil	No. 2 Fuel Oil
Tank Volume (gallons)	6,300,000	6,300,000	3,360,000	2,310,000	3,150,000
Total Annual Throughput (gallons)	715,834,178	19,751,871	201,339,440	1,656,000	357,380,482
Turnovers Per Year	113.6	3.1	59.9	0.72	113.45
Molecular Weight of Vapor	130.0	190.0	130.0	130.0	130.0
Storage Temperature (°F)	75.0	75.0	75.0	75.0	75.0
Vapor Pressure at Storage Temperature (psia)	0.0105	0.0001	0.0001	0.0105	0.0105
Tank Diameter (ft)	150.0	150.0	120.0	100.0	120.0
Average Vapor Space Height (ft)	24.0	24.0	20.0	20.0	19.0
Average Diurnal Temperature Change (°F)	20.0	20.0	20.0	20.0	20.0
Paint Factor	1.33	1.33	1.33	1.33	1.33
Product Factor	1.0	1.0	1.0	1.0	1.0
Turnover Factor	0.4	1.0	0.6	1.0	0.4
Breathing Losses (lb/yr)	3,730.9	189.3	80.2	1,685.7	2,251.2
(TPY)	1.9	0.09	0.04	0.8	1.1
Working Losses (lb/yr)	11,725.4	6.8	28.3	54.3	4,683.1
(TPY)	4.7	0.0034	0.01	0.0	2.3
Total Emissions (TPY)	6.56	-0.10	0.05	-0.87	3.47

[a] Assumes 66.7 percent of the potential No. 2 fuel oil usage required for GTs 1-24.
[b] Creditable emission decrease for ceasing No. 6 fuel oil use; assumes 66.7 percent of the 1969 through 1989 average fuel usage for Units 4 and 5 (see Table 2-10).
[c] Potential emissions for No. 6 fuel oil use for Units 4 and 5 prior to repowering.
[d] Creditable emission decrease for removing Tank No. 4; annual throughput is the 1970 through 1989 average for GTs 1-12 which are located adjacent to the tank.
[e] Assumes 33.3 percent of the potential No. 2 fuel oil usage required for GTs 1-24.

Table 2-5a. Maximum Emissions of VOCs From Storage Tanks After Repowering Units 4 and 5

Description	No. 3 Tank Potential[a]	No. 2 Tank Potential[b]	No. 5 Tank Potential[b]	No. 2 Tank Old[c]
Type of Liquid Stored	No. 2 Fuel Oil	No. 2 Fuel Oil	No. 2 Fuel Oil	No. 6 Fuel Oil
Tank Volume (gallons)	6,300,000	3,360,000	3,150,000	3,360,000
Total Annual Throughput (gallons)	746,090,320	373,045,160	373,045,160	9,861,129
Turnovers Per Year	118.4	111.0	118.43	2.9
Molecular Weight of Vapor	130.0	130.0	130.0	130.0
Storage Temperature (°F)	75.0	75.0	75.0	75.0
Vapor Pressure at Storage Temperature (psia)	0.0105	0.0105	0.0105	0.0001
Tank Diameter (ft)	150.0	120.0	120.0	120.0
Average Vapor Space Height (ft)	24.0	20.0	19.0	20.0
Average Diurnal Temperature Change (°F)	20.0	20.0	20.0	20.0
Paint Factor	1.33	1.33	1.33	1.33
Product Factor	1.0	1.0	1.0	1.0
Turnover Factor	0.4	0.4	0.4	0.4
Breathing Losses (lb/yr)	3,730.9	2,310.8	2,251.2	80.2
(TPY)	1.9	1.2	1.1	0.04
Working Losses (lb/yr)	9,776.8	4,888.4	4,888.4	2.3
(TPY)	4.9	2.4	2.4	<0.01
Total Emissions (TPY)	6.75	3.60	3.57	-0.04

[a] Assumes tank handles 50 percent of all the potential No. 2 fuel oil use for the repowered Units 4 and 5 and GTs 1-24.
[b] Assumes tank handles 25 percent of all the potential No. 2 fuel oil use for the repowered Units 4 and 5 and GTs 1-24.
[c] Creditable emission decrease for converting No. 2 tank from No. 6 fuel oil to No. 2 fuel oil; the annual throughput is 0.333 percent of the 1969 through 1989 average fuel usage for Units 4 and 5.

Table 2-6. Summary of Maximum Average Regulated Air Emissions From the Lauderdale Repowering Project

Pollutant	Four CTs/HRSGs[a] (TPY)	Storage Tank (TPY)	Total[b] (TPY)
Particulate Matter[c]	818.5	NA	818.5
Sulfur Dioxide[c]	12,141.7	NA	12,141.7
Nitrogen Oxides[c]	5,954.4	NA	5,954.4
Carbon Monoxide[d]	1,870.8	NA	1,870.8
Volatile Organic Compounds[c]	110.1	4.8[e]	114.9
Lead[c]	0.21	NA	0.21
Arsenic[c]	0.098	NA	0.098
Beryllium[c]	0.058	NA	0.058
Mercury[d]	0.350	NA	0.350
Fluorides[c]	0.753	NA	0.753
Sulfuric Acid Mist[c]	1,513	NA	1,513

[a]HRSGs only fired with natural gas and when natural gas is fired in CT.
[b]Does not include creditable emission decreases for Units 4 and 5.
[c]Based on oil firing at 75°F ambient temperature and 80.5 percent capacity factor (operation at full load).
[d]Based on natural gas firing at 75°F ambient temperature and 100 percent capacity factor; includes emissions from HRSGs, i.e., 96.4 TPY for CO and 0.014 TPY for mercury.
[e]Net emissions increase from storage tanks [Maximum potential VOC emissions after repowering of 13.9 TPY (see Table 2-5a) minus maximum potential VOC emissions prior to repowering of 9.1 TPY (see Table 2-5)].

Note: NA = not applicable.
neg. = negligible.
TPY = tons per year.

temperature, the average annual temperature for the area. With the exception of mercury (Hg) emissions, maximum annual emissions of regulated pollutants will result from No. 2 fuel oil burning. Emissions from the HRSGs are not additive to the CT emissions in this table, except for mercury, since the duct burners will only be fired with natural gas.

The net increase in VOC emissions from storage tanks is based on the net emissions increase before (Table 2-5) and after repowering Table 2-5a).

VOC emissions from the repowered units will be limited by annual average heat input restrictions on firing No. 2 fuel oil and natural gas. The requested annual VOC emission limitation is:

$$(HI_{CTNG} \cdot 22.3/59.04 \times 10^{12}) + (HI_{HRSGNG} \cdot 35/3.18 \times 10^{12}) + (HI_{CTOIL} \cdot 136.8/57.7 \times 10^{12}) \leq 110.1$$

where: HI_{CTNG} = annual heat input of CTs with natural gas firing (Btu)

HI_{HRSGNG} = annual heat input of HRSG duct burners with natural gas firing (Btu)

HI_{CTOIL} = annual heat input of CTs with No. 2 fuel oil firing (Btu)

The value 110.1 represents a limit of 99.9 TPY, plus creditable emission decreases from Units 4 and 5 of 15 TPY and subtracting net tank emissions (13.9 - 9.1 = 4.8 TPY). The calculation is as follows: 99.9 TPY + 15 TPY - 4.8 TPY = 110.1 TPY.

Supplemental firing will only be performed using natural gas and only occur concurrent with natural gas firing in the CTs. The CT/HRSG heat input would be restricted based on the limitations presented in Table 2-7. These operating restrictions would limit the CTs to emit no more than 110.1 tons/year.

Table 2-7. Annual Heat Input Limitations for Repowered Units Turbine

	Natural Gas[a]				No.2 Fuel Oil			Total	
	Capacity Factor[b] (%)	Heat Input (10^9 Btu)	VOCs (TPY)		Capacity Factor[b] (%)	Heat Input (10^{12} Btu)	VOCs (TPY)	Capacity Factor[b] (%)	VOCs (TPY)
If the Capacity	0.0%	0.0	0.0	Then the Capacity	80.5%	46,454.5	110.1	80.5%	110.1
Factor and Associated	5.0%	2,970.4	2.9	Factor and Associated	78.4%	45,245.6	107.2	83.4%	110.1
Heat Input on	10.0%	5,940.8	5.7	Heat Input on	76.3%	44,036.8	104.4	86.3%	110.1
Natural Gas is	15.0%	8,911.1	8.6	No. 2 Fuel Oil can	74.2%	42,828.0	101.5	89.2%	110.1
equal to:	20.0%	11,881.5	11.5	be equal to or	72.1%	41,619.2	98.6	92.1%	110.1
	25.0%	14,851.9	14.3	less than:	70.0%	40,410.3	95.8	95.0%	110.1
	30.0%	17,822.3	17.2		67.9%	39,201.5	92.9	97.9%	110.1
	35.0%	20,792.6	20.1		65.0%	37,518.0	88.9	100.0%	109.0
	40.0%	23,763.0	22.9		60.0%	34,632.0	82.1	100.0%	105.0
	45.0%	26,733.4	25.8		55.0%	31,746.0	75.2	100.0%	101.0
	50.0%	29,703.8	28.7		50.0%	28,860.0	68.4	100.0%	97.1
	55.0%	32,674.1	31.5		45.0%	25,974.0	61.6	100.0%	93.1
	60.0%	35,644.5	34.4		40.0%	23,088.0	54.7	100.0%	89.1
	65.0%	38,614.9	37.2		35.0%	20,202.0	47.9	100.0%	85.1
	70.0%	41,585.3	40.1		30.0%	17,316.0	41.0	100.0%	81.2
	75.0%	44,555.6	43.0		25.0%	14,430.0	34.2	100.0%	77.2
	80.0%	47,526.0	45.8		20.0%	11,544.0	27.4	100.0%	73.2
	85.0%	50,496.4	48.7		15.0%	8,658.0	20.5	100.0%	69.2
	90.0%	53,466.8	51.6		10.0%	5,772.0	13.7	100.0%	65.3
	95.0%	56,437.1	54.4		5.0%	2,886.0	6.8	100.0%	61.3
	100.0%	59,407.5	57.3		0.0%	0.0	0.0	100.0%	57.3

[a]Natural gas firing includes both CT and supplemental firing; the ammount of supplemental firing is proportional to CT capacity factor.
[b]Capacity Factor in this context is the percent of full load operation at 75°F ambient conditions.

Fuel specifications for natural gas and distillate oil for the Lauderdale Repowering Project are presented in Tables 2-8 and 2-9.

2.3 EXISTING UNITS 4 AND 5

The existing Units 4 and 5 fossil-fuel-fired steam generating units will be taken out of service prior to completion of the Repowering Project. Operation of these units has varied over their history to respond to electric demand. Without the repowering project, these units would be expected to be operated at levels higher than in recent years. These units have burned both natural gas and No. 6 fuel oil and do not have annual operating restrictions for either fuel. Because of the varied nature of operation, the last 2 years of fuel usage information is not representative of actual emissions for which the facility has previously emitted or has the potential to emit. Therefore, the last 20 years were considered as representative for calculating actual emissions. Presented in Table 2-10 are the hours of operation and quantities of fuel burned in each unit from 1969 to 1989. Actual representative air emissions from Units 4 and 5 were calculated on the basis of the average fuel usage. Emission factors were obtained from EPA publication AP-42 and other publications (see Appendix B for references). Operational limits for Units 4 and 5 have been requested to limit maximum potential VOC emissions to 99.9 TPY for the Lauderdale Plant. (See discussion in Section 2.4)

The emission factors and resulting emissions for all regulated pollutants are shown in Table 2-11. Sulfur dioxide emissions were determined using the actual sulfur content in No. 6 fuel oil for the last 2 years, which is representative of the quality of fuel used in these units. The average sulfur content during 1987 and 1988 was 0.964 percent.

Maximum operating parameters and maximum sulfur dioxide, particulate matter, and nitrogen oxides emissions associated with the existing Units 4 and 5 are presented in Table 2-12.

2.4 EXISTING GAS TURBINE UNITS 1 THROUGH 24

There are 24 identical GT peaking units currently operating at the Lauderdale Plant. These units are used for peaking purposes to meet load demands and operate intermittently. The units can operate on either natural gas or No. 2 fuel oil. Maximum operating parameters and air emission rates from these existing units are presented in Table 2-12.

The operation GTs and Units 4 and 5 will be limited so that the total potential VOC emissions plus that of their associated storage tanks (i.e., assuming maximum throughput from GTs 1 through 24 using Tanks No. 3 and 5 and maximum throughput for Units 4 and 5 on No. 6 fuel oil using Tank No. 2) will be less than 100 TPY. The maximum storage tank emissions are 9.1 TPY which results in a VOC limitation on the GTs and Units 4 and 5 of 90.9 TPY. The annual heat input limitations for the GTs are:

$$(HI_{GTNG} \cdot 251/14.8 \times 10^{13}) + (HI_{GTOIL} \cdot 95.9/14.8 \times 10^{13}) + (HI_{U4\&5NG} \cdot 20.1/3.02 \times 10^{13}) + (HI_{U4\&5OIL} \cdot 75.2/3.02 \times 10^{13}) \leq 90.9$$

where: HI_{GTNG} = annual heat input of GTs 1-24 with natural gas firing,

HI_{GTOIL} = annual heat input of GTs 1-24 with oil firing,

$HI_{U4\&5NG}$ = annual heat input of Units 4 and 5 with natural gas firing, and

$HI_{U4\&5OIL}$ = heat input of Units 4 and 5 with oil firing.

The value 90.9 represents TPY from the plant minus tank VOC emissions which have been estimated to be 9.1 TPY.

These limitations more accurately reflect the actual operating conditions of the GTs and Units 4 and 5. Since they began operation in the early 1970s, the actual average VOC emissions were 21.12 TPY.

All VOC emission calculations for the existing GTs were based on data developed from stack testing; AP-42 was used to develop VOC emissions for Units 4 and 5. The stack testing performed on the GTs consisted of performing Method 25A analyses and excluding all methane and ethane in the gas stream as allowed under Rule 17-2.100(223), F.A.C. The description of testing and the VOC calculations are presented in Appendix C.

2.5 SITE LAYOUT AND STRUCTURES

Site plans of the Lauderdale Plant, both before and after the repowering project is completed, are shown in Figures 2-2 and 2-3. The four new CTs and HRSGs will be located just east of the existing Units 4 and 5 steam generator buildings and steam turbine building. The Units 4 and 5 steam generator buildings and stacks will be dismantled upon retirement of the units. The locations of the existing gas turbine units (GT1-GT24) are also shown on the site plan. These locations will not change with the implementation of the repowering project.

A profile view of the environmental enclosure for the CTs, air inlet filters, HRSGs, and discharge stacks is presented in Figures 2-4 and 2-5. The principal structures associated with the facility are the environmental enclosure for the CTs (74.5 ft high), the HRSGs (61 ft high), and the stacks (150 ft high).

3.4.2 Nonattainment Review

An application for an FDER permit is being requested which would limit VOC emissions from the existing Lauderdale Plant to 99.9 TPY.

With this permit conditions, the potential emissions from the existing plant would be reduced by about 160 TPY, a 65 percent reduction. In addition, the facility would be a minor source of VOCs. Note that the actual emissions from the plant are substantially less than 100 TPY (see also Tables 2-10, 2-10a, and 2-10b).

For minor sources, nonattainment review is required for ozone if the net increase in VOC emissions due to the proposed modification exceeds the significant emission rate of 100 TPY. As shown in Table 3-3, the maximum potential increase in VOC emissions due to the Repowering Project and contemporaneous emission decreases will be 99.9 TPY (refer to Section 2.2 for discussion of requested limits.) Nonattainment requirements are, therefore, not applicable.

FDER-5

<u>Comment</u>: Submit a construction permit application to document the existing facility as minor for VOCs.

<u>Response</u>: A construction permit application for the existing Lauderdale Plant is provided under separate cover. The Lauderdale Plant will be and has been a minor source of VOCs as evidenced by the data presented in the response to FDER-2. The requested emission limitation is based on limiting plant VOC emissions to 99.9 TPY. The emission-limiting standard requested by FPL for the GTs and Units 4 and 5 is:

$$(HI_{GTNG} \cdot 251/14.8 \times 10^{13}) + (HI_{GTOIL} \cdot 95.9/14.8 \times 10^{13}) + (HI_{U4\&5NG} \cdot 20.1/3.02 \times 10^{13}) + (HI_{U4\&5OIL} \cdot 75.2/3.02 \times 10^{13}) \leq 90.9$$

where:
- HI_{GTNG} = annual heat input of GTs 1-24 with natural gas firing,
- HI_{GTOIL} = annual heat input of GTs 1-24 with oil firing,
- $HI_{U4\&5NG}$ = annual heat input of Units 4 and 5 with natural gas firing, and
- $HI_{U4\&5OIL}$ = heat input of Units 4 and 5 with oil firing.

The values 251, 95.9, 20.1, and 75.2 in the above equation represent maximum annual potential VOC emissions in TPY for the applicable units and fuel used. The values 14.8×10^{13} and 3.02×10^{13} represent the maximum annual potential heat input in Btu for the GTs and Units 4 and 5, respectively (see air permit for basis of calculation).

Section 3.4.2 of the Air Permit Application (Volume 2 of the SCA) has been revised to be consistent with this response (see response to FDER-4).

The value 90.9 represents TPY from the plant minus tank VOC emissions which have been estimated to be 9.1 TPY.

In addition to limiting VOCs, the requested emission limitation will have the effect of reducing potential emissions of sulfur dioxide, nitrogen oxides, carbon monoxides, and PM10 from the existing Lauderdale Plant.

FDER-6

__Comment__: Please provide more detailed specifications for equipment details specifications.

__Response__: As clarified by telecommunication of 03/19/90 with Predeep Raval, the manufacturer's literature on the Westinghouse 501F combustion turbine is reproduced on the following pages.

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
345 E. 47 St., New York, N.Y. 10017

88-GT-162

A New 150MW High Efficiency Heavy-Duty Combustion Turbine

A. J. SCALZO
Technical Director, Combustion Turbine Operations

L. D. McLAURIN
Manager, Engine Design and Development
Combustion Turbine Operations

G. S. HOWARD
Manager, Aerodynamics and Performance
Combustion Turbine Operations

Westinghouse Electric Corporation
Generation Technology Systems Division
Orlando, Florida

YOSHITAKA MORI
Deputy General Manager, Turbine Engineering Department
Power Systems Engineering Division, Power Systems Headquarters

HARUYA HIURA
Deputy Manager, Engineering Department
Takasago Machinery Works

TOMOHIKO SATO
Manager, Turbo-Machinery Laboratory
Takasago Research and Development Center

Mitsubishi Heavy Industries, Ltd.,
Tokyo and Takasago, Japan

ABSTRACT

The 501F 60HZ Combustion Turbine has been developed jointly by Westinghouse Electric Corporation and Mitsubishi Heavy Industries Ltd. It continues a long line of large heavy-duty single-shaft combustion turbines by combining the proven efficient and reliable concepts of the W501D5 with the low NO_x technology of the MW701D together with the experience of the advanced cooled MF111. The new engine is described along with improved evolutionary changes made from previous engines.

Planned design and performance verification programs including model, full scale component testing, and full load engine tests are described. Mature output and efficiency in simple cycle mode will be 145 MW and 34%, respectively, with expected combined cycle efficiencies in excess of 50%.

INTRODUCTION

The 501F is a 3600 RPM heavy-duty combustion turbine designed to serve the 60Hz power generation needs for utility and industrial service in the 1990's. This engine represents the latest in the evolutionary cycle that continues a long line of large single shaft heavy-duty combustion turbines. Jointly developed by Westinghouse Electric Corporation and Mitsubishi Heavy Industries, Ltd., the 501F combines the efficient, reliable design concepts of the W501D5 [4] with the low NOx combustion technology of the MW701 D [2] and the state of the art cooling utilized in the advanced, high temperature MF111 [9]. The result is an advanced design, high temperature, efficient, low NOx, more powerful combustion turbine based on time proven reliable design concepts that will satisfy the large combustion turbine power generation needs for the next decade. Designed for both simple and combined cycle applications, it will operate on all conventional combustion turbine fuels as well as with coal derived low Btu gas produced in an integrated gasification combined cycle power plant (IGCC) [3]. Currently being offered for 1990 operation, it will have an initial simple cycle ISO rating of 135 MW with a heat rate of 10,150 Btu/Kwh (LHV) at a turbine inlet temperature of 1210°C (2210°F) on natural gas fuel. The mature rating shown in Table I is at a turbine inlet temperature of 1260°C (2300°F) and will be achieved after obtaining sufficient field experience. In combined cycle applications the thermal efficiency of the mature plant can exceed 50% (LHV) in power blocks of 200 MW nominal power rating.

	INITIAL	MATURE
POWER, NET KW	135,000	145,000
HEAT RATE, KJ/KW-HR	10,706	10,548
BTU/KW-HR	10,150	10,000
AIR FLOW, KG/SEC	413.6	413.6
LBS./SEC	912	912
PRESSURE RATIO	14:1	14.2:1
EXHAUST TEMPERATURE, °C	545	571
EXHAUST TEMPERATURE, °F	1013	1061

TABLE I 501F PLANT PERFORMANCE

Presented at the Gas Turbine and Aeroengine Congress and Exposition—June 5-9, 1988—Amsterdam, The Netherlands
This paper has been accepted for publication in the Transactions of the ASME.
Discussion of it will be accepted at ASME Headquarters until September 30, 1988

Since the late 1940's, with the growth of the aviation gas turbine, combustion turbine technologies have experienced a continuous evolution. This has, in general, been reflected in the technology of the heavy-duty combustion turbines used for power generation and mechanical drive applications. During the past ten years; heavy-duty combustion turbines have operated at a turbine inlet temperature in the vicinity of 1093°C (2000°F). In the past, increases in firing temperatures have been driven by competitive market pressures; however, a ten year hiatus from increases in firing temperature due primarily to a lack of these pressures, has provided sufficient time for advancements in manufacturing, material processing and quality control to allow for the state-of-the-art cooling technology, used successfully by the aviation industry for many years, to be utilized in the larger units. The first heavy-duty combustion turbine to incorporate these advanced-cooling technologies was the MF111 with initial commercial operation in August of 1986 at a turbine inlet temperature of 1160°C (2120°F). In addition, stringent emission regulations in Japan provided increased pressure on Mitsubishi Heavy Industries, Ltd. to develop the low NOx Hybrid Combustion system that has operated successfully at Higashi-Niigata Tohoku Electric Power Company Plant since 1984. Across the board advances in computer technology in the past decade have also enabled manufacturers to improve analytical procedures in all aspects of design including stress analysis, heat transfer, aerodynamics, fluid mechanics, and structural dynamics. For some critical components, the computer program completely integrates all the governing engineering disciplines into a single iterative routine for quick, accurate optimization. Benefits of this technological advance are shown in Figure 1 where optimal cooling system design allows metal temperatures in the 501F to be kept within W501D5/MW701D experience.

Supplementing these advances in analytical techniques is a comprehensive testing program consisting of airfoil cascades, turbine model tests, full scale verification of combustor designs and rotor blade vibratory dynamics followed by an instrumented shop test at load, and finally by an instrumented field test.

This paper describes the features of this latest in a long line of heavy-duty combustion turbines of the 501 model series. Aerodynamic, cooling, and mechanical design improvements are discussed along with the evolutionary changes based on time proven design concepts. Technological advances as well as planned verification test programs are discussed

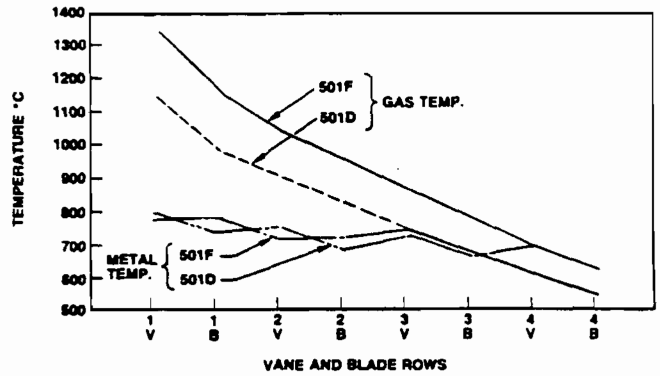

FIG. 1 501F METAL AND GAS TEMPS.

including cascade and model turbine aerodynamic tests, combustor tests, rotating blade vibration tests and shop test at load.

GENERAL DESCRIPTION

Figure 2 illustrates the general configuration of the 501F heavy-duty combustion turbine. Several basic long established design concepts and philosphies are evident, such as the two-bearing single shaft construction, cold-end power drive, and axial exhaust. These fundamental time proven concepts used by the authors' companies for over 25 years have now become industry standards. The axial exhaust concept introduced on the W501AA in 1970 has been retained because of its improved performance and plant arrangement advantages in combined cycle power plants.

As in all past W501/MW701 designs, the single rotor is made up of the compressor and turbine components supported by two tilting pad bearings. The 501F rotor is of bolted construction supported by two 17 inch diameter, two-element tilting-pad bearings for load carrying and an upper half fixed bearing. This provides inherent stability of the tilting pad with the reliability of the plain bearing thus eliminating the top pad fluttering problem that has led to local babbitt failures ("spragging"). The thrust bearing is a 22.5 inch double-acting Kingsbury thrust bearing that uses the LEG (Leading Edge Groove) Lubrication System.

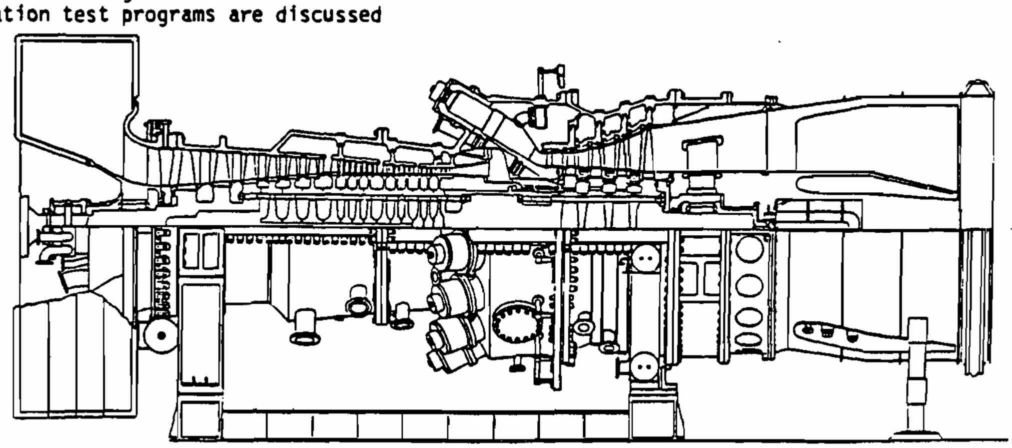

FIG. 2 501F LONGITUDINAL SECTION

The compressor rotor is comprised of a number of elements, spigotted and bolted together by 12 through bolts. The turbine rotor section is made up of discs bolted together by 12 through bolts and using CURVIC[1] clutches, which consist of toothed connection arms that extend from adjacent discs and interlock providing precise alignment and torque carrying features. This turbine rotor design has amassed over 10 million hours of reliable service in all sizes of combustion turbines.

The air inlet system, which contains a silencer, delivers air to the compressor via a plenum-bell mouth and houses the inlet, main journal and thrust bearings. The compressor is a 16 stage axial flow design of 14:1 pressure ratio that is based on the highly successful W501/MW701 compressor. A 4 stage turbine was selected to maintain moderate aerodynamic loadings even at the increased firing temperature.

The combustion system consists of 16 can-annular combustors with the same diameter and length as the W501D5/MW701D. This low NOx hybrid design is an improvement on the current highly successful design that has been in commercial operation for over three years in the MW701D on liquified natural gas fuel. [2] The presence or absence of flame and the uniformity of distribution of fuel flow between combustors are monitored by thermocouples located downstream of the last stage turbine blades. These can also detect combustor malfunctions when at load while U/V detectors are used to sense ignition during the early starting phase.

All engine casings are horizontally split to facilitate maintenance with the rotor in place. Inlet and compressor casings are of nodular cast iron and cast steel respectively while combustor, turbine, and exhaust casings are alloy steel. The inlet bearing housing is supported by 8 radial struts while the aft end bearing housing is supported by 6 tangential struts. Air-foil shaped covers protect the tangential struts from the blade path gases and support the inner and outer diffuser cones. Tangential struts respond slowly during transients and maintain alignment of the bearing housing by rotating it as required to accommodate thermal expansion. Individual inner casings (blade rings) are used for each turbine stationary stage and can be readily removed and replaced or serviced with the rotor in place. Similar blade rings have been added in the compressor for stages seven through sixteen. Another feature of these blade rings is that they have a high thermal response independent of the outer casing and can be aligned concentric to the rotor to prevent blade rubs, minimize clearance, and maximize performance.

Cooling circuits for the turbine section displayed in Figure 3 are similar to those used on the W501D5. [4] They consist of a rotor cooling circuit and four stationary cooling circuits. Rotor cooling air is provided by compressor discharge air extracted from the combustor shell. This air is externally cooled and filtered before returning to the torque tube casing for seal air supply and for cooling of the turbine discs as well as the first, second, and third stage turbine rotor blades. This cooled, filtered air pro-

1 Trademark of Gleason Works

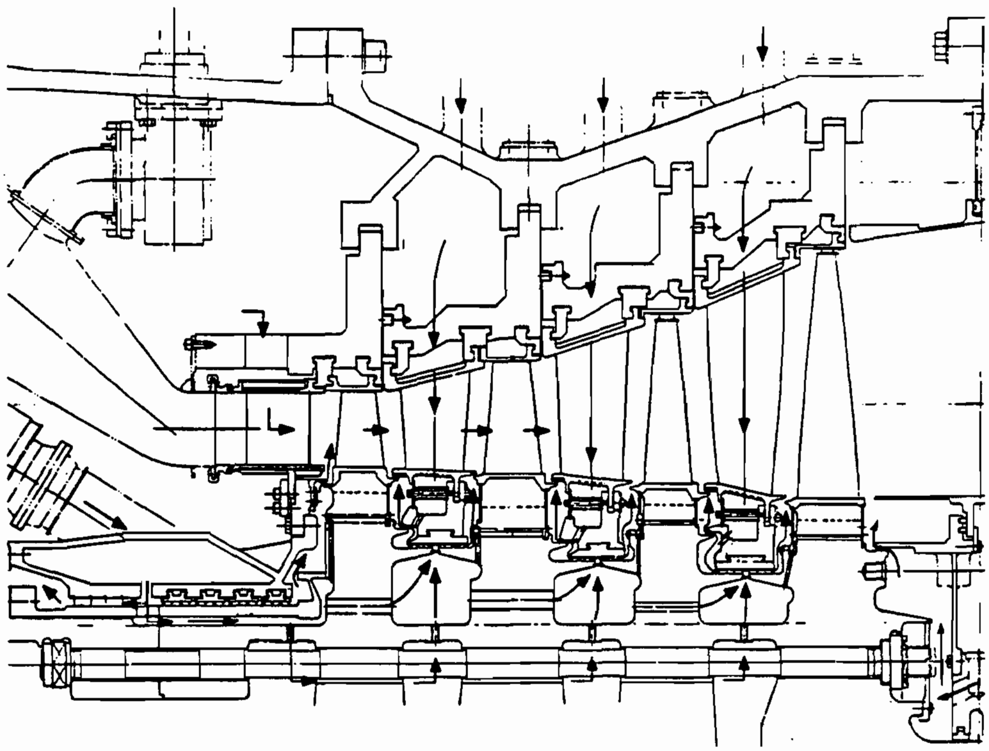

FIG. 3 501F COOLING CIRCUITS

vides a blanket of protection from hot blade path gases and eliminates excessive contaminants that could block critical intricate cooling passages of the rotor blades.

Direct compressor discharge air is used to cool the row 1 vane while compressor bleed air from stages 13, 10, and 6 are used to provide cooling air to turbine blade ring cavities at stages 2, 3, and 4 respectively. This supply of bleed air also cools the stage 2, 3, and 4 vane segments and ring segments and provides cooling air for the turbine interstage disc cavities. This precludes the ingestion of hot blade-path gases by providing cooling air for the interstage seal flow and the fore and aft disc faces.

The stationary vanes and rotating blades for the first two turbine stages are coated for corrosion protection. Compressor diaphragms are also coated to improve aerodynamic performance and corrosion protection. For some environments, compressor rotor blades may be coated for corrosion protection.

CYCLE PARAMETER SELECTIONS

The 501F engine, like all recently designed combustion turbines of the authors' companies, is specifically designed for both simple and combined cycle service. The operating firing temperature level is selected to be commensurate with state-of-the-art materials and combined convection/impingement/film/pin fin cooling required for utility and industrial service life. The value selected is 1260°C (2300°F) at the inlet to the first turbine rotor blade.

After the turbine inlet temperature has been selected, the cycle pressure ratio can be chosen to maximize simple cycle power output and combined cycle efficiency. Figures 4 and 5, which are plots of simple and combined cycle efficiencies as a function of specific power with parameters of cycle pressure ratio and turbine inlet temperature, are used to select a pressure ratio of 14 to 1. The selection of 14:1 results in a cycle that has near maximum simple cycle output with a potential combined cycle efficiency greater than 50 percent, as shown by Figure 5.

The last parameter to be selected is the cycle air flow, whose quantity is determined by the turbine exit annular flow area. It can be shown that the last stage blade stress level is directly proportional to the exit annular area. Since the long highly twisted last stage blade is uncooled, the blade material capability and last stage gas temperature then determine the flow capacity of the engine. A flow of 912 lbs/sec has been selected which will result in a conservatively stressed blade and still yield an engine efficiency in simple cycle of over 34%.

COMPRESSOR DESIGN

The compressor is a newly designed, highly efficient, 16-stage axial flow compressor patterned after the proven compressor of the W501D5. Flow and pressure coefficients of the 501F compressor have been kept similar to the D5 compressor by increasing the mean diameter of the stages to accommodate the 15% increase in flow. In addition, the rear stages of the new compressor have larger diameters to help balance spindle thrust. Interstage bleeds for starting and cooling flows are in the sixth, tenth, and thirteenth stages, with the thirteenth stage used only for supplying cooling air to the second-stage turbine stationary blading and inter-stage cooling system. The compressor is also equipped with variable inlet

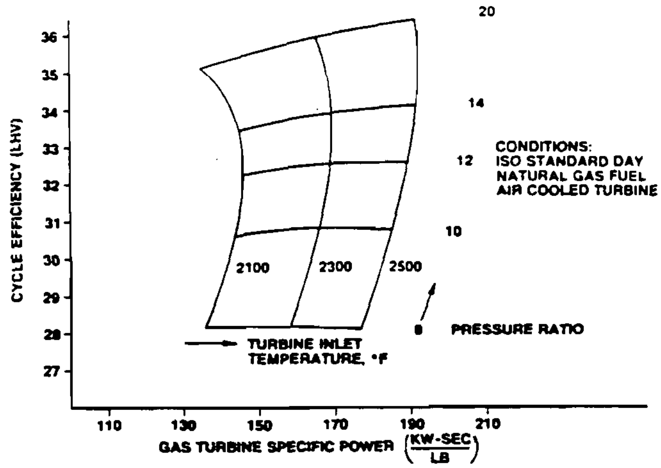

FIG. 4 SIMPLE CYCLE PERFORMANCE

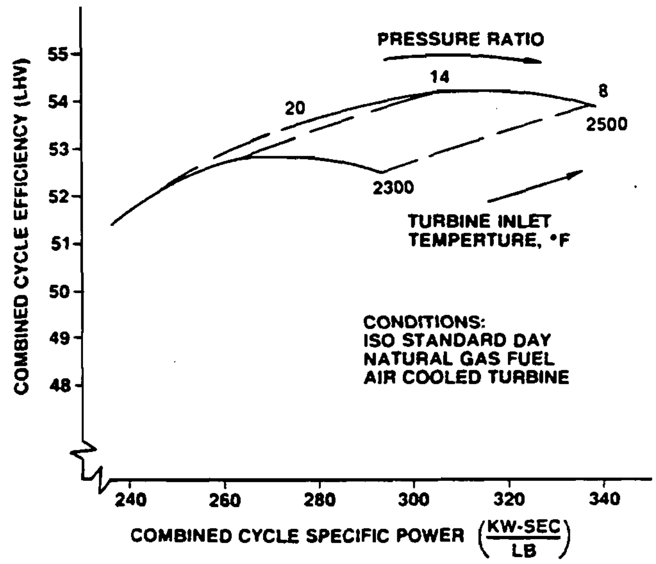

FIG. 5 COMBINED CYCLE PERFORMANCE

guide vanes to improve the compressor low speed surge characteristic and are used in combined cycle applications for improved part load performance and steam cycle heat-up.

The blade path was designed utilizing a three-dimensional streamline curvature flow field analysis computer program. Rotor blades are double circular arc designs in the first four stages. The stators and all other rotor blades are conventional W-65 airfoil sections. All rotor blades incorporate an improved root design that has flat contact faces (as in turbine blade roots) for ease of manufacturing and inspection and a new locking system which is inspectable and still allows the blades to be removed in the field with the rotor in place. In most cases, a conservative design approach allows for the continued use of the standard strength grade of AISI 403, while in the first two stages, 17-4PH (17% Cr. precipitation hardened stainless steel) was introduced to maintain acceptable factors of safety.

Stationary blading is fabricated into two 180° diaphragms per stage for easy removal and will maintain the highly efficient inner shroud sealing system currently used on the W501/MW701. These seals will be supported by machined lips on the inner shroud and can be removed to facilitate inspection and maintenance of shrouds and seals. Two exit guide vanes are used, instead of one, to straighten the flow leaving the compressor. Stationary blading and shrouds are standard strength AISI 403 throughout.

TURBINE DESIGN

The design of the 501F has maintained moderate aerodynamic loadings in spite of the increased inlet temperature by choosing a 4 stage turbine with higher peripheral speed compared to the W501D5/MW701D. Furthermore, improvements in aerodynamic air foil shapes have been made possible by utilization of a fully three dimensional flow analysis computer code. Understanding the flow phenomena within the cascade makes a low loss blading design possible. Figure 6 is a view of the third stage turbine vane which has been designed using this state-of-the-art computer code. Note the vane cross sectional rotation dictated by the end wall effects. This sophisticated airfoil design approach was employed to assure that the turbine has the highest practical aerodynamic efficiency.

The first and second stage rotors contain 72 and 66 blades, respectively, and are the free-standing type, while the third and fourth stage rotors contain 112 and 100 blades, respectively, and utilize integral "Z" tip shrouds. The use of a shrouded system is a departure from past design practice on the 501 series, but has been in use on the CW352 and MW252 turbines. This approach considers increases in power and mass flow which introduce the potential for flow induced nonsynchrounous vibration caused by the aeroelastic interaction between blade structure and flow [5]. This potential can reach critical values in the back end blading where frequencies are below the sixth harmonic. Options are to increase the blade natural frequency, or to provide for increased structural damping, or both. The required increases in blade chords as dictated by the aeroelastic criterion for the free-standing option made the integral "Z" shroud option more attractive because of the added potential for future turbine upgrading and the reduction in bearing span afforded by the smaller chord widths. The analysis of the shrouded blade strength was accomplished using a state of the art 3-D Finite Element Model (FEM) cyclic symmetry procedure to define blade group vibratory modes, as well as stresses due to centrifugal force and gas loading. The configuration was optimized using an intergrated computer aided engineering (CAE) system for rotating blade design that provides for continous iteration procedures including thermal performance, aerodynamics, vibratory, heat transfer, and mechanical requirements. This Turbine Interactive Design System (TDSYS) [6] assures that all aspects of the design are considered including complex trade-off analyses in order to develop an optimal design in which all requirements are met.

The first turbine stationary row consists of 32 precision-cast, single-vane segments of ECY768, a Westinghouse-developed cobalt base alloy. As in past W501/MW701 designs, the row 1 single vanes are removable, without any cover lift, through access manways. Inner shrouds are supported from the torque tube casing to limit flexural stresses and distortion, thus maintaining control of critical row 1 vane angles. There are 24 precision-cast, two-vane segments of ECY768 material in the second turbine stationary row. The third and fourth turbine stationary rows are precision-cast X45 vane segments with 16 three-vane and 14 four-vane segments, respectively.

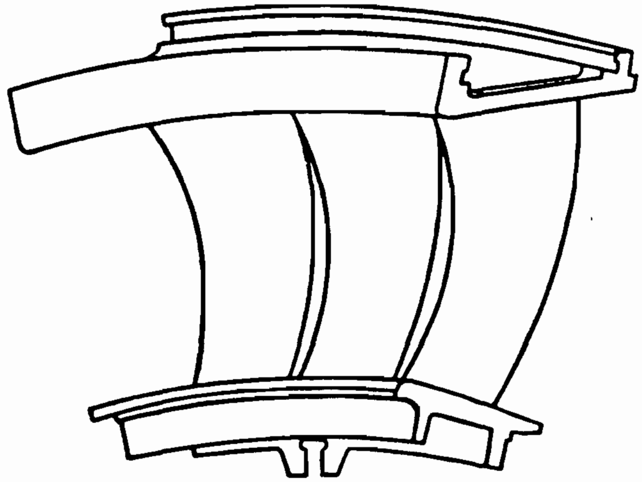

FIG. 6 ISOMETRIC OF 3-D DESIGNED ROW 3 VANE SEGMENT

Each row of vane segments is supported in a separate inner casing (blade ring) that is keyed and supported to permit radial and axial thermal response independent of possible external cylinder distortions. Blade ring distortion in the 501F turbine is further minimized by use of segmented isolation rings that support the vane segments and also ring segments over the rotor blades to form a thermal barrier between the flow path and the blade ring. As in all past W501/MW701 designs, the interstage seal housings are uniquely supported from the inner shrouds of rows 2, 3 and 4 vane segments by radial keys that permit the thermal response of the seal housings to be independent of the more rapid thermal response of the vane segments.

The Row 1 vane cooling design is shown in Figure 7. This highly effective configuration, which evolved directly from the W501D5 design [7] utilizes state of the art concepts with three impingement inserts in combination with an array of film cooling exits and a trailing edge pin fin system. The first two cavities take direct compressor discharge air to maximize the available pressure head while the aft cavity utilizes spent shroud cooling air for its lower pressure needs. Film cooling is used at the leading edge as well as at selected pressure and suction side locations. This limits vane wall thermal gradients and external surface temperatures, while providing an efficient reentry for spent cooling air. Pin fins, used successfully for the first time on the W501D5 row 1 vane, are employed to increase turbulence and surface area thereby optimizing the overall trailing edge cooling effectiveness. The design of the row 1 vane is such that the low cycle fatigue (LCF) design criteria is satisfied by control of wall gradients [8]. The row 2 vane cooling is a less complex version of row 1 vane cooling. It utilizes twin impingement inserts with film cooling exits and a trailing edge pin fin exit system. For this row, 13th stage compressor bleed air is ducted directly to the twin insert system. Film cooling is only required at one location on the suction side and at the exit of the aft insert on the pressure side.

Compressor bleed air from the 10th stage is used to supply cooling air to the third stage blade ring cavity. Cooling air is directed to the inlet cavity of a three cavity multi-pass convective cooled vane airfoil. Leading edge cavity flow also supplies the interstage seal and cooling system while the third pass cavity exits at pressure side "gill holes" on the vane surface. The fourth stage vane is uncooled but does transport 6th stage compressor bleed air for the fourth row interstage seal and cooling system.

The rotating blades are precision cast of INCONEL 738 for the first three rows. Forged Udimet 520 is used for the last row. All rows utilize long blade root extensions or transitions in order to minimize the 3-D stress concentration factor that results when load is transferred between cross sections of different size and shape. The blade roots are the same geometric multiple serration type used on past W501/MW701 designs with four serrations used on the first two rows and five serrations used on the rear two stages.

The first stage blade is cooled by a combination of convection techniques via multi-pass serpentine passages and pin fin cooling in the trailing edge exit slots. The cooling circuitry is shown in Figure 8. Air supply for blade cooling is high pressure compressor discharge air that has been cooled and filtered and returned to the turbine rotor via four supply pipes in the combustor shell. Cooling air flows outward through four slots in the root and conveyed radially through the blade shank as shown. Impingement and shower head film cooling are selected for the leading edge region. Basic empirical relationships of the convective heat transfer phenomenon using serpentine passages and turbulence promoters have been verified at the Takasago Research and Development Center utilizing fundamental heat transfer test rigs. In addition, this design has been verified by the row 1 blade experience of MF 111 [9]. Pin fin cooling in the trailing edge combined with the film cooling on the pressure side has also been verified for rotating blades by a suitable rig test at the Takasago R&D Center. By using this verified state of the art technology, the design creep rupture and low cycle fatigue (LCF) life is satisfied by maintaining low temperature and thermal gradients. The row 2 rotor blade is also precision cast and is cooled by a combination of convection techniques via serpentine passage and pin fin cooling in the trailing edge exit slots. Row 3 blade is precision cast with single pass convective cooling holes. The single pass design has been extensively verified by laboratory testing and field experience.

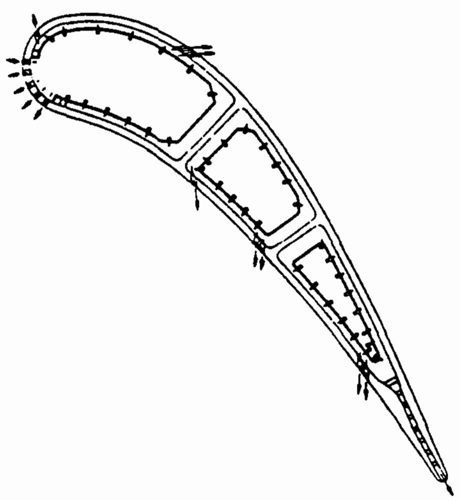

FIG. 7 CROSS SECTION OF ROW 1 VANE SHOWING COOLING FLOWS

The cooling system shown in Figure 3 maintains the NiCrMoV turbine discs below 400°C (752°F) which keeps the disc below the creep range and assures that life is only limited by corrosion and/or wear. Fleet leaders with this disc design are the W501A turbines with up to 150,000 operating hours.

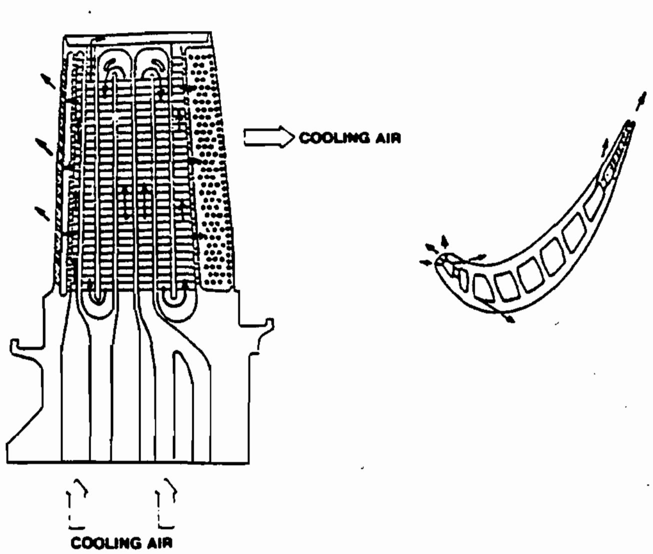

FIG. 8 FIRST STAGE BLADE COOLING

LOW NOx COMBUSTION SYSTEM

The 501F gas turbine has 16 cannular combustors with the same diameter and length as the MW501D and MW701D. A new premix lean-burn hybrid combustor shown in Figure 9 is to be applied to meet the existing and new NOx emissions limitations around the world while having dual fuel capability. The hybrid concept proposed in 1977[1], was first developed for engine use in the MW701D[2] and has been in commercial operation since December 1984 at Tohuko Electric Power Company HAGASHI NIGATA combined cycle Plant where NOx emissions have been reduced to 60 ppmv on natural gas fuel without water or steam injection at a turbine inlet temperature of 1085°C (1985°F).

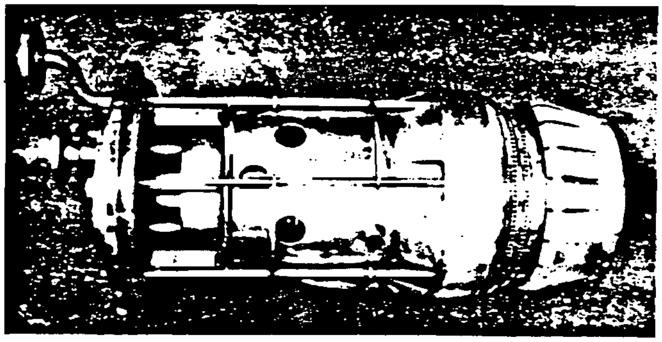

FIG. 9 IMPROVED LOW NO_X COMBUSTOR

The hybrid combustor features a two-stage burner assembly and a bypass valve which directs a portion of the compressor delivery air directly into the transition piece to enhance flame stability during starting and to maintain desired fuel/air ratio during loading. This unique valving system then is modulated to full closed at full load. The new hybrid combustor differs from the present one by having the ratio of pilot to main fuel trimmed considerably to reduce pilot burner NOx generation and, thereby, overall NOx emission. The combustion liners and transition pieces are provided with a Mitsubishi Heavy Industries Ltd. developed configuration named MTFIN, shown in Figure 10 and already proven in service in the MF111. This twin layer composite structure has inherently more efficient cooling, thus providing more air for the low NOx system.

VERIFICATION TESTING

All new advanced technology parts applied in the 501F engine are qualified for engine use by verification tests, including, (a) Rotating blade vibration (b) Turbine aerodynamic and, (c) Combustion tests. Overall engine performance and durability will be verified by engine shop tests. The verification test schedule is shown in Table 2.

(a) Rotating blade vibration test for the blades of the compressor and turbine

The rotating blade vibration test will be performed to verify the vibration characteristics for selected rotating blades of the compressor and turbine. The 1st and 2nd stage blades of the compressor and of all 4 stages of turbine will be tested to verify natural frequencies. Damping characteristics will also be measured for the shrouded blades of the 3rd and 4th stages of the turbine. These damping characterstics will be used to obtain turbine blade dynamic responses via a cyclic symmetry computer routine.

(b) Turbine aerodynamic test

In order to verify the turbine performance, several aerodynamic tests were performed. These included cascade tests and model turbine tests. Two dimensional performance of the typical sections were verified by using a high speed cascade tunnel. To assure the cycle match with the compressor, the flow capacity of the first nozzle was also verified in an annular cascade test rig. Results of the cascade tests were all satisfactory. A model turbine test rig of the 4th stage was constructed to confirm the benefit of the newly incorporated 3-dimensional aerodynamic design techniques. Measured performance of the 4th stage clearly showed the usefulness of the 3-dimensional design techniques. In addition, a model turbine test of the first two stages will be run in early 1988 to provide final verification of the critical stage matching and 3-dimensional aerodynamic design techniques.

(c) Combustion test

A newly designed hybrid combustor with improved performance is being tested in component test rigs for verification of the exhaust emissions (NOx, UHC and CO), pressure drop, pattern factor, wall cooling and vibrational performance characterstics. Dynamic pressure oscillations in the combustion chambers are also being investigated. Combustion test consists of cold flow test, flame propagation test, shaker test,

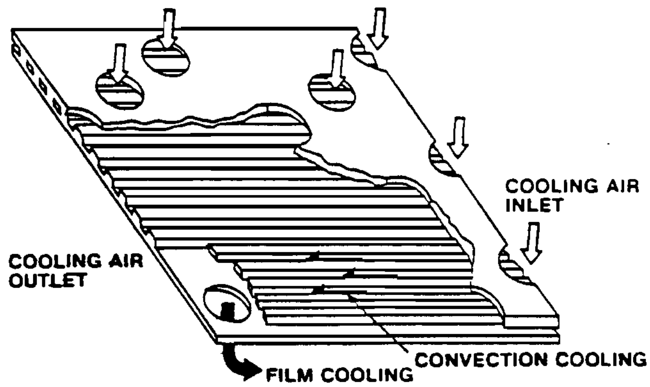

FIG. 10 SCHEMATIC OF MTFIN

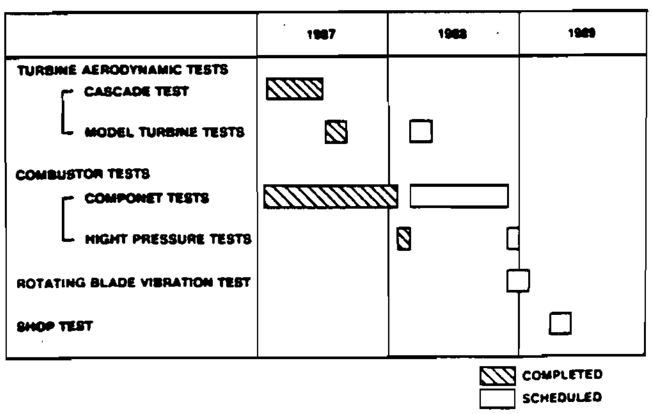

TABLE II VERIFICATION TEST SCHEDULE

atmospheric test and high pressure test. Figure 11 shows a schematic of the high pressure test facility. The test rig is capable of operation at 501F rated engine conditions. In the test cell, a full-scale hybrid combustor, transition piece and bypass valve are installed. The exit instrumentation consists of seven thermocouple rakes and four emission probes. Combustion liner temperatures are monitored by embedded thermocouples. Vibratory stresses on the combustion liners, transition pieces, supports and fuel nozzles are measured by strain gauges. Pressure transducers are also attached to provide information on the dynamic pressure oscillation within the combustion chamber.

(d) Engine Shop Test

In order to verify the correct operation for the 501F engine, a shop test including full load conditions will be carried out in March 1989. During the shop test, the generator will be coupled with the gas turbine and the electrical output produced by the generator will be absorbed by the water rheostat in the test facility.

The shop test is the important final stage for the confirmation of the following:

1. Compressor inlet air flow over the entire IGV range.

2. Compressor surge margin.

3. Engine starting and acceleration characterstics.

4. Mechanical operation of the engine from starting to overspeed including rotor vibration characteristics.

5. Mechanical and thermal performance of the engine over its entire operating range on oil fuel.

6. Reliability of the engine by measurement of gas and metal temperatures, pressure, vibratory stresses, etc.

7. Emission characterstics of the engine and the effects of water/steam injection upon emissions and thermal performance on oil fuel.

To provide this data, the engine will be extensively instrumented to measure thermodynamic values, metal temperatures, static and vibratory strains, vibration characterstics, displacements, and other parameters. Dynamic strain gauges are installed on the turbine blades to verify dynamic responses. The signals from the rotating sensors are transmitted by a telemetry system. Clearance measurement systems using proximity probes allow stator-to-rotor radial displacement measurements during transients. Through the use of an infrared pyrometer, it will be possible to obtain the temperature distribution on each turbine blade of the first stage under operating conditions. Data acquisition equipment is installed to record the special engineering test data. This equipment includes tape recorders, spectrum analyzers, plotters and chart recorders.

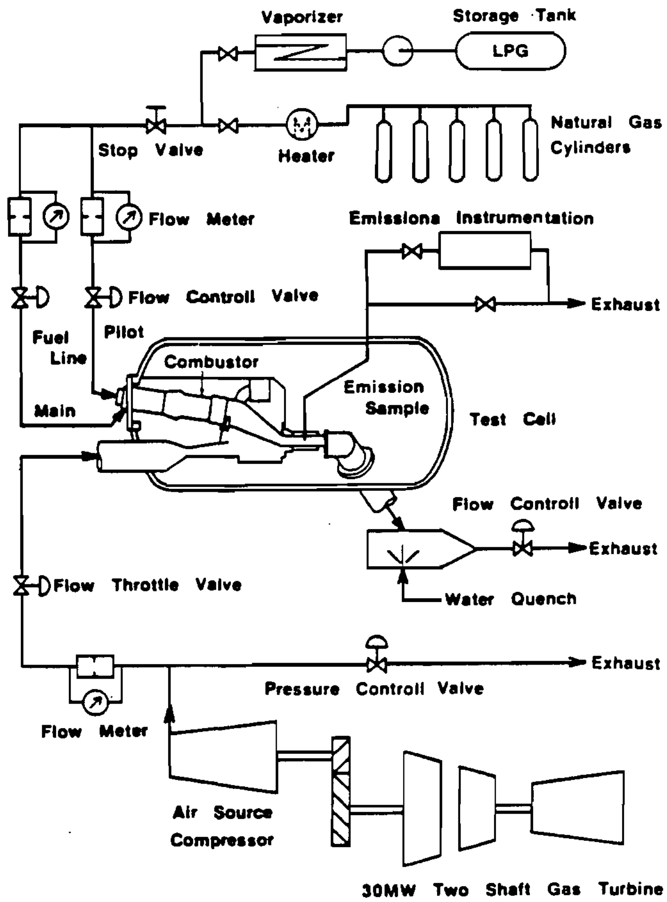

FIG. 11 SCHEMATIC OF COMBUSTION TEST FACILITY

SUMMARY

The 501F, jointly developed by Westinghouse and Mitsubishi Heavy Industries, has been described together with the latest state of the art technology and verification programs utilized to assure its efficiency and reliability. Time proven design and maintenance features of past W501/MW701 engines have been retained. Improvements in material processing, manufacturing, and quality control have enabled the use of advances pioneered by the aviation industry in high temperature blades and vanes and introduced for the first time in heavy duty combustion turbines by the MF111. This advanced high temperature 150 MW class combustion turbine will have a mature rating in simple cycle mode of 145 MW and 34% efficiency with combined cycle ratings exceeding 200 MW and 50% efficiency.

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2. Aoyama, K. and Mandai, S., "Development of a Dry Low NO_x Combustor for a 120 MW Gas Turbine," ASME Paper No. 84-GT-44.

3. Hendry, R. L. and Pillsbury, P. W., "Commercial Demonstration of the Dow Gasification Process in an Integrated Combined Cycle Cogeneration Application," Proceedings American Power Conf., 1987.

4. Scalzo, A.J., Holden, P.C., Howard, G.S., "The Westinghouse 501D Combustion Turbine Engine," ASME Paper No. 81-GT-32.

5. Scalzo, A. J., Allen, J. M., and Antos, R. J., "Analysis and Solution of a Nonsynchrounous Vibration Problem in the Last Row Turbine Blade of a Large Industrial Turbine", Journal for Gas Turbine and Power, Vol. 108, October 1986.

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7. Tobery, E. W., and Bunce, R. H., "Cascade Heat Transfer Tests of the Air Cooled W501D First Stage Vane," ASME Paper Number 84-GT-114, 1984.

8. Sato, T., Takeishi, K., and Sakon, T., "Thermal Fatigue Life Prediction of Air-Cooled Gas Turbine Vanes," ASME Paper No. 85-GT-17.

9. Akita, E., et al., "Development and Testing of the 13MW Class Heavy Duty Gas Turbine MF-111," ASME Paper No. 87-GT-37.

FDER-7

Comment: The thermal discharge of the cooling water to the surface water may have certain impact on the temperature of the on-site ground water in the surficial aquifer; although it may not be of hazardous nature, yet it should be addressed.

Response: The potential for thermal impacts of the on-site surficial aquifer exists because the cooling canal/pond system contains an unstratified water column which is at a higher temperature than the adjoining groundwater for portions of the year. Other conditions which are required for the cooling pond water to enter the surficial aquifer include:

1. Favorable aquifer characteristics (i.e., sufficiently high permeability); and
2. Hydraulic gradients sufficient to force the pond water into the aquifer.

The probability that the aquifer characteristics include sufficiently high permeability is very good. The pond is the result of excavations of the Biscayne aquifer limestone and the overlying materials. The Biscayne aquifer is well known for its very high transmissivity values and, although the pond bottom and sides have undoubtedly received heavy sediment loads from the mining operations, they are probably not sealed to an extent which would preclude aquifer/pond water exchanges.

The presence (and frequency) of favorable hydraulic gradients (i.e., pond water elevations higher than the groundwater elevation) can be evaluated qualitatively using available regional and site-specific surface water and groundwater elevation data. The regional groundwater flow in the aquifer is seaward; therefore, during portions of the year (most notably in the higher rainfall summer months), the aquifer will likely discharge to the pond (i.e., no thermal impacts). This simplistic assessment can be greatly compounded when the tidal effects in the pond are considered.

With the tidal action, the pond and aquifer can be alternatively discharging to each other depending on the tidal phase. The on-site groundwater elevation averages +1 to +2 ft-msl (see Section 2.3.2.1 of the SCA), and the tidal range in the pond is about 1.0 ft with a mean water level of about 0.5 ft-msl (see Section 2.3.4.1 of the SCA). Depending on the season and the tidal phase, pond water and groundwater will alternately exchange water with each other, and the predominate movement will vary from year to year (depending on regional rainfall patterns).

Considering all of the above, it is possible that some heated pond water enters the aquifer during some portions of some years. Since this movement is both reversible (i.e., groundwater discharges to the pond) and short lived (i.e., occurring over only a portion of the tidal cycle on some days), it is likely that any resulting heating of the shallow aquifer is minimal and there is no evidence of adverse impacts.

FDER-8

<u>Comment</u>: The Surface Water Quality data presented in 2.3, Tables 2.3-9 & 2.3-10 did not include results for Cyanide, Bromine and Bromates which are listed in FAC Rule 17-3.121 (Class III Surface Water Standards).

<u>Response</u>: Per the Plan of Study, water quality sampling and analysis was to be conducted one time during the monitoring period for the parameters cyanide, bromine, and bromates. The data for cyanide are presented in Table 10.5.2-14 (the reported cyanide concentration for all stations was <0.003 mg/L). The chemical analyses for bromine and bromates were inadvertently omitted by the contract laboratory. Field samples were taken March 22, 1990, and analyzed for these parameters. Results of the analyses are as follows:

~~Data to be provided.~~

STATION	BROMINE	BROMATES
1		
2		
3		
4		
5		
EQP. BLANK		

FDER-9

Comment: The results for Table 2.3-9 & 2.3-10 showed violations for Dissolved Oxygen, pH, Copper, Iron, Selenium and Mercury as compared to FAC Rule 17-3.121. It is assumed that results from station 1, located at Lauderdale Plant intake structure on the Dania Cut-Off Canal, are background values and were subtracted from the Stations 2, 3, 4 and 5 results, if the background results were in violation of the Class III standards. The following table(s) present the violations of the Class III Water Quality Standard (see attached).

Response: The data presented in Tables 2.3-9 and 2.3-10 do show Chapter 17-3.121, F.A.C., water quality standard exceedances for dissolved oxygen, pH, copper, iron, selenium, and mercury. The data presented in the SCA for these parameters were the laboratory reported values and did not include data correction (i.e., subtraction of the background concentration from the downstream stations concentration). Per the comment, the water quality data for the listed parameters have been corrected for the background values, and these data are presented in Table FDER9-1 for dissolved oxygen, Table FDER9-2 for copper, Table FDER9-3 for iron, and Table FDER9-4 for mercury. The pH and selenium data were not tabulated because only one exceedance was observed.

It is also of note that the above data corrections and comparisons were performed only for Stations 1, 4, and 5. Stations 2 and 3 were not included in the tables (or subsequent analyses) because these stations are within the cooling pond proper and thus are not jurisdictional waters. By contrast, Stations 1 and 5 are the makeup source and receiving waters, respectively; Station 4 is of interest because it is representative of the point of discharge from the cooling canal/pond system.

Discussion of these tables is provided in response to FDER-10.

Table FDER9-1. Dissolved Oxygen Data from Stations 1, 4, and 5

Station/ Parameter	Date						
	Oct-88	Nov-88	Dec-88	Apr-89	May-89	Jun-89	Jul-89
STATION 1							
Dissolved Oxygen	3.7	4.0	4.4	3.8	3.5	3.4	2.8
Chloride	6,450	5,100	9,400	5,200	5,440	8,640	3,010
Temperature	26.8	27	23.1	28.4	29.7	30.8	30.2
Saturated DO	7.5	7.6	7.8	7.4	7.2	6.8	7.3
Percent Saturated	49.4%	52.9%	56.7%	51.5%	48.6%	49.7%	38.3%
STATION 4							
Dissolved Oxygen	3.8	3.7	3.8	5.8	5.8	4.2	3.1
Chloride	3,500	6,350	8,400	6,380	5,060	6,300	2,160
Temperature	27.7	28.5	24.1	29.2	31.3	31.9	31.2
Saturated DO	7.6	7.3	7.7	7.2	7.0	6.9	7.2
Percent Saturated	50.0%	50.8%	49.3%	80.6%	82.5%	61.1%	42.8%
STATION 5							
Dissolved Oxygen	3.7	3.7	3.9	4.2	3.6	3.5	3.5
Chloride	5,350	5,900	8,160	6,160	4,640	6,540	2,340
Temperature	27.5	27.6	23.6	28.8	30.8	31.3	31.2
Saturated DO	7.5	7.4	7.8	7.3	7.1	6.9	7.2
Percent Saturated	49.4%	49.8%	50.0%	57.9%	50.5%	50.5%	48.4%
OBSERVED NET CONCENTRATION CHANGE							
Station 1 to 4	0.1	-0.3	-0.6	2.0	2.3	0.8	0.3
Station 1 to 5	0.0	-0.3	-0.5	0.4	0.1	0.1	0.7
THEORETICAL NET CONCENTRATION CHANGE							
Station 1 to 4	0.1	-0.3	-0.1	-0.2	-0.2	0.0	-0.1
Station 1 to 5	0.0	-0.1	0.0	-0.1	-0.1	0.1	-0.1

Notes:

1. Units for values in the table are as follows:
   a. Dissolved Oxygen - mg/L;
   b. Chloride - mg/L;
   c. Temperature - degrees Centigrade;
   d. Saturated DO - mg/L; and
   e. Net Concentration Data - mg/L of Dissolved Oxygen.

2. Saturated DO concentrations were calculated using the methodology presented in Table 4500-O:I of the 17th Edition of Standard Methods.

3. The "Theoretical Net Concentration Change" is the difference of the saturated DO concentrations at the stations shown. This value represents the change in DO which would be expected due to water temperature and chloride concentration differences only (i.e., the DO change which occur due to power plant operations).

Table FDER9-2. Copper Data From Stations 1, 4, and 5

	Date		
Station	Dec-88	Mar-89	Apr-89
Station 1	17.2	21.5	10.3
Station 4	6.2	32.8	12.5
Station 5	10.0	13.6	19.6
Net Change in Water Quality			
Station 1 to 4	-11.0	11.3	2.2
Station 1 to 5	-7.2	-7.9	9.3

Note: All copper data are in mg/L.

Table FDER9-3. Iron Data from Stations 1, 4, and 5

Station	Aug-88	Sep-88	Oct-88	Nov-88	Dec-88	Jan-89	Feb-89	Mar-89
Station 1	685	494	1060	847	1380	1330	1620	482
Station 4	220	92.4	756	837	1090	1480	1550	195
Station 5	228	206	884	818	1250	1620	1520	155
Net Change in Water Quality								
Station 1 to 4	-465	-402	-304	-10	-290	150	-70	-287
Station 1 to 5	-457	-288	-176	-29	-130	290	-100	-327

Note: All iron concentrations are in mg/L.

Table FDER9-4. Mercury Data for Stations 1, 4, and 5

Station	Date											
	Aug-88	Sep-88	Oct-88	Nov-88	Dec-88	Jan-89	Feb-89	Mar-89	Apr-89	May-89	Jun-89	Jul-89
REPORTED CONCENTRATIONS												
Station 1	0.3	<0.2	2.4	1.0	0.5	0.7	0.8	<0.2	<0.2	0.2	0.4	<0.2
Station 4	0.3	<0.2	2.7	1.5	0.2	0.4	1.2	<0.2	<0.2	<0.2	<0.2	<0.2
Station 5	<0.2	0.7	3.3	0.4	0.4	2.2	1.6	<0.2	<0.2	0.2	<0.2	<0.2
Equipment Blank	0.4	0.7	5.5	11.1	0.2	1.1	2.0	0.2	0.2	0.2	0.2	0.2
CORRECTED CONCENTRATION												
Station 1	<DL	<DL	<DL	<DL	0.3	<DL	<DL	<DL	<DL	<DL	0.2	<DL
Station 4	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Station 5	<DL	<DL	<DL	<DL	0.2	1.1	<DL	<DL	<DL	<DL	<DL	<DL

Notes: 1. All mercury concentrations are in mg/L.
2. The term "<DL" refers to the mercury concentration being less than the detection limit and was used when subtraction of the equipment blank from the sample concentration resulted in a value less than or equal to zero.

FDER-10

Comment: The above violations of Class III standards need to be explained. The source(s) of contamination and or the cause of the violations need to be determined. Additional details above and beyond the footnote, need to be presented to document the suspected contamination for Mercury.

Response: The potential sources/causes of the above-noted exceedances of Chapter 17-3.121, F.A.C., water quality standards are discussed below by parameter. When evaluating the water quality data in the vicinity of the Lauderdale Plant site, it is important to note that several canals in the area receive water from a wide variety of sources (e.g., the Everglades drainage, urban stormwater runoff, Biscayne aquifer inflow, and the Atlantic Ocean) and are substantially impacted by cultural activities (e.g., urban and agricultural stormwater runoff, septic tank inflow, boat dry dock activities, limerock dredging, etc.). These diverse water sources flow into the manmade canals which were built for drainage purposes rather than for supporting the variety of biological and chemical processes which give natural streams the ability of self purification. Even under optimal circumstances, the water bodies in the area are not comparable to pristine, natural streams or lakes.

Dissolved Oxygen--Table FDER9-1 presents a summary of the DO data collected during the monitoring period; the table also presents the theoretical saturated DO concentration (based on temperature and chloride concentration) and the percent of DO saturation. As seen in the table, the DO in the Dania Cut-Off Canal (Station 1) was less than the 4.0 mg/L standard five times (October 1988 and April through July 1989). At the cooling canal/pond system outlet (Station 4), the DO was below the standard four times (October through December 1988 and July 1989). In the receiving water (Station 5), the DO was less than the standard six times (October through December 1988 and May through July 1989).

In reviewing these data, it is evident that for all stations and all months the DO is typically at 50 percent ±10 percent of the saturation value. These typically low DO saturation (and low concentration) values appear to be ubiquitous to the area and are likely a result of a combination of factors including: adjacent land use practices, upstream drainage (from agricultural areas in the Everglades), groundwater inflow into the canals, and the morphology of the canals (i.e., long, narrow water bodies with low flow velocities and minimal opportunity for wind-induced mixing). Additionally, the discharge from the Lauderdale Plant has a thermal component only (i.e., a temperature increase over ambient) and does not discharge oxygen-demanding substances.

The increased pond temperature will theoretically result in a lower DO concentration; however, the observed net change in DO in the pond is less than or equal to the theoretical net change for every month except December 1988. As shown in the table, the net DO change in the pond (i.e., from Station 1 to 4) should have decreased because of the plant thermal discharge but they were observed to increase. The low DO concentrations are likely a natural and/or cultural phenomenon and not a result of the Lauderdale Plant operations.

pH--The comment referred to a reported pH value greater than the 8.5 (note: the pH at Station 3 during February 1989 was observed at 8.7). This pH observation was the only value outside of the 6.5 to 8.5 range seen at all stations during the monitoring period. Station 3 is within the confines of the cooling canal/pond system and thus not within regulatory jurisdiction. However, the observed value is likely a result of natural and/or cultural phenomena as the maximum pH for all stations was reported that month.

Copper--Table FDER9-2 presents a summary of the copper data collected during the monitoring period. As seen in the table, the copper concentration in the Dania Cut-Off Canal (Station 1) was greater than the 15 mg/L standard two times (December 1988 and March 1989). At the cooling canal/pond system outlet (Station 4), copper exceeded the standard one time (March 1989). In the receiving water (Station 5), copper was observed higher than the standard one time (April 1989).

The copper data do not exhibit any discernible spatial or temporal patterns with regard to exceeding the standard. For example, in December 1988, copper exceeded the standard only in the Dania Cut-Off Canal and in April 1989 the sole exceedance was observed in the receiving water (i.e., South Fork New River). The March 1989 data show copper exceedances at the intake (Station 1) and pond outlet (Station 4) but none in the receiving water (Station 5). The March data do show an increase of 11.3 mg/L when comparing Stations 1 and 4, but this increase is less than the 15 mg/L standard. Given the randomness of the copper exceedances and the fact that copper compounds are not used in the condenser cooling water system at the Lauderdale Plant, the copper exceedances are likely a result of natural and/or cultural phenomena and/or variability and are not due to plant operation practices.

Iron--Table FDER9-3 presents a summary of the iron data collected during the monitoring period. As seen in the table, the iron concentration in the Dania Cut-Off Canal (Station 1) was greater than the 300 mg/L standard eight times (August 1988 through March 1989). At both the cooling canal/pond system outlet (Station 4) and the receiving water (Station 5), iron exceeded the standard five times (October 1988 through February 1989).

During the 8-month period in which iron exceedances of the standard were observed, there was always an exceedance in the Dania Cut-Off Canal (Station 1); for 7 of the 8 months, iron was higher at this station than at either the pond outlet (Station 4) or in the receiving water (Station 5). This trend strongly suggests that all iron exceedances originate from the Dania Cut-Off Canal waters and are a result of unknown natural and/or cultural phenomena occurring upstream of the Lauderdale Plant. Additionally, given that the pond outlet iron concentration was generally lower than inlet water concentration, it appears that at least a portion of the iron detected was associated with particulate matter and was removed from the water column via sedimentation.

During the one observation where Stations 4 and 5 exhibited higher iron concentrations than Station 1 (i.e., January 1989), Station 4 was still the lowest concentration and its increase over background was 150 mg/L (i.e., less than the standard). The source of exceedances in that month may be due to activities in the South Fork New River. Given the above data, it is apparent that the observed iron exceedances are due to activity (of an unknown nature) upstream of the Lauderdale Plant and are not a result of the power plant operations.

Selenium--Selenium exceeded the standard of 25 mg/L during November 1988 at Station 1 (34.5 mg/L), Station 4 (31.5 mg/L), and Station 5 (32.5 mg/L). These were the only observed selenium exceedances in the jurisdictional waters. As noted from the spatial distribution of the data, selenium is higher in both the inlet water source (Station 1) and the receiving water (Station 5) than at the cooling canal/pond system outlet. Given this distribution, selenium exceedances are likely the result of activities (of an unknown nature) occurring upstream of the Lauderdale Plant and are not a result of the power plant operations.

Mercury--During the first several months of the sampling program, the monthly equipment blank data showed mercury contamination in the sampling apparatus (note: laboratory QA/QC data do not exhibit mercury contamination). Table FDER9-4 presents the monthly mercury data for the entire monitoring period including the equipment blank data and the corrected mercury data (i.e., equipment blank value subtracted from the sample value).

The corrected mercury data presented in Table FDER9-4 show that mercury was detected twice at Station 1 (December 1988 and June 1989), twice at Station 5 (December 1988 and January 1989), but was always below the detection limit at the cooling canal/pond system outlet (Station 4). Low levels of mercury in the surface waters draining from the Everglades agricultural areas are well documented. Since the detectable quantities of mercury were observed in the canals (which originate in the Everglades agricultural area), it is likely that the mercury is from that source.

FDER-11

<u>Comment</u>: FPL's current permit, Permit/Certification Number 10-06-158722 Specific Condition #1 reads as follows:

1. "The water quality at the perimeter of the Zone of discharge and the Mixing Zone shall be consistent at all times with the water quality standards set forth in Chapter 17-3, Florida Administrative Code (FAC). Should conditions of the waters within the Zone of discharge or the Mixing Zone warrant, the permittee may be required by the Department to upgrade, reduce or cease the discharge of effluent into the Zone of discharge and adopt an alternate method of disposal."

Due to the noted violation, Specific Condition #1 should be implemented or FP&L should petition the Department for site specific alternative water quality criteria through use of FAC Rule 17-3.031.

<u>Response</u>: Comment FDER-10 identified six water quality parameters which exceeded their respective Chapter 17-3, F.A.C., water quality standard at least once during the 12-month monitoring period. As described in the response to that comment, none of the water quality standard exceedances is believed to be due to operation of the Lauderdale Plant. Therefore, implementation of Specific Condition No. 1 to Permit/Certification No. 10-06-158772 does not appear to be warranted.

As also described in the Response to Comment FDER-10, the observed exceedances for pH, copper, selenium, and mercury were infrequent and randomly occurring events. Therefore, seeking site-specific alternative criteria (SSAC) for these parameters would not be an appropriate application of Chapter 17-3.031, F.A.C.

The DO and iron exceedances of their respective water quality standards were not infrequent occurrences and did exhibit some degree of spatial and/or temporal correlation. The cause of these exceedances is believed to be due to natural background and/or man-induced conditions which are unrelated to the operations of the Lauderdale Plant and cannot be controlled or abated. Therefore, it appears that SSAC for DO and iron may be appropriate.

FDER-12

<u>Comment</u>: Section 5.2.3 Measurement Programs Subsection 5.2.3.2 Ground Water stated that "After the use of the SSB/EPP is discontinued, the ground water monitoring program will be discontinued." The Ground Water Monitoring Program should be continued for one year after the SSB/EPP is discontinued, at the time a review of the data will indicate if the program should be continued or discontinued.

<u>Response</u>: FPL concurs and will continue the SSB/EPP groundwater monitoring for a period of 1 year after use of the SSB/EPP is discontinued. The continued monitoring will be at the current sampling frequency and for the current parameter list. At the end of the 1-year continued monitoring period, FPL will prepare a data analysis report which will include recommendations as to whether the monitoring should be further extended or discontinued. This report will be submitted to FDER for review and concurrence with the recommendations.

FDER-13

<u>Comment</u>: Section 3.5.4 Process Water System indicated many waste stream being treated in a on-site process water treatment system then discharged to the cooling canal/pond system. The treated effluent should be tested for all the parameters listed in FAC 17-3.061 and 17-3.121 annually.

<u>Response</u>: In Section 5.2.3.1, it was proposed that the effluent of the wastewater treatment facility would be sampled monthly and analyzed for chloride, phosphate, iron, copper, oil and grease, TDS, and pH.

The FDER suggested parameter list (i.e., all parameters in Chapters 17-3.061 and 17-3.121, F.A.C.) covers many analytes which are not used in the treatment process nor are they expected to be present in the discharge (see SCA Table 3.5-7, Page 3 of 3). For this reason, annual sampling of these parameters appears unwarranted.

As an alternative, FPL proposes to include DO in the list of those parameters identified in Section 5.2.3.1 of the SCA. This section of the SCA has been changed to reflect this addition.

FDER-14

__Comment__: Surface water monitoring stations 1 through 5 should be monitored quarterly for the parameters listed in Sections 17-3.061 and 17-3.121, F.A.C.

__Response__: FPL agrees that some form of surface water monitoring may be necessary for the waters discharged from the plant but disagrees with the sampling location and parameter list suggested in the comment. FDER suggested sampling locations (i.e., surface water monitoring Stations 1 through 5) are not valid sampling points because two of the stations (Stations 2 and 3) are within the cooling canal/pond system (which is a treatment system) and not within a water of the state. Additionally, although Station 5 is in the receiving water, it is also downstream of a number of boat dry-dock and repair facilities. Therefore, FPL recommends alternative sampling locations at Station 4 (at the cooling canal/pond system outlet) which is where the plant discharges are released to waters of the state and Station 1 which is the background station.

The FDER suggested parameter list (i.e., all parameters in Chapters 17-3.061 and 17-3.121, F.A.C.) covers many analytes which:

1. Are not used in the treatment process nor are they expected to be present in the discharge (see SCA Table 3.5-7, Page 3 of 3); and
2. Were shown not to exceed the FDER water quality standards during the 12-month surface water monitoring program.

Therefore, quarterly monitoring for all FDER water quality parameters appears unnecessary.

As an alternative, FPL recommends quarterly monitoring at Stations 1 and 4 for those parameters which are expected to be present in the discharge. Section 5.2.3.1 has been modified to reflect this proposed change.

5.2.1.2 Groundwater Discharges

No new industrial wastewater will be discharged to groundwater, and existing groundwater discharges at the facility will be eliminated. The new equalization basin will be lined, and the existing solid settling basins and evaporation/percolation pond in the eastern portion of the site will be eliminated. The stub canal percolation pond and the proposed runoff pond will be the only remaining ponds, receiving only stormwater runoff.

All other industrial process wastewater is to be treated at the wastewater treatment facility which discharges to surface water. Minor sources of discharges to groundwater at the site will include five remaining septic tanks, which serve various facilities across the site and discharge an average of 1,000 gpd. These septic tanks are located in isolated areas of the site (see Section 3.5.2); the use of all other septic tanks will be replaced by connection to the Hollywood sewer system.

5.2.2 Cooling Tower Blowdown

There will be no cooling towers at the Lauderdale Repowering Project and, therefore, no cooling tower blowdown.

5.2.3 Measurement Programs

5.2.3.1 Surface Water

Currently, the condenser intake and outlet are measured for temperature. These measurements will continue after the existing Units 4 and 5 are repowered. In addition, the new wastewater treatment facility effluent will be sampled monthly for flow, chloride (Cl), phosphate (PO_4), iron (Fe), copper (Cu), oil and grease, TDS, pH, and DO. Surface water monitoring will be performed quarterly at Stations 1 and 4 for Cl, PO_4, Fe, Cu, oil and grease, TDS, pH, and DO. The description of the numerical computer model used to assess the potential impacts of chemical discharges is presented in Section 5.1.5.1.

FDER-15

<u>Comment</u>: A limitation on heat input to duct burners per last sentence of Section 4.2 (page 4-3) of PSD APP to 90.62 x 10^6 Btu/hr may be needed. The facility may escape NSPS subpart Db because it is less than 100 x 10^6 Btu/hr.

<u>Response</u>: The maximum design heat input for the duct burners is 90.62 x 10^6 Btu/hr. Therefore, the NSPS codified in 40 CFR Part 60 Subpart Db do not apply. Refer to Errata 1, Volume 2, Page 4-3.

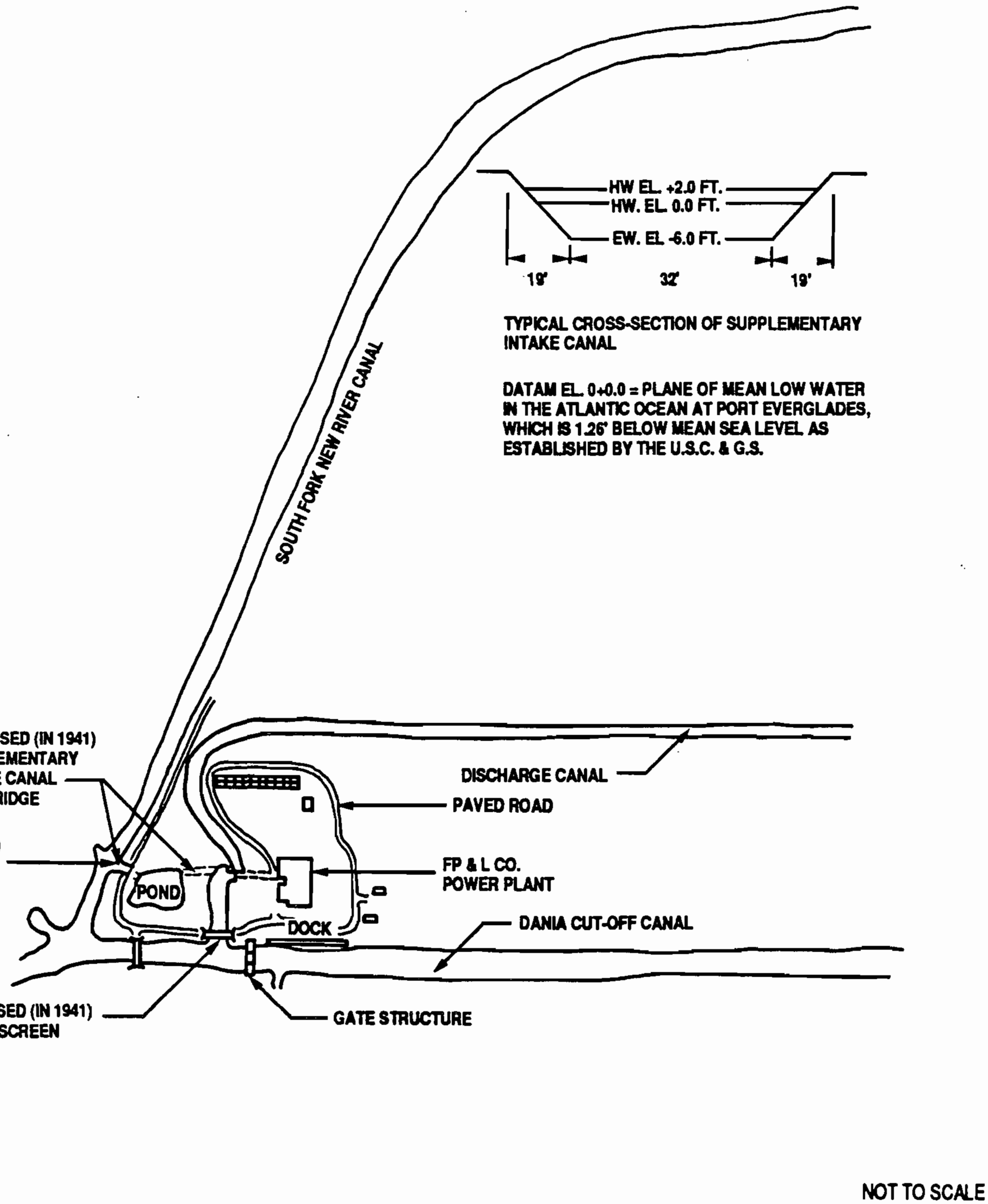
FDER-16

Comment: It appears that repowering this plant can be accomplished without filling the finger canal connected to the Dania Cut-Off Canal and the South New River Canal. Please justify the need for the canal filling.

Response: The water body referred to as a finger canal is the old intake canal which originally served Units 1, 2 and 3, as depicted in Figure 2.3-37 of the SCA. Figure FDER16-1 shows the original configuration of that canal when it connected only to the Dania Cut-Off Canal (1941) and before the "supplementary" canal was constructed to connect to the South Fork New River. Thus, this water body is actually an unused portion of a former circulating water system.

Section 10.1.4 includes the application for permit for activities in the waters of the state, beginning on Page 10.1.4-24, for the filling activity referred to in the comment.

The reason for filling this area is that construction of the Lauderdale Repowering Project is expected to produce significant quantities of material which meets the definition of "Construction and Demolition Debris" [Chapter 17-701.020(14), F.A.C.]. Disposal of such material is allowed either at a permitted landfill or solid waste facility, or the material may be used as fill in any area, including waters of the state, if a dredge and fill permit is obtained [Chapter 17-701.061(1), F.A.C.]. FPL prefers to avoid the environmental impacts associated with transporting such material off-site and consuming space at a landfill when on-site disposal is appropriate. Additionally, after filling the area, it will become a dry detention area complying with SFWMD requirements.



SOURCES: FPL, 1941; KBN, 1990.

Figure FDER 16-1

ORIGINAL CONFIGURATION OF SUPPLEMENTARY INTAKE CANAL AND TRASH SCREENS - - 1941

Lauderdale Repowering Project

FPL

FDER-17

<u>Comment</u>: Please be aware that mitigation may be needed to offset the loss of open water and fringe area.

<u>Response</u>: FPL agrees that mitigation may be appropriate and plans to create a manatee shelf which will compensate for loss of open water and fringe area.

FDER-18

Comment: Ft. Lauderdale FPL Repowering RO discharge is Probably in Violation of Pre Treatment Requirements.

Response: Mr. Harold Frediani of Ebasco Services Incorporated contacted Mr. Vic Kamath of FDER to obtain clarification of the comment which was authored by Mr. Kamath. Because the RO reject (concentrate) is not discharged to a POTW, it does not have to meet any pretreatment standards.

As illustrated in SCA Table 3.5-7, the RO concentrate has a maximum flow of 667 gpm (Page 3.5-21). This flow is mixed with the 252,000 gpm of cooling water (described in SCA Section 5.2.1.1), for a dilution ratio in excess of 300 to 1. This mixture then resides in the cooling canal/pond system (see SCA Table 3.5-6) for about 30 hours before being discharged to waters of the state.

Mr. Kamath expressed concern that the RO concentrate might exhibit toxicity due to concentrations of hydrogen sulfide or due to lack of dissolved oxygen. As shown in SCA Table 2.3-9, DO ranged between 2.8 and 6 mg/L at the circulating water intake (Station 1) and between 3.1 and 7.5 mg/L at the location representative of the POD (Station 4). The impact of the RO concentrate DO level on that of the combined discharge can be shown mathematically to be insignificant. The presence of DO at or above 3.1 mg/L also precludes the presence of hydrogen sulfide at toxic levels at the POD.

FDER-19

Comment: How are the following waste streams to be handled: Combustion turbine wash water, Chemical lab wastes, what Biocide, where is discharge of proposed process water treatment system, and R.O. reject?

Response: The wastestreams will be handled as follows:

1. Combustion turbine washwater will be collected in sumps (one each for Units 4 and 5) located inside the CT environmental enclosure. From these sumps, it will be transferred to a pump station in the HRSG area. It will then be pumped to the equalization basin as shown on Figure 3.5-6 of the SCA and subsequently treated in the wastewater treatment facility.
2. Chemical laboratory wastes will be collected in a sump in the Results Department building. From there, they will be pumped to a sump in the steam turbine area. This sump's contents will then be pumped to the same pump station in the HRSG area that is described in Item 1 above.
3. Biocide will not be used in any of the wastestreams. The only biocide used on-site is in the oil, as described in Sections 3.6.2 and 3.7.2. Stormwater runoff from fuel storage and handling areas, which might contain fuel oil with some of these biocides, will be collected in sumps in the fuel storage and handling areas and pumped directly from those sumps to the separate oily waste equalization basin. As shown on Figure 3.5-6, this waste will then be routed through a pretreatment facility including both physical and chemical oil separation (see Figure 3.6-1).
4. The process water treatment system discharges to the wastewater treatment system (see Figure 3.5-5). The wastewater treatment system eventually releases its effluent to the existing discharge channel to the cooling canal/pond system. This location is labelled "Non-thermal Liquid Releases" on Figure 3.2-2.
5. RO reject will be monitored for pH. If the pH is between 6.0 and 8.5, it will be released to the existing discharge channel to the

cooling canal/pond system (see description of location in Item 4 above).

Otherwise, it will be routed to the wastewater treatment system for pH adjustment.

FDER-20

<u>Comment</u>: Why not tie rest of the septic tanks in to a central sewer; Via low pressure sewers if necessary.

<u>Response</u>: The septic tanks in question now serve a combined population estimated at 10 people and is proposed to do so after repowering. The proposed central sewer will serve a population estimated to be 175 people. Capital costs to tie in the last 10 people would more than double the installation cost. Because the environmental impact of the existing system is negligible, the impact of the future reduced flow rate is also expected to be negligible.

FDER-21

Comment: Please provide breakdown of fuel consumption between HRSGs and gas turbines.

Response: The maximum fuel usage for the CTs and duct burners is presented in Tables A-1 and A-4 of the air permit application and is summarized in Table FDER21-1. The duct burners will be used only as necessary to increase steam production in the HRSG when the CTs cannot provide all the required energy through waste heat. The natural gas usage in the duct burners will be variable depending on ambient temperature, electric needs, and final unit performance. In any event, at the maximum heat input, the duct burners will be less than 5 percent of the total heat input to each unit. The duct burners will not be fired with No. 2 fuel oil or fired with natural gas when the CTs are fired with No. 2 oil.

Table FDER21-1. Maximum Fuel Usage for FPL Lauderdale Combustion Turbines and Duct Burners

Fuel	Ambient Operating Temperature 40°F	ISO	75°F	95°F
Combustion Turbines (each)[a]				
Fuel oil (lb/hr)	88,531.7	89,567.4	86,088.9	81,837.2
Natural gas (M scf/hr)	1,696.8	1,672.4	1,604.8	1,526.6
Duct Burners (each)				
Natural gas (M scf/hr)	86.3	86.3	86.3	86.3

Note: M scf/hr = thousand standard cubic feet per hour.
lb/hr = pounds per hour.

[a]Either fuel can be fired, but not both fuels simultaneously.

FDER-22

Comment: Please provide economics of using SCR for oil firing. Molecular sieve catalysts have been proven on oil-fired operations.

Response:

1. The economics of SCR for gas firing are presented in Table 4-4 within the Air Permit Application (SCA Section 10.1.5). While cost associated with oil firing is expected to increase as a result of catalyst replacement. More significant costs potentially would occur due to corrosion in the low pressure boiler tube bundles of the HRSG. Sufficient operating experience has not been gained to estimate these costs either in terms of material substitution in the HRSG or replacement of boiler tubes. Neither is there sufficient operating experience to estimate accurately back end HRSG washing required to remove ammonium bisulfate deposits. Some limited operating experience would suggest that the low pressure boiler tubes would have to be washed frequently during oil firing to limit backend HRSG corrosion.

   Taken together, the catalyst replacement and HRSG corrosion potentially would increase the cost in Table 4-4 by $8,576,540 or by about 50 percent (assuming one additional catalyst replacement every two years and 4 hours washing the HRSG backend every other week).

   FPL has been unable to confirm that molecular sieve catalysts have been proven on oil-fired operation of large combustion turbines or combined cycle facilities.

   (See also technical comments to EPA's letter dated 2/12/90, i.e., response to FDER-28.)

FDER-23

Comment: Please address the possibility of using HRSGs with low NO_x burners. A review of previous permits indicates HRSGs capable of meeting 0.1 lb/MMBtu for NO_x emissions.

Response: Recent bid evaluations and negotiations with HRSG vendors have now resulted in a guaranteed duct burner emissions limit of 10 lb/hr NO_x at 90 MMBtu per hour. This is equivalent to 0.1 lb/MMBtu. Guarantee on the emission rates of particulate matter, CO, and VOCs also have been obtained for this level of NO_x control. The second page of Table 3.4-2 and Table 2-2 in the Air Permit Application (SCA Appendix 10.1.5) have been revised accordingly; new versions follow.

Table 3.4-2. Estimated Performance on Natural Gas Fuel, Full Load for One CT/HRSG Train (Page 2 of 2)

Parameter	Value
Duct Burner Emissions	
NO_x at 0.2 lb/10^6 Btu, lb/hr	10.0 (1.9 ppmvd[a])
CO, lb/hr	17.6 (5.4 ppmvd[a])
VOC, lb/hr as C	2.0 (1.1 ppmvd[a])
Particulates, lb/hr	0.7
SO_x, lb/hr	0.003

[a]ppm based on total exhaust flow from CTs.

Table 2-2. Maximum Criteria Pollutant Emissions for Lauderdale Repowering Project

Pollutant	CT Maximum Emissions[a]	Supplemental Firing Emissions
Particulate[b]		
Basis	Design	Design
lb/hr	60.6	0.7
TPY	265.4	3.1
Sulfur Dioxide		
Basis	0.5% sulfur	2 gr/1,000 ft^3[c]
lb/hr	895.67	0.05
TPY	3,923.1	0.22
Nitrogen Oxides		
Basis	65 ppm[d]	0.1 lb/10^6 Btu
lb/hr	440.0	10
TPY	1,972.1	43.8
Carbon Monoxide		
Basis	33 ppm[e]	0.055 lb/10^6 Btu
lb/hr	108.9	17.6
TPY	477.1	77.1
VOCs		
Basis	6 ppm[e]	0.018 lb/10^6 Btu
lb/hr	8.49	2.0
TPY	37.2	8.8
Lead		
Basis (lb/10^{12} Btu)	8.9	neg.
lb/hr	0.015	neg.
TPY	0.066	neg.

[a]Maximum emissions with oil firing at ISO conditions except for particulate, CO, and VOC; maximum emissions for these pollutants are 40°F (see Table A-2).
[b]Does not include sulfate or sulfite aerosols; those emissions are included in sulfuric acid emissions.
[c]Maximum pipeline sulfur is 200 gr/1,000 ft^3.
[d]Corrected to 15 percent O_2 dry conditions.
[e]Corrected to dry conditions.

Note: gr/1,000 ft^3 = grains per 1,000 cubic feet.
lb/10^6 Btu = pounds per million British thermal units.
lb/10^{12} Btu = pounds per 10^{12} British thermal units
lb/hr = pounds per hour.
ppm = parts per million.
TPY = tons per year.

FDER-24

<u>Comment</u>: The non-regulated pollutants antimony, barium, cobalt, radionuclides, zinc, and chlorine are identified for gas/oil combustion in the publication "Control Technologies for Hazardous Air Pollutants." These pollutants should be addressed a part of the BACT.

<u>Response</u>: Table A-9 has been added to show emissions of antimony, barium, cobalt, zinc, and chlorine when firing oil. Review of other EPA emission factor references do not include these pollutants for natural gas firing. In addition, no emission factor references were found for radionuclides for natural gas or distillate oil firing.

As discussed in Section 4.3.5 of the Air Permit Application (Appendix 10.1.5), there are no technically feasible methods for controlling trace amounts of nonregulated pollutants in combined cycle plants other than the inherent quality of fuel.

Table A-9

FDER-25

Comment: Application should address the possibility of using "improved combusters" which are capable of limiting NO_x to 25 ppm.

Response: The "advanced" combustion turbines selected for the Repowering Project utilize combustion technologies to minimize NO_x emissions (see Section 3.1 of SCA). These machines are specifically designed for utility use, with combined cycle operation. They minimize emissions not only by reducing the ppm in the exhaust stream but also by maximizing the MW output per unit of fuel (see SCA Section 3.4.5). The 42 ppm proposed as BACT is the minimum value guaranteed by any vendor when bids were received.

The advanced combustion turbine selected for the Lauderdale Repowering Project has been developed jointly by Westinghouse Electric Corporation and Mitsubishi Heavy Industries Ltd. The following discussion is based on information provided by employees of these two companies in a paper submitted for publication in the Transactions of the ASME in 1988.

ABSTRACT

The 501F 60HZ Combustion Turbine has been developed jointly by Westinghouse Electric Corporation and Mitsubishi Heavy Industries Ltd. It continues a long line of large heavy-duty single-shaft combustion turbines by combining the proven efficient and reliable concepts of the W501D5 with the low NO_x technology of the MW701D together with the experience of the advanced cooled MF111. The new engine is described along with improved evolutionary changes made from previous engines.

Planned design and performance verification programs including model, full scale component testing, and full load engine tests are described. Mature output and efficiency in simple cycle mode will be 145 MW and 34%, respectively, with expected combined cycle efficiencies in excess of 50%.

INTRODUCTION

The 501F is a 3600 RPM heavy-duty combustion turbine designed to serve the 60Hz power generation needs for utility and industrial service in the 1990's. This engine represents the latest in the evolutionary cycle that continues a long line of large single shaft heavy-duty combustion turbines. Jointly developed by Westinghouse Electric Corporation and Mitsubishi Heavy Industries, Ltd., the 501F combines the efficient, reliable design concepts of the W501D5[4] with the low NO_x combustion technology of the MW701 D [2] and the state of the art cooling utilized in the advanced, high temperature MF111 [9]. The result is an advanced design, high temperature, efficient, low NO_x, more powerful combustion turbine based on time proven reliable design concepts that will satisfy the large combustion turbine power generation needs for the next decade. Designed for both simple and combined cycle applications, it will operate on all conventional combustion turbine fuels as well as with coal derived low Btu gas produced in an integrated gasification combined cycle power plant (IGCC) [3]. Currently being offered for 1990 operation, it will have an initial simple cycle ISO rating of 135 MW with a heat rate of 10,150 Btu/Kwh (LHV) at a turbine inlet temperature of 1210°C (2210°F) on natural gas fuel. The mature rating shown in Table I is at a turbine inlet temperature of 1260°C (2300°F) and will be achieved after obtaining sufficient field experience. In combined cycle applications the thermal efficiency of the mature plant can exceed 50% (LHV) in power blocks of 200 MW nominal power rating.

	INITIAL	MATURE
POWER, NET KW	135,000	145,000
HEAT RATE, KJ/KW-HR	10,706	10,548
BTU/KW-HR	10,150	10,000
AIR FLOW, KG/SEC	413.6	413.6
LBS/SEC	912	912
PRESSURE RATIO	14:1	14.2:1
EXHAUST TEMPERATURE, °C	545	571
EXHAUST TEMPERATURE, °F	1013	1061

TABLE I 501F PLANT PERFORMANCE

Since the late 1940's, with the growth of the aviation gas turbine, combustion turbine technologies have experienced a continuous evolution. This has, in general, been reflected in the technology of the heavy-duty combustion turbines used for power generation and mechanical drive applications. During the past ten years; heavy-duty combustion turbines have operated at a turbine inlet temperature in the vicinity of 1093°C (2000°F). In the past, increases in firing temperatures have been driven by competitive market pressures, however, a ten year hiatus from increases in firing temperature due primarily to a lack of these pressures, has provided sufficient time for advancements in manufacturing, material processing and quality control to allow for the state-of-the-art cooling technology, used successfully by the aviation industry for many years, to be utilized in the larger units. The first heavy-duty combustion turbine to incorporate these advanced cooling-technologies was the MF111 with initial commercial operation in August of 1986 at a turbine inlet temperature of 1160°C (2120°F). In addition, stringent emission regulations in Japan provided increased pressure on Mitsubishi Heavy Industries, Ltd. to develop the low NO_x Hybrid Combustion system that has operated successfully at Higashi-Niigata Tohoku Electric Power Company Plant since 1984. Across the board advances in computer technology in the past decade have also enabled manufacturers to improve analytical procedures in all aspects of design including stress analysis, heat transfer, aerodynamics, fluid mechanics, and structural dynamics. For some critical components, the computer program completely integrates all the governing engineering disciplines into a single iterative routine for quick, accurate optimization.

LOW NO_x COMBUSTION SYSTEM

The 501F gas turbine has 16 cannular combustors with the same diameter and length as the MW501D and MW701D. A new premix lean-burn hybrid combustor is to be applied to meet the existing and new NO_x emissions limitations around the world while having dual fuel capability. The hybrid concept proposed in 1977[1], was first developed for engine use in the MW701D[2] and has been in commercial operation since December 1984 at Tohoku Electroc Power Company HAGASHI NIGATA combined cycle Plant where NO_x emissions have been reduced to 60 ppmv on natural gas fuel without water or steam injection at a turbine inlet temperature of 1085°C (1985°F).

The hybrid combustor features a two-stage burner assembly and a bypass valve which directs a portion of the compressor delivery air directly into the transition piece to enhance flame stability during starting and to maintain desired fuel/air ratio during loading. This unique valving system then is modulated to full closed at full load. The new hybrid combustor differs from the present one by having the ratio of pilot to main fuel trimmed considerably to reduce pilot burner NO_x generation and, thereby, overall NO_x emission. The combustion liners and transition pieces are provided with a Mitsubishi Heavy Industries Ltd. developed configuration named MTFIN, shown in Figure 10 and already proven in service in the MF111. This twin layer composite structure has inherently more efficient cooling, thus providing more air for the low NO_x system.

In summary, the advanced CTs are different from standard CTs in the following respects:

1. Higher power output and improved efficiency (150 to 160 MW for advanced machines compared to 80 to 100 MW for standard machines),
2. The higher operating temperature (i.e., 2,300°F turbine inlet temperature for an advanced machine compared to about 2,000°F for a standard machine) which has the potential for greater NO_x emissions, and
3. Improved combustors already included in the design of the advanced machine to limit NO_x production and maximize power output.

FDER-26

<u>Comment</u>: Provide basis for using capable recovery factor with 12 percent interest over 30 years for annualized capital cost on Tables 4-4, 4-5, and 4-6.

<u>Response</u>: These figures represent FPL's weighted average incremental cost of capital and are applied in all long-term financial studies. They were utilized in both the Annual Planning Hearing (APH) and the Petition to Determine Need for Electrical Power Plant 1993-1996 (November 1989, Table III.D.1). Details of the derivation of the capital recovery factor are presented in the need-for-power documents filed before the PSC on July 25, 1989.

FDER-27

__Comment__: Provide basis for using levelizing factor with 12 percent interest, 30 years, and 5 percent escalation rate levelized annual cost on Tables 4-4, 4-5, and 4-6.

__Response__: These figures represent FPL's weighted average incremental cost of capital and are applied in all long-term financial studies. They were utilized in both the Annual Planning Hearing (APH) and the Petition to Determine Need for Electrical Power Plant 1993-1996 (November 1989, Table III.D.1).

FDER-28

<u>Comment</u>: Provide responses to EPA Region IV's comments regarding BACT (copy of letter attached).

<u>Response</u>: Refer to the technical comments to EPA Region IV's letter.

FPL

Lauderdale Repowering Project

SITE CERTIFICATION APPLICATION

Responses to SFRPC Comments

SFRPC-1

Comment: Staff would find it helpful if the application indicated whether a zoning change or variance is necessary to comply with the local code. Portions of the Broward County Zoning Code are included in Section 10 of the application. The M-1 and M-3 zoning categories are listed as the existing approved zoning; however, they do not specifically allow utilities.

Response: As of the date the SCA was filed and the date it was determined to be complete, the entire Lauderdale site was located in unincorporated Broward County and zoned M-3 under the Broward County Zoning Code. While electric utility facilities are not specifically listed as a permitted use under the M-3 category, the code contains no prohibition on such use in this zoning category. Based upon the evidence presented at the land use hearing held in the site certification proceedings for the Lauderdale Repowering Project on March 13, 1990, the designated Hearing Officer has determined that the proposed use of the site is consistent and in compliance with the Broward County Zoning Code (see Hearing Officer's Recommended Order in DOAH Case No. 89-6636, dated April 4, 1990). Broward County has concurred that the site location is consistent with applicable land use plans and zoning ordinances.

SFRPC-2

Comment: Figure 4.1.1 is described as illustrating the areas of construction under this proposal. Section 4 also states that only 3 acres of disturbed wetlands will be affected, thereby not creating a significant impact to aquatic resources.

Please illustrate which portions of the new construction area are in wetlands (disturbed or otherwise). Please describe a mitigation proposal that is commensurate with the quality of the resource lost.

Response: The central construction laydown/parking area (Item 9 on SCA Figure 4.1-1) and the filling of the old intake will impact existing on-site wetlands. These areas are further illustrated on SCA Pages 10.1.4-7 and 10.1.4-31, respectively.

The proposed mitigation for these areas is addressed in responses to FDER-17, SFWMD-31, and BCEQCB-5.

SFRPC-3

Comment: What is the net drawdown effect to the water level at the site and in nearby SFWMD canals from the proposed activities?

Response: The only activity associated with the repowering project which has a potential net drawdown effect on nearby water levels is the withdrawal of groundwater. The impact of this withdrawal is addressed on SCA Pages 2.3-29 through 2.3-35 and in the responses to comments SFWMD-7, -8, -9, -14, -32, and -34.

SFRPC-4

__Comment__: Section 3 discusses using light oils for the plant. Please explain to what extent recycled fuels or oil can be utilized as a fuel source.

__Response__: The actual fuel oil for the plant must meet the requirements of the ASTM Specification D2880 for Gas Turbine Fuel Oil designated No. 2-GT. Because this specification is fairly rigorous with respect to impurities, no use of recycled fuels or oils as a fuel source is planned.

FPL

Lauderdale Repowering Project

SITE CERTIFICATION APPLICATION

Responses to SFWMD Comments

SFWMD-1

Comment: 2.1.2 Existing Site Uses--As a point of information, the references to right-of-way permits on pages 2.1-6 and 2.1-8 (Table 2.1-2) should be corrected to read right-of-way occupancy permits. Additional District comments/questions on the status of these permits can be found under Section 2.2.4 (Easements, Titles, Agency Works) and in Appendix 10.4 (Existing Permits).

Response: Comment is noted. See response to SFWMD-4 and Table SFWMD 4-1.

SFWMD-2

Comment: 2.1.6 Property Delineation--The legal description of the repowering project provided in Figure 2.1-6 excludes portions of the South New River and Dania Cutoff Canal rights-of-way which appear to be used by the existing power plant as well as some of the facilities associated with the repowering project. Since the canals will continue to be used as part of the cooling water system for the repowered facilities, the legal description and accompanying drawing should include these canals. For the same reason, the discharge canal to the South Fork New River should also be identified as part of the repowering project.

Response: The legal description in the SCA is of the boundary of the site FPL owns or has right of control over. Even though cooling waters will be withdrawn from and discharged to surrounding canals, it is not appropriate to extend the legal description to those water courses. By extension, cooling water flows to and from the site by a series of water courses, and one would not include them in the descriptions of the area to be certified. The certified site represents the area FPL controls in which development will occur. If necessary, uses of other properties beyond the site boundary will be obtained through mechanisms such as permits or leases.

SFWMD-3

Comment: 2.2.4 Easements, Titles, Agency Works--This section should be revised to address the following questions/comments.

Based on a review of the information provided in the application, it appears that there are roads, cooling ponds, and possibly other existing uses on the District's rights-of-way which have never received the appropriate right-of-way occupancy permits from the District. A request to have those uses authorized should be made as soon as possible. While this can be done as a modification to this certification application, it can also be done through the District's right-of-way occupancy permitting process. This would allow the certification application to deal only with those modifications, if any, associated with the repowering project itself while using the right-of-way occupancy permitting process to handle those modifications which should have occurred prior to the submittal of the certification application. Due to the timetables associated with these two processes, the right-of-way occupancy permit modifications would most likely be completed by the time of the certification hearing on the repowering project.

Response: FPL acknowledges that there may be uses associated with the existing plant that are located on SFWMD rights-of-way. If indeed there are such uses, FPL will apply to the district for permits for such uses. FPL agrees that permitting of existing uses and modification of existing ROW permits, including the consolidation of all such ROW permits into one master permit, is appropriate. By June 1, 1990, FPL intends to submit an application to modify and to consolidate such permits. As suggested by district staff, any ROW uses undertaken as part of the Lauderdale Repowering Project could then be handled as part of the PPSA certification.

SFWMD-4

<u>Comment</u>: 2.2.4 <u>Easements, Titles, Agency Works</u>--The information contained in Appendix 10.4-65 should be replaced with copies of the right-of-way occupancy permits issued to FP&L which clearly identify the authorized uses of the District's rights-of-way. As a result of reviewing our files, we have identified a number of potential discrepancies between permitted and existing uses which should be resolved, including permitted facilities which are not included in the list of permits in Table 2.1-2. These items are discussed in more detail under Appendix 10.4

<u>Response</u>: In lieu of submitting copies of the actual permits (which would constitute a voluminous insert to the SCA), a list of the existing SFWMD right-of-way occupancy permits for the Lauderdale site is provided as Table SFWMD 4-1. The list identifies the uses permitted under each permit. Based on discussions with the district staff, this list represents the current ROW occupancy permits for uses of SFWMD ROWs associated with the FPL Lauderdale site.

Table SFWMD 4-1. Summary of SFWMD Right-of-Way Occupancy Permits for FPL Lauderdale Plant Site (Page 1 of 2)

The following is a chronological list of right-of-way occupancy permits issued by the South Florida Water Management District for various features of the FPL plant site, which enter or cross canals around the site. First is a list of permits along the Dania Cut-Off Canal, followed by a list of permits along the South New River Canal.

I. <u>Dania Cut-Off Canal</u>

1. Permit No. 1927-15, issued July 12, 1927--Permit for construction and operation of a bridge across the Dania Cut-Off Canal.

2. Permit No. 1939-4, issued August 15, 1939--Permit for construction and operation of a tide gate (since removed and relocated) in the Dania Cut-Off Canal, and for construction and operation of an intake and discharge canal from and into the Dania Cut-Off Canal.

3. Permit No. 1941-21, dated January 28, 1941--Permit for operation of oil unloading dock and construction and operation of extension of that dock in the Dania Cut-Off Canal.

4. Permit No. 1941-22, dated January 21, 1941--Permit for construction and operation of a trash screen in the Dania Cut-Off Canal for the original intake; for an intake canal between the South New River Canal and an existing on-site pond connecting to the original intake canal; for a bridge and roadway over the newly excavated canal; and for construction of a trash screen at this newly excavated canal.

5. Permit No. 483, dated December 28, 1955--Permit for construction of concrete oil unloading docks and dolphins and a portion of a road on the north side of the Dania Cut-Off Canal.

6. Permit No. 502, issued February 15, 1956--Permit for construction and operation of tide gate in Dania Cut-Off Canal, upstream from intake canals for Units 4 and 5.

7. Permit No. 552, dated June 8, 1956, and modified March 9, 1989--Permit for original dredging, and later maintenance dredging, of intake canals for Units 4 and 5, along the Dania Cut-Off Canal.

8. Permit no. 6564, dated October 7, 1976--Permit for construction of seawall along north and south shore of Dania Cut-Off Canal around existing tide gate.

9. Permit No. 7055, dated July 12, 1979--Permit for aerial messenger and control cable over the Dania Cut-Off Canal.

Table SFWMD 4-1. Summary of SFWMD Right-of-Way Occupancy Permits for FPL Lauderdale Plant Site (Page 2 of 2)

II. <u>South New River Canal</u>

1. Permit No. 6720, dated August 11, 1977--Permit for replacement of wooden bridge with culvert for the canal connecting old intake pond to South New River Canal.

2. Permit no. 83, dated May 1, 1953 (and subsequently modified)--Permit for three 138-kV transmission lines running north/south, across the South New River Canal.

3. Permit No. 1943, dated June 11, 1962--Permit for five transmission lines crossing the South New River Canal, running east and west.

4. Permit NO. 2269, issued November 1, 1963--Permit for single transmission line crossing South New River Canal, running east/west.

SFWMD-5

Comment: 2.2.4 Easements, Titles, Agency Works--Any subsequent changes made to the originally authorized uses and/or facilities should be clearly identified as modifications in this application if the permit(s) have not yet been modified, pursuant to Section 40E-6.331, F.A.C., to reflect these changes. This would include previously authorized uses and/or facilities which are no longer in use. If any new changes in the existing uses and/or facilities are proposed as a result of the repowering project, those changes should also be clearly identified in the certification application as a modification to the existing permit(s).

Response: Changes to existing uses, uses that have been discontinued, and uses that FPL intends to remove from the district's ROWs will be identified in the application to modify and consolidate permits under a master permit number. See also the response to SFWMD-3.

SFWMD-6

Comment: 2.3.3 Site Water Budget and Area Users--As a result of current saltwater intrusion patterns in the vicinity of the power plant, District staff are concerned about the relationship between the existing and future groundwater and surface water withdrawals by FP&L and the continuing inland migration of saline waters in this area. It is important that the following questions be adequately addressed by FP&L if the District is to perform the required analyses regarding reasonable-beneficial use. It is recommended that FP&L consult with district staff prior to initiating any field or modelling activities in order to ensure that the proposed methodologies are compatible with District permitting criteria and practices.

2.3.3 Site Water Budget and Area Users--Please provide a figure equivalent to Figure 3.5-1 (Proposed Water Uses Simplified Flow Diagram) for all existing plant water uses.

Response: The most recent figure of this type was included in the NPDES renewal application submitted in May 1986. A copy of that figure and the table explaining it are provided as Figure SFWMD6-1 and Table SFWMD6-1, respectively. Although this figure depicts wastestreams rather than water uses, it does show all the uses. The source water is off-site wells.

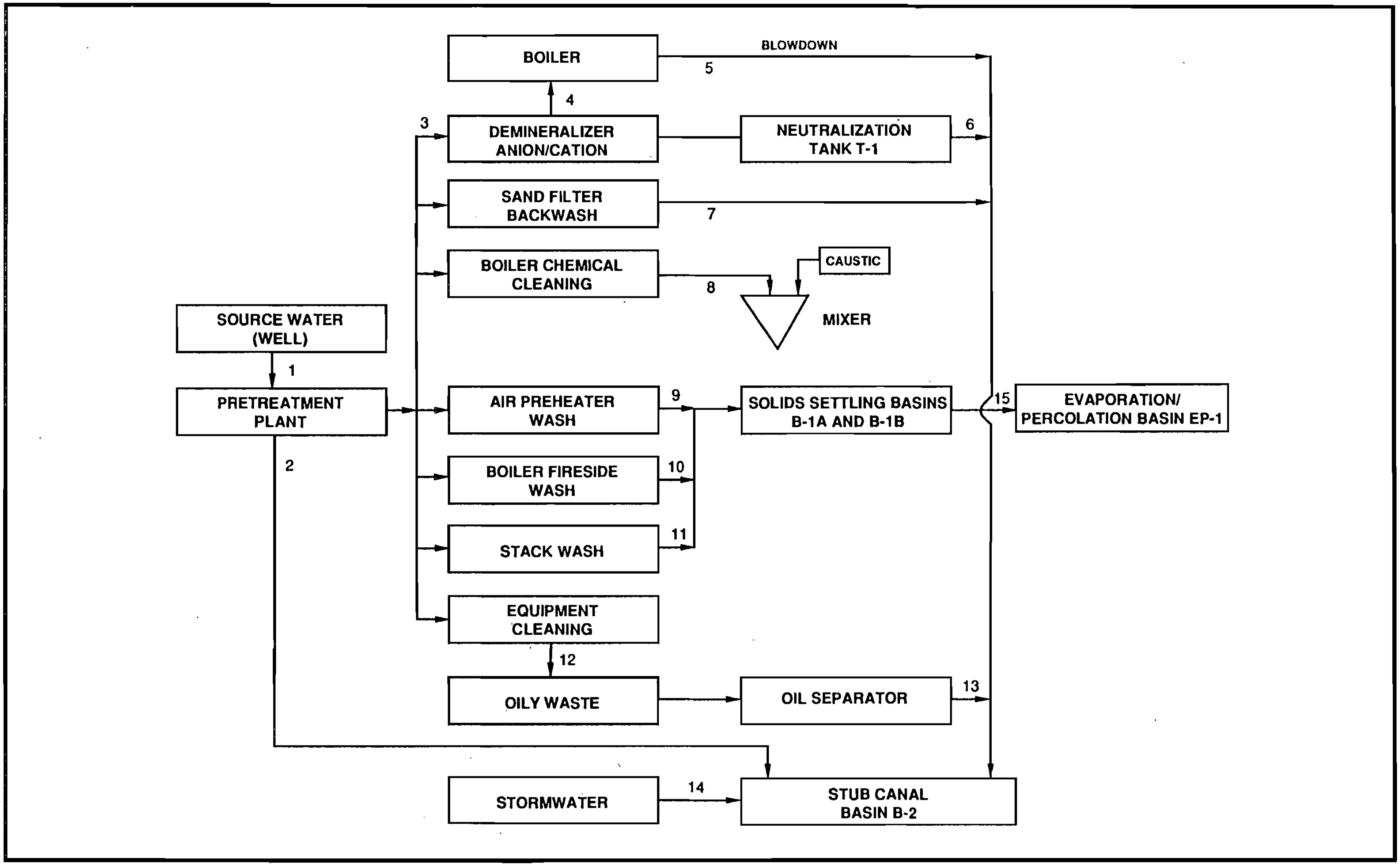


Figure SFWMD6-1 LAUDERDALE PLANT WASTE SYSTEM FLOW DIAGRAM

Lauderdale Repowering Project

FPL

Table SFWMD6-1. Average Waste Stream Flows

1. 68,000 gallons/day
2. 55 gallons/day
3. 46,000 gallons/day
4. 20,000 gallons/day
5. 13,000 gallons/day
6. 13,000 gallons/day
7. 500 gallons/day
8. 150,000 gallons per cleaning; average one cleaning per unit every 2 to 3 years.
9. 48,000 gallons/year
10. 200,000 gallons/year
11. 48,000 gallons/year
12. 6,000 gallons/day
13. Variable due to rainfall
14. Variable due to rainfall
15. Emergency overflow for basins[a]

[a]Overflow from basins would only occur as a result of a significant rainfall event. An event to cause overflow has never occurred at the plant.

SFWMD-7

Comment: 2.3.3 Site Water Budget and Area Users--District staff are concerned that the two-dimensional model (PLASM) used by FP&L in its analysis of drawdown impacts may not be adequate in view of existing site conditions. While the PLASM model included the surrounding canals as constant head boundaries, District analysis of the lithologic data and the results from the slug test conducted at the site indicates that the canal may not act as a fully penetrating barrier. In addition, there is probably a fair amount of silt on the bottom of the canals which would further reduce the amount of water the canals supply to the aquifer. Please provide additional data which will address these concerns and more adequately validate this assumption.

Response: In response to SFWMD concerns that the PLASM modeling previously conducted may not have adequately defined drawdown impacts due to the complexity of site conditions, FPL agreed to conduct a hydrogeologic investigation at the site. This hydrogeologic investigation, conducted from February 8 through April 5, 1990, was in accordance with the Scope of Work agreed to by the district during a February 8, 1990, meeting between SFWMD and FPL. Preliminary hydrogeologic modeling was conducted using INTERSAT [the model used by SFWMD Water Use Permitting Division to evaluate consumptive use permit (CUP) applications] to design the optimal placement of observation wells for an aquifer performance test (APT). The results of the preliminary modeling and the APT design were approved by SFWMD during a February 23, 1990, presentation. Fourteen observation wells were installed to four discreet vertical intervals of the Biscayne aquifer, extending from 20 ft to 150 ft depths. Background water-level data were electronically collected in observation wells for 6 days, and background water quality samples were collected from all observation wells, the discharge canal, and the Dania Cut-Off Canal and analyzed for chloride concentrations. The APT was conducted March 20 through March 23, 1990, simulating FPL pumpage and adequately stressing the aquifer to obtain reliable test results. Water quality samples were collected near the end of the 72-hour pumpage segment of the test and again 4 days following stabilization of the aquifer. APT data evaluation included groundwater modeling using INTERSAT to define drawdown impacts as well as determination of physical aquifer parameters including transmissivity and storativity. Water quality impacts were indicated by chloride concentration fluctuations during and following pumping.

The results of the hydrogeologic investigation conducted at the FPL Lauderdale facility will be presented to SFWMD staff at a meeting schedule for April 5, 1990. Based on the outcome of this meeting, a schedule for preparation and submittal of a written hydrogeologic report will be established.

SFWMD-8

Comment: 2.3.3 Site Water Budget and Area Users--If the above assumption cannot be supported by field or other data, additional documentation on the existing and potential impacts associated with the existing and proposed withdrawals must be provided by FP&L. It is the District's opinion that the most appropriate means of providing that documentation is a model which will account for the brackish nature of the canal while recognizing that they do not function as fully penetrating constant head boundaries. The model must be designed to address the potential for saline intrusion into existing adjacent wells as well as FPL's on-site wells, potential upconing of saline water, and impacts to on-site and off-site wetland communities. It should also take into account the proposed reductions in ground water withdrawals from FP&L's existing on and off-site wells.

Response: Groundwater flow modeling was performed during the hydrogeologic investigation conducted February 8 through April 5, 1990, at the site. The modeling results will be presented to SFWMD staff at a meeting scheduled for April 5, 1990.

See the response to SFWMD-7 for a more complete description of the hydrogeologic investigation conducted at the site.

SFWMD-9

<u>Comment</u>: 2.3.3 <u>Site Water Budget and Area Users</u>--In order to quantify aquifer parameters to be incorporated into the model, it is requested that FPL conduct an aquifer performance test (APT) to determine aquifer parameters and to obtain canal leakance values.

<u>Response</u>: An APT was conducted at the site March 20 through 23, 1990, to determine aquifer parameters and obtain canal leakance values. The APT design was approved by SFWMD during a February 23, 1990, presentation to the district. The results of the APT will be presented to SFWMD staff at a meeting scheduled for April 5, 1990.

See the response to SFWMD-7 for a more complete description of the hydrogeologic investigation conducted at the site.

SFWMD-10

Comment: 2.3.3 Site Water Budget and Area Users--Please provide any additional salinity data available to FP&L that is not included in the certification application for all surface water quality stations in the Dania Cut-off Canal, cooling canal/pond system, South New River Canal, and South Fork New River.

Response: Table SFWMD10-1 provides additional data for the Dania Cut-Off Canal.

Table SFWMD10-1. Chloride Measurements in Dania Cut-Off Canal for 1990

Date	Chlorides (mg/L)
January 4, 1990	2,700
January 10, 1990	7,200
February 8, 1990	7,310
February 15, 1990	9,715
February 21, 1990	8,230
February 27, 1990	9,965
March 6, 1990	10,395
March 10, 1990	8,165

Note: Sample taken from Station 1.

SFWMD-11

Comment: 2.3.3 Site Water Budget and Area Users--Please provide past pumpage records or pump operation records for the on-site wells and all surface water withdrawals.

Response: There are no pumpage records for the on-site wells. Per the FDER IWW permit, records of daily once-through cooling water flows are submitted to FDER on a monthly basis. FPL will supply copies of these records to SFWMD for any requested period.

SFWMD-12

<u>Comment</u>: 2.3.3 <u>Site Water Budget and Area Users</u>--Please complete the enclosed Table A for all existing wells.

<u>Response</u>: Table A has been completed for Wells 8, 9, 4B, 5B, and FLIR. This information is given in Table SFWMD12-1.

Table SFWMD12-1. Description of Wells

Parameter	Well Designation No. 8	No. 9	4B	5B	FLIR
Map Designation	No. 8 Field Well	No. 9 Field Well	4B Well Cooling Water	5B Well Cooling Water	FLIR Well Irrigation Water
Existing or Proposed	Existing	Existing	Existing	Existing	Existing
Diameter (inches)	4	4	20	20	6
Total Depth (ft)	55	55	60	60	53
Cased Depth (ft)	Unknown	Unknown	40	40	45
Screened Interval	Unknown	Unknown	Unknown	Unknown	Unknown
Pumped or Flowing	Pumped	Pumped	Pumped	Pumped	Pumped
Working Valve, if Artesian (Yes or No)	NA	NA	NA	NA	Shallow well
Pump Manufacturer and Model Number	Carver	Carver	Peerless Moturbo	Peerless Moturbo	Unknown
Pump Type (Centrifugal, Jet, Deep Jet, Turbine, etc.)	Centrifugal	Centrifugal	Vertical Centrifugal	Vertical Centrifugal	Centrifugal
Intake Depth (NGVD)	Unknown	Unknown	-22.5	-22.5	-25
Pump or Flow	two pumps at 125 gpm each	two pumps at 125 gpm each	3,000 gpm at 95 psi	3,000 gpm at 95 psi	250 gpm
Active (Yes or No)	Yes	Yes	Yes	Yes	Yes
Year Drilled	1944	1944	1981	1956	Unknown
Type of Meter	Flow Research Series 1000[a]	Flow Research Series 1000[a]	None	None	None

Note: NA = not applicable.

[a]Common meter measures total water withdrawal.

SFWMD-13

<u>Comment</u>: 2.3.3 <u>Site Water Budget and Area Users</u>--Please complete the enclosed Table B for all existing and proposed surface water pumps.

<u>Response</u>: Table B has been completed for all surface water pumps. This information is given in Table SFWMD13-1 for existing pumps and Table SFWMD13-2 for proposed pumps.

Table SFWMD13-1. Description of Existing Surface Water Pumps

	Pump Designation							
Parameter	4A--Circulating Water Pump	4B--Circulating Water Pump	4--Screen Wash	4A--Auxiliary Cooling Water	5A--Circulating Water Pump	5B--Circulating Water Pump	5--Screen Wash	5A--Auxiliary Cooling Water
Map Designation	Cooling Water 4A Pump	Cooling Water 4B Pump	4 Screen	4A Well Cooling Water	Cooling Water 5A Pump	Cooling Water 5B Pump	5 Screen Wash	5A Well Cooling Water
Surface Water Body	Dania Cut-Off Canal	Dania Cut-Off Canal	Dania Cut-Off Canal	Dania Cut-Off Canal	Dania Cut-Off Canal	Dania Cut-Off Canal	Dania Cut-Off Canal	Dania Cut-Off Canal
Pump Type	Vertical Single Stage	Vertical Single Stage	Vertical Turbine Pump	Vertical Turbine Pump	Vertical Single Stage	Vertical Single Stage	Vertical Turbine Pump	Vertical Turbine Pump
Pump Manufacturer and Model Number	Foster Wheeler 54 MF2-K4.85	Foster Wheeler 54 MF2-K4.85	Peerless 10 MA-8STG	Peerless 18MAX-1 Stage DLS	Foster Wheeler 54 MF2-K4.85	Foster Wheeler 54 MF2-K4.85	Peerless 10 MA-8STG	Peerless 18MAX-1 Stage DLS
Pump Capacity (gpm)	58,000	58,000	600	3,000	58,000	58,000	600	3,000
Pump Horsepower	450	450	60	100	450	450	60	100
Pump Diameter (inches)	54	54	7-1/8	12-7/8	54	54	7-1/8	12-7/8
Elevation of Intake (NGVD)[a]	-14	-14	-10.5	-10.5	-14	-14	-10.5	-10.5
Is pump a two-way pump?	No	No	No	No	No	No	No	No
Florida Plane Coordinates	N631,000 E762,750	N631,000 E762,750	N631,000 E762,750	N631,000 E762,750	N631,000 E763,000	N631,000 E763,000	N631,000 E763,000	N631,000 E763,000

[a]NGVD is approximately equal to mean sea level.

Table SFWMD13-2. Description of Proposed Surface Water Pumps

Parameter	Open Cooling Water 4A	Open Cooling Water 4B[a]	Open Cooling Water 5A	Open Cooling Water 5B[a]
Surface Water Body	Dania Cut-Off Canal	Dania Cut-Off Canal	Dania Cut-Off Canal	Dania Cut-Off Canal
Pump Type	Vertical Single Stage	Vertical Single Stage	Vertical Single Stage	Vertical Single Stage
Pump Manufacturer and Model Number	To Be Selected	To Be Selected	To Be Selected	To Be Selected
Pump Capacity (gpm)	12,000	12,000	12,000	12,000
Pump Horsepower	300	300	300	300
Pump Diameter (inches)	To Be Determined	To Be Determined	To Be Determined	To Be Determined
Elevation of Intake (NGVD)[b]	-5	-5	-5	-5
Is pump a two-way pump?	No	No	No	No
Florida Plane Coordinates	N631,000 E762,750	N631,000 E762,750	N631,000 E763,000	N631,000 E763,000

[a]"B" designates 100-percent capacity spare pump.
[b]NGVD is approximately equal to mean sea level.

SFWMD-14

Comment: 2.3.3 Site Water Budget and Area Users--Please develop a monitoring well network located between the canal and the production wells at multiple depths which will generate water quality and water level data sufficient to assess the impacts of the existing/proposed on-site withdrawals. To the extent it is available, this data can be used in the modeling efforts discussed above in questions 7 and 8. This monitoring network will also be required by the District as a condition of certification and it is strongly recommended that it be implemented as soon as possible rather than waiting for the completion of the certification process.

Response: Fourteen observations wells were installed to four discreet vertical intervals ranging in depth from 20 to 150 ft. These observation wells comprise an extensive monitoring well network to generate water quality and water level data adequate to assess the impact of site withdrawals. Monitoring of the observation well network was implemented in conjunction with an aquifer performance test (APT) conducted at the site and will continue at regularly scheduled intervals.

See the response to SFWMD-7 for a more complete description of the hydrogeologic investigation conducted at the site.

SFWMD-15

Comment: 3.3 Fuel--In addition to the earthen dike which surrounds the fuel tanks, what kind of liner or other types of measures are in place or proposed to prevent groundwater contamination in the event of a fuel spill?

Response: The fuel tanks and associated piping are registered with the Florida Department of Natural Resources as a Terminal Facility. This facility operates under applicable federal, state, and local rules, including the implementation of a Spill Prevention Control and Countermeasure Plan prepared in accordance with 40 CFR 112.

As part of FPL's written commitment of manpower, equipment, and materials required to expeditiously control and remove any harmful quantity of oil discharged, the Lauderdale Plant has:

1. A designated facility representative responsible for cleanup--the Oil Spill Coordinator,
2. The availability of a vacuum-pump-equipped tank truck to remove free oil, and
3. Loose sand covering the ground within diked areas to soak up spilled oil.

No liners or other additional types of measures are proposed to prevent groundwater contamination in the event of a fuel spill. The Lauderdale Repowering Project will not affect the fuel oil storage and handling system in any manner expected to require such measures.

SFWMD-16

Comment: 3.5 Chemical and Biocide Waste--What type of liner will be used with the equalization pond?

Response: The liner will be 100-mil-thick high-density polyethylene.

SFWMD-17

Comment: 3.5 Plant Water Use--Figure 3.5-1 (Proposed Water Uses Simplified Flow Diagram) indicates that, on an average annual basis, 1085 gpm will be needed from the existing on-site wells for pretreatment and demineralizing purposes. Does the requested volume include the amount of water lost during the reverse osmosis process? If not, please adjust the requested on-site ground water withdrawals to include the RO losses.

Response: The requested volume does include the amount of water lost during the reverse osmosis process. The Proposed Pretreatment block on the referenced figure includes the RO unit and the average flow of 301 gpm to Wastewater includes the RO losses.

SFWMD-18

Comment: 3.5 Plant Water Use--Figure 3.5-1 also indicates that, on an average annual basis, a total of 226,000 gpm is withdrawn from surface waters (presumably the Dania Cut-off Canal based on the text) for auxiliary and condenser cooling purposes. If there are any losses associated with this diversion of water (for example, evaporation), Figure 3.5-1 should be revised to reflect these uses.

Response: The figure depicts condenser and auxiliary cooling as end uses. In reality, these flows will be discharged to the cooling canal/pond system and eventually to the South New River Canal. The evaporative loss from the system, between the discharge into the cooling canal/pond system and the discharge from the cooling canal/pond system, has been conversvatively estimated in Table 3.5-6 not to exceed 1,674 gpm.

SFWMD-19

<u>Comment</u>: 3.5 <u>Plant Water Use</u>--Although returned to the South New River Canal via the on-site cooling canal/pond system, the existing and proposed surface water withdrawals from the Dania Cutoff Canal for cooling purposes are considered a consumptive use under the District's current water use permitting criteria since the Dania Cut-off Canal water does not meet the definition for seawater (19,000 ppm). Please revise Table 3.5-5 to reflect this consumptive use.

<u>Response</u>: Revised Table 3.5-5 is provided on the following page.

Table 3.5-5. Total Consumptive[a] Water Use (gpm)

System	On-Site Groundwater		Off-Site Groundwater		Potable Water		Surface Water[e]
	Average	Maximum	Average	Maximum	Average	Maximum	Average and Maximum
Existing Plant	6,000	6,000	93	300	6.6[b]	24.8[b]	232,000
Construction Period	7,000[c]	8,500[c]	200	300	6.6[b]	24.8[b]	232,000
Repowered Plant	1,085	6,000	0	300	50[d]	140[d]	252,000

[a]Consumptive use is considered that which withdraws water from a source and does not discharge it back to the same source (e.g., well water).
[b]Based on actual data.
[c]Includes dewatering.
[d]Based on South Florida Building Code.
[e]Provided solely in response to SFWMD-19.

SFWMD-29

SFWMD-20

Comment: 3.8 On-Site Drainage--Please provide an acreage breakdown for the following existing and proposed use of the site: pervious area, water management area, building (roofed) area, other impervious (parking, etc.) area.

Response: The breakdown is as follows:

Use	Existing (acres)	Proposed (acres)
Pervious	195.2	184.5
Water Management	181.5	184.2
Building	1.3	2.6
Other Impervious	13.9	20.6

The supporting calculations for these values are presented on the following pages and will be added to the SCA in Appendix 10.7.

EBASCO SERVICES INCORPORATED

BY HOP DATE 3/25/90 SHEET 1 OF 13

CHKD. BY KM DATE 3/26/90 OFS NO. 7918.017 DEPT. NO. 941

CLIENT FPL

PROJECT PFLR

SUBJECT Existing and Proposed Stormwater Runoff Acreage Breakdown

Page 2 is based on SCA Figure 2.3-2

east-west division based on Figure 2.1-6

East half = 202.2 acres (Figure 2.1-6)
West half = 189.7 acres " "

391.9 ≈ 392 acres

From east half, have 7 land areas (see p. 2) numbered I through VII

by planimeter of areas on p. 2

Area	Square Inches	Acres
I	.2325004	3.46
II	.2635005	3.92
III	.6975013	10.39
IV	.1085002	1.62
V	.2480004	3.69
VI	.0930001	1.38
VII	.0775001	1.15
East Half	13.578027	202.2 *

* known

Total I thru VII	25.61

202.2
− 25.6
176.6 acres lake

next [illegible]

Best Available Copy

Calc. 56

EBASCO SERVICES INCORPORATED

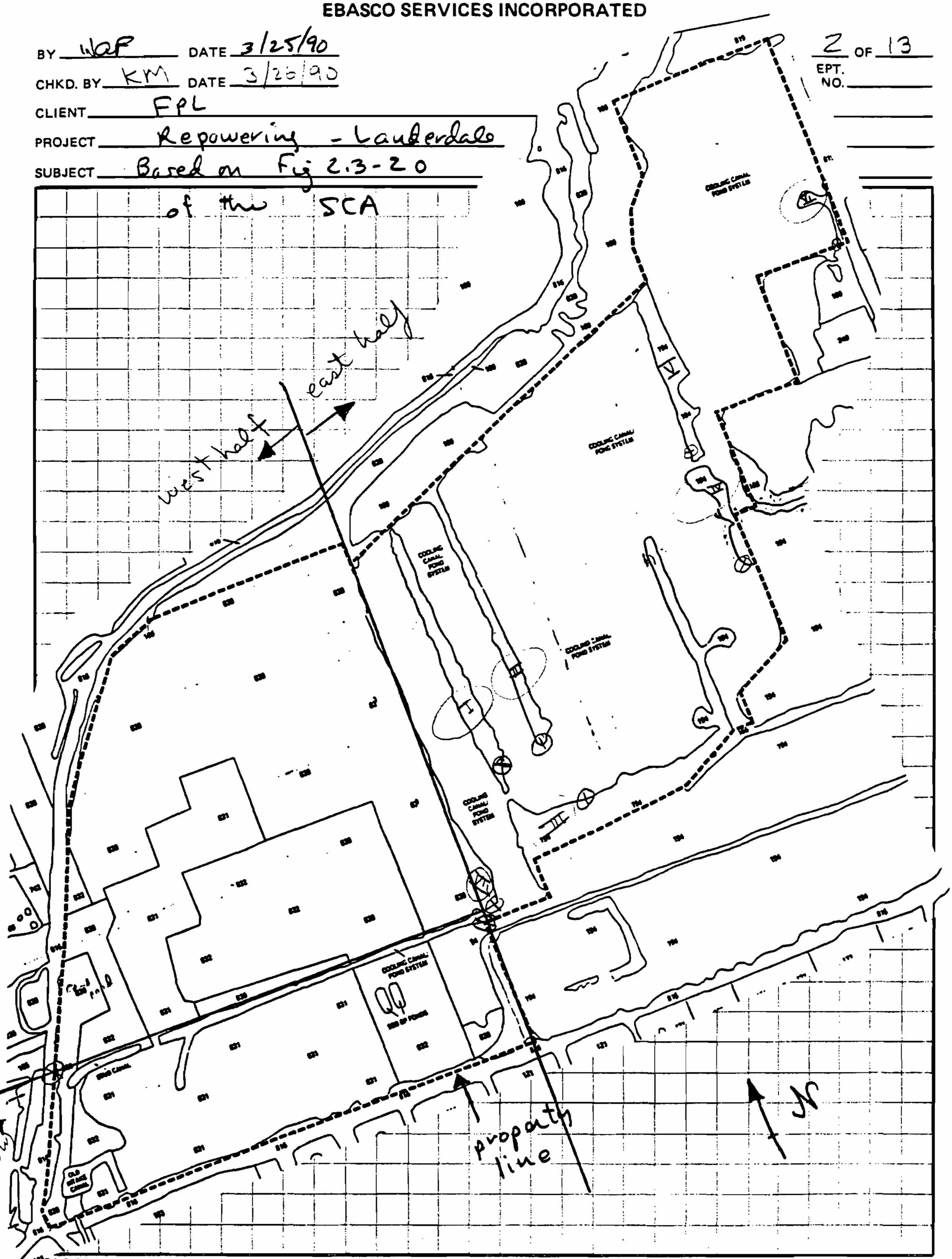
BY WAF DATE 3/25/90 — 2 OF 13

CHKD. BY KM DATE 3/26/90 — DEPT. NO.

CLIENT FPL

PROJECT Repowering - Lauderdale

SUBJECT Based on Fig 2.3-20 of the SCA



S81 2-88

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BY NJR DATE 3/25/90 SHEET 3 OF 13

CHKD. BY KM DATE 3/26/90 OFS NO. 7918.017 DEPT. NO. 941

CLIENT FPL

PROJECT PFLR

SUBJECT Existing + Proposed Stormwater Runoff Acreage Breakdown

SFWMD sufficiency question 20 only gives four types of areas:

pervious areas
water management areas
building (roofed) areas
other impervious areas

So, for east half of site

176.6 acres of water management area
25.6 acres of pervious area

---

for the west half of the site, divide into 2 sections; north-west & south-west

Northwest is north of existing discharge canal southwest is south of existing discharge canal (& including canal)

see p. 4

Of the Northwest portion, only the GT area (3 banks of 4, each - see p. 5 for enlarged view) and the oil tank are impervious and they are not buildings, so are "other" impervious areas

from page 5

impervious → $206 \times 469 + 120^2 \cdot \pi/4$

$= 96{,}614 + 11{,}310 = 107924 \text{ ft}^2$

$= 2.5$ acres

581/8-81

EBASCO SERVICES INCORPORATED

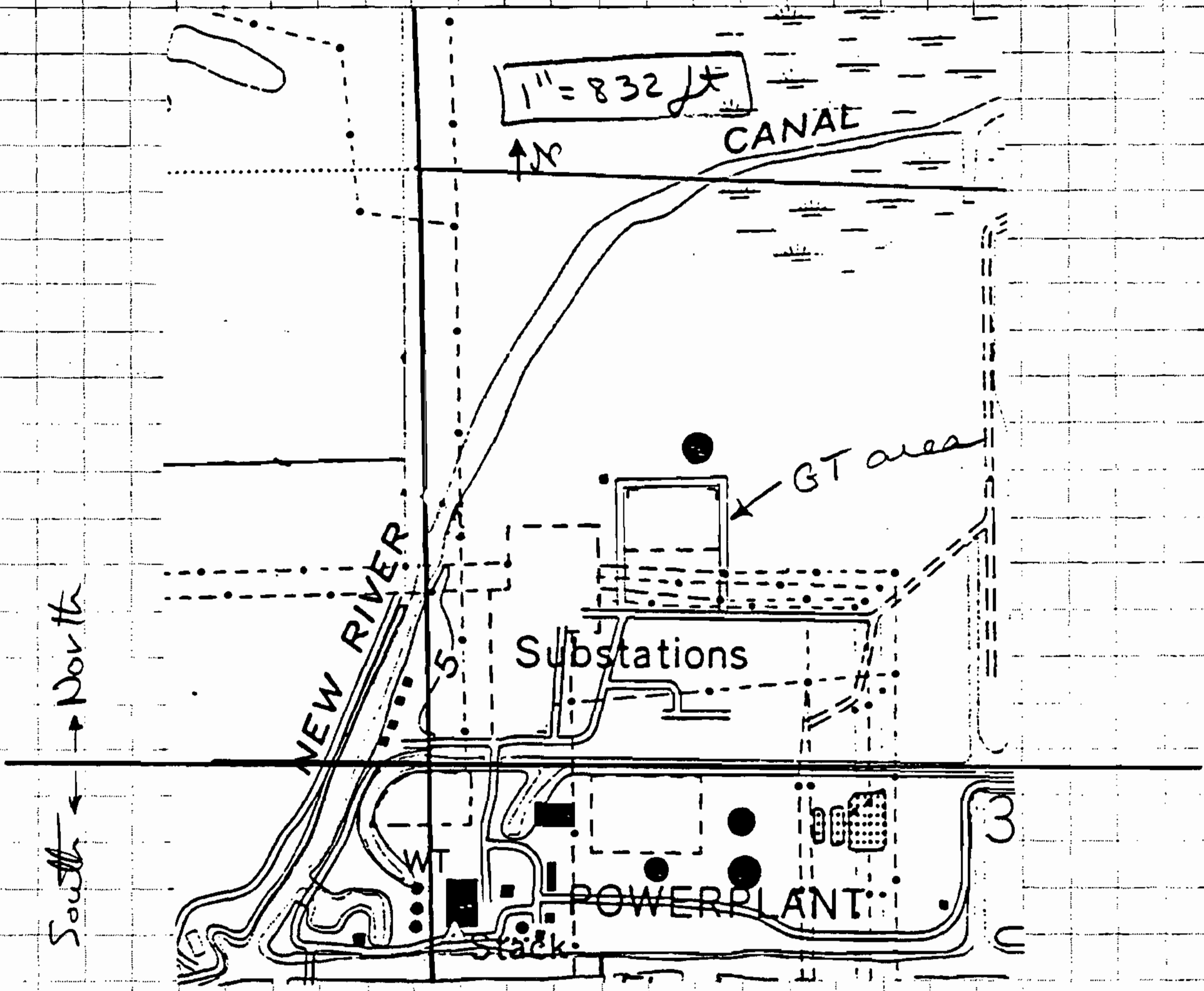
BY NOP DATE 3/25/90 SHEET 4 OF 13

CHKD. BY KM DATE 3/26/90 OFS NO. 7918.017 DEPT. NO. 941

CLIENT FPL

PROJECT PFLR

SUBJECT Acreage Breakdown on site



Based on USGS 7½' Quad Sheet Lauderdale S. multiplied 2.4 times

EBASCO SERVICES INCORPORATED

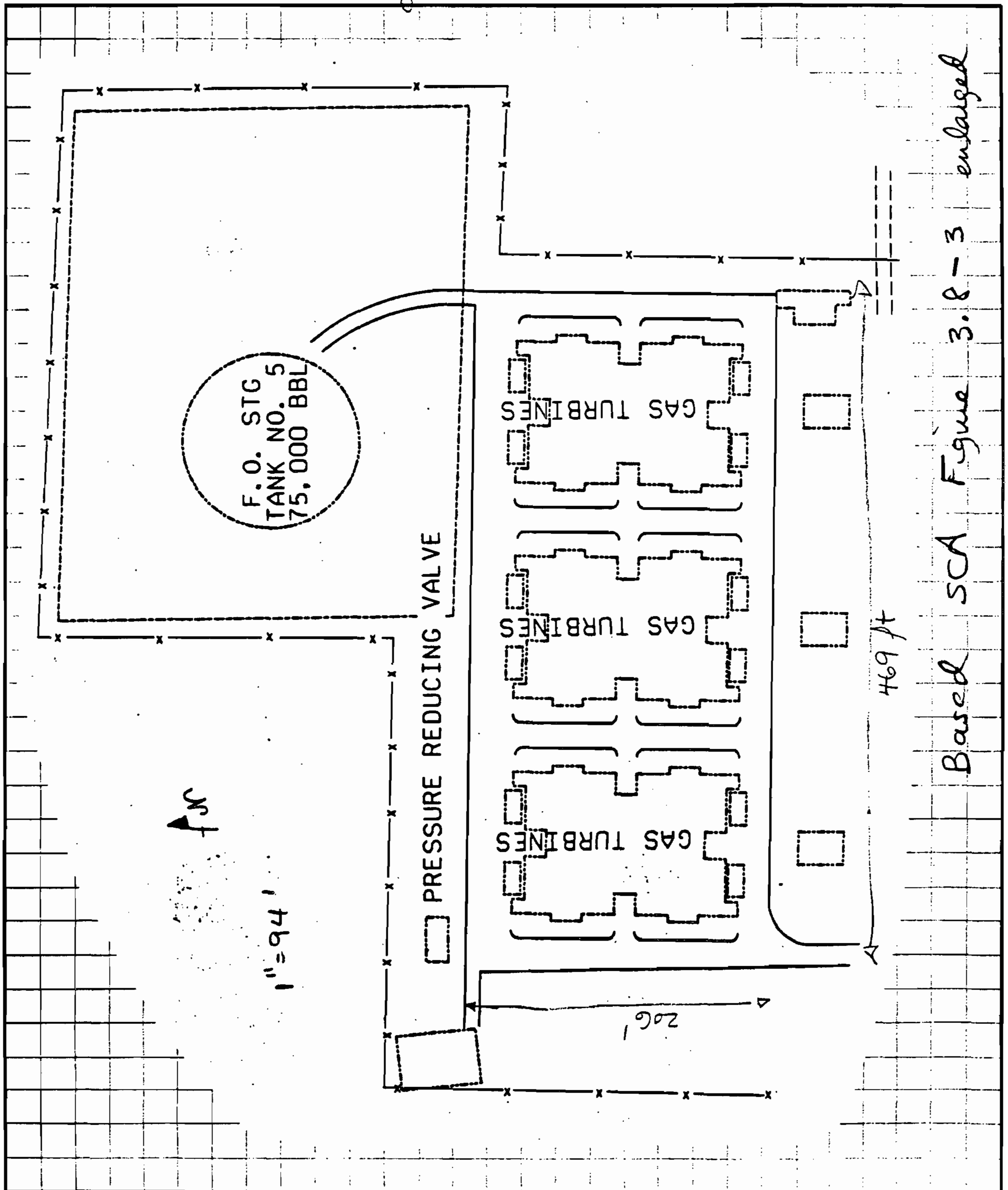
BY HoP DATE 3/25/90 SHEET 5 OF 13

CHKD. BY KM DATE 3/26/90 OFS NO. 7918.017 DEPT. NO. 941

CLIENT FPL

PROJECT PFLR

SUBJECT Site Drainage



EBASCO SERVICES INCORPORATED

BY NGP DATE 3/25/90 SHEET 6 OF 13

CHKD. BY KM DATE 3/26/90 OFS NO. 7918.017 DEPT. NO. 941

CLIENT FPL

PROJECT PFLR

SUBJECT Site Drainage

Planimeter from p 2, the Northwest area

= 9.501519 in^2 = 141.5 acres

of this, 2.5 is other impervious

thus 141.5 − 2.5 = 139.0 acres is pervious

Southwest portion is all that's left

West half = 189.7 acres
Northwest part = 141.5
48.2 = remainder or south-west

Summary thus far:

	east half	north-west	Total
pervious areas	25.6	139	164.6
water man. areas	176.6		176.6
building areas			
other imp. areas		2.5	2.5
			343.7

these values are unchanged between existing and proposed

all the differences between proposed and existing will occur in the "southwest" portion

(go to page 9)

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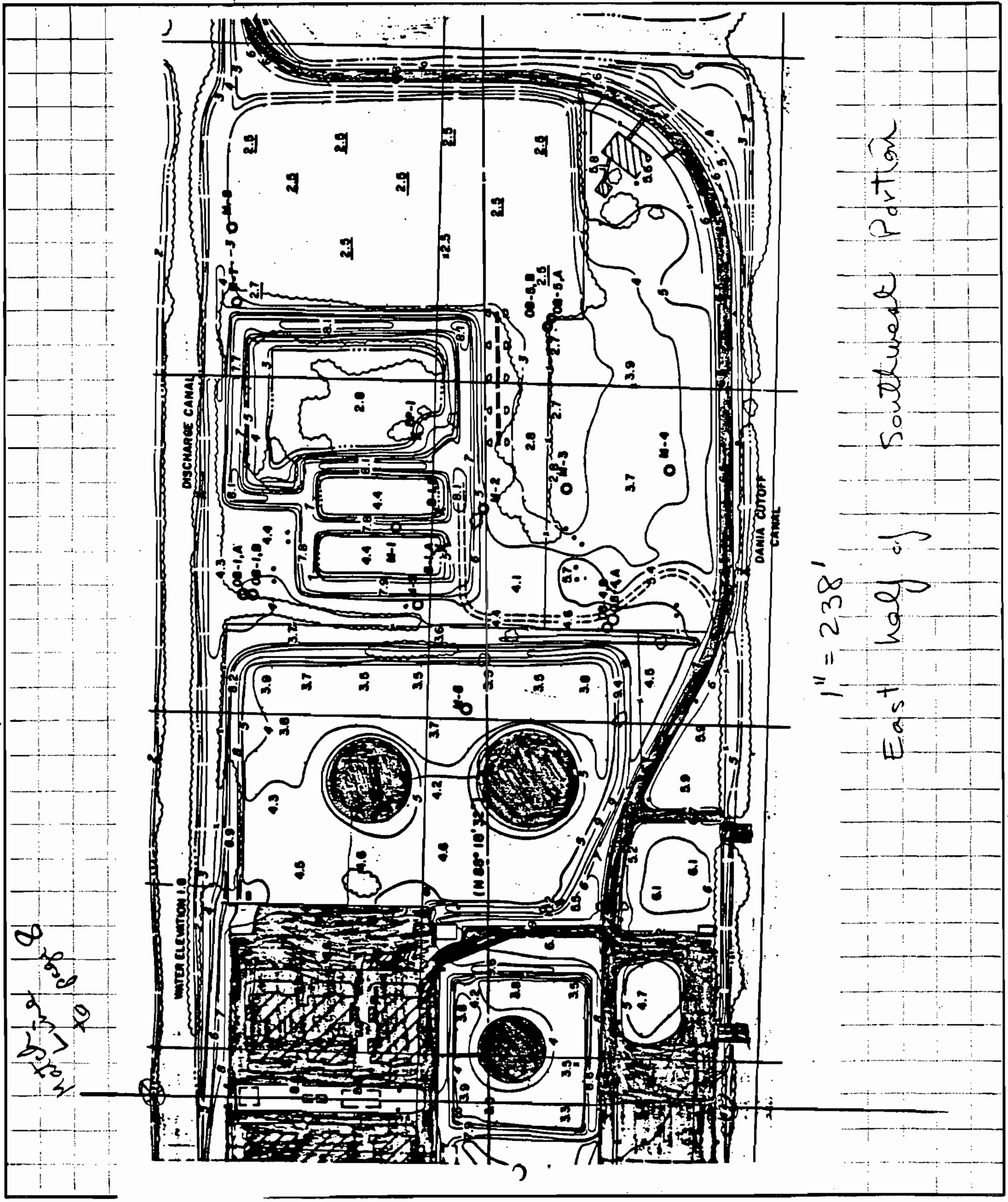
BY Knf DATE 3/25/90 SHEET 7 OF 13

CHKD. BY KM DATE 3/26/90 OFS NO. 7918.017 DEPT. NO. 941

CLIENT FPL

PROJECT PFLR

SUBJECT Existing + Proposed Stormwater Runoff Acreage Breakdown



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EBASCO SERVICES INCORPORATED

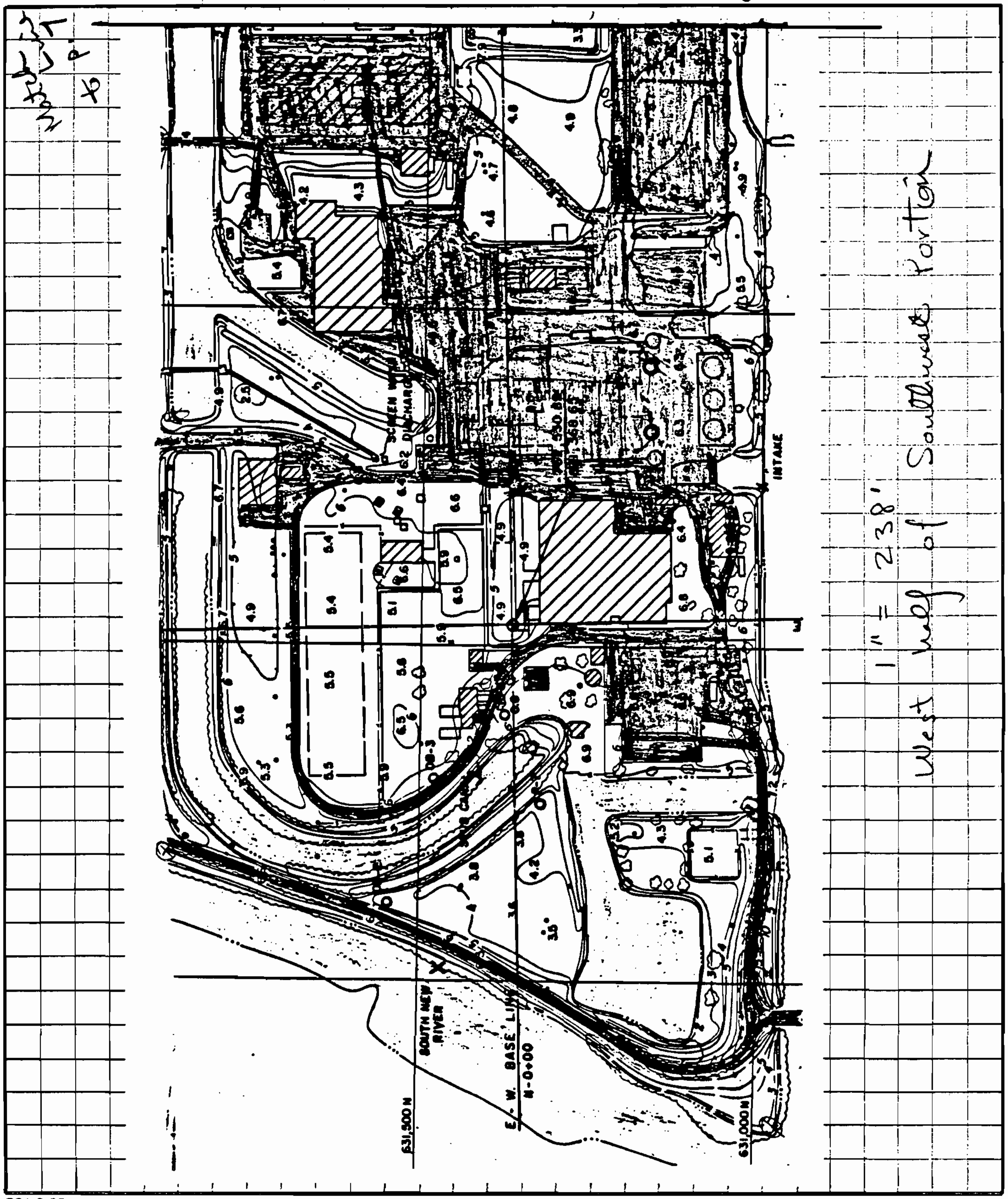
BY NGF DATE 3/25/90 SHEET 8 OF 13

CHKD. BY KM DATE 3/26/90 OFS NO. 7918.017 DEPT. NO. 941

CLIENT FPL

PROJECT PFLR

SUBJECT Existing and Proposed Stormwater Runoff Acreage Breakdown



581 2-88

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EBASCO SERVICES INCORPORATED

BY NAT DATE 3/25/90 SHEET 9 OF 13

CHKD. BY KM DATE 3/26/90 OFS NO. 7916.017 DEPT. NO. 341

CLIENT FPL

PROJECT PFLR

SUBJECT Site Drainage

Pages 7 & 8 depict southwest Portion of Site with areas designated as follows:

shaded – other impervious

– buildings

blank – pervious

inside — water management areas
——— . . . ———

by planimeter, per sheet

	p8 in^2	p7 in^2	Total in^2	Acres
other impervious	10.05952	4.96000099	15.02	11.4
building	1.5810031	0.1550003	1.74	1.3
water (d/s intake) (stub) management (disch. channel)	1.3020026 1.5500031 1.4260028 4.2780085	2.1390042	6.42	4.9
pervious (calc. by subtract from totals)			40.25	30.6
Total	30.876061	32.550065	63.43	48.2 (from p. 6)

581/8-81

EBASCO SERVICES INCORPORATED

BY HCP DATE 3/25/90 SHEET 10 OF 12
CHKD. BY KM DATE 3/26/90 OFS NO. 7918.017 DEPT. NO. 941
CLIENT FPL
PROJECT PFLR
SUBJECT Site Drainage

Summary - Existing Acreage

	East & Northwest Portions	Southwest Portion	Total Existing
Pervious Areas	164.6	30.6	195.2
Water Management Areas	176.6	4.9	181.5
Building Areas	-	1.3	1.3
Other Impervious Areas	2.5	11.4	13.9

Total = 391.9 Acres

EBASCO SERVICES INCORPORATED

BY H2P DATE 3/25/90 SHEET 11 OF 13
CHKD. BY KM DATE 3/26/90 OFS NO. 7913.017 DEPT. NO. 741
CLIENT FPL
PROJECT PFLR
SUBJECT Site Drainage - Acres

Acreage Breakdown for Proposed Site Usage is the same except for the Southwest Portion – from Section 3.2.2 of SCA & New Areas

Water Management Areas — Existing

Eq Basin - 3 Acres — pervious - 3
Runoff Pond 0.7 — pervious 0.7
3.7

Buildings

CT Enclosure $\frac{390 \times 105 \text{ (sect 3.2.2)}}{43560} = .9$ acres

rest of Power Block 8.4 other Impervious

4.6 pervious
4.7 other imp.
(by inspection of p. 12)

New Warehouse 0.4 acres — other → 0.4
1.3

Other Impervious

Wat Treatment Area 1.1 — 1.1 perv
Wastewater Trt area 1.5 — 1.5 perv
8.4
Triangular Parking Lot on West End 0.8 — 0.8 perv
11.8

Pervious

New area of old intake canal 1.0 — 1.0 wat man. area

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EBASCO SERVICES INCORPORATED

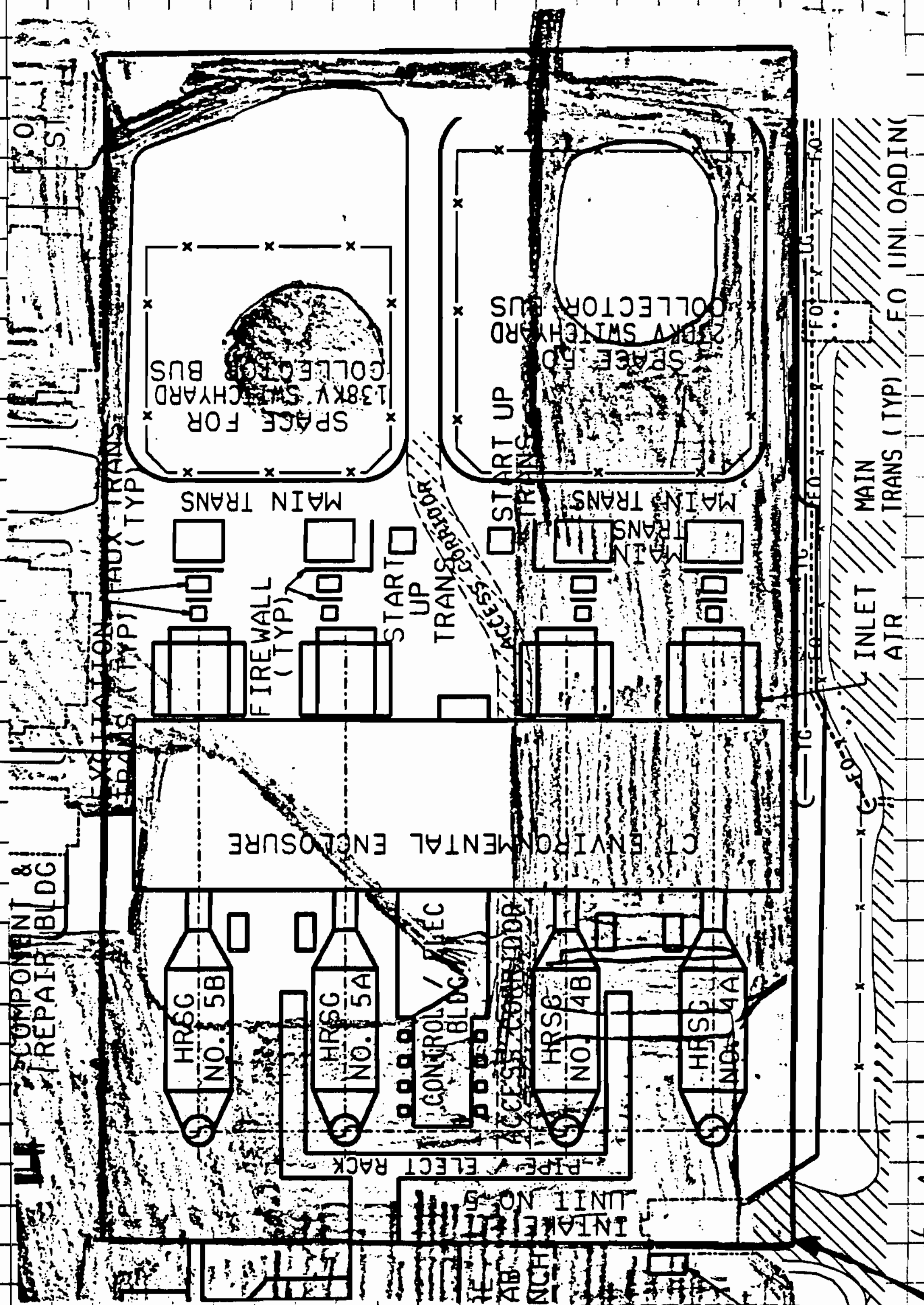
BY: WAR DATE: 3/25/90 SHEET 12 OF 13

CHKD. BY: KM DATE: 3/26/90 OFS NO. 7918.017 DEPT. NO. 941

CLIENT: FPL

PROJECT: PFLR

SUBJECT: site drainage – acreage



Shaded Area is impervious (other)

extended power block from Figure 3.8-1

581 2-88

Calc. 56

EBASCO SERVICES INCORPORATED

BY HOF DATE 3/25/90 SHEET 13 OF 13

CHKD. BY KM DATE 3/26/90 OFS NO. 7918.017 DEPT. NO. 941

CLIENT FPL

PROJECT PFLR

SUBJECT Existing and Proposed Stormwater Runoff Acreage Breakdown

Summary of changes

	Existing (p. 10)	Add (p 11) with Proposed Use	Delete ⊛ with Proposed Use	Under Proposed Use
Pervious Areas	195.2	1.0	11.7	184.5
Water Management Areas	181.5	3.7	1.0	184.2
Building Areas	1.3	1.3	0	2.6
Other Impervious Areas	13.9	11.8	5.1	20.6
total	391.9	17.8	17.8	391.9

⊛ from p. 11

delete per p. 11

pervious		other
3.0	→ 9.1	4.7
0.7	1.1	0.4
4.6	1.5	
0.8		
9.1	11.7	5.1

581/8-81

SFWMD-21

Comment: 3.8 On-Site Drainage--Please revise Figures 3.8-1, 3.8-2 and 3.8-3 (Site Drainage - Western, Eastern, Northern Portions of Site) to reflect existing and proposed on-site flows of runoff. How will runoff from impervious surfaces be conveyed (i.e., culverts, swales, etc.) to the proposed water management area(s)/runoff pond? Please clarify how the "restored" areas (after construction of the repowering project is completed) will be incorporated into the proposed surface water management system? Please provide locations, design details, and dimensions for all existing and proposed drainage structures on the plans and/or in text form.

Response: Figures 3.8-1, 3.8-2, and 3.8-3 reflect proposed on-site flows of runoff. Sections 3.8.3 and 3.8.4 have been revised (see following pages) to clarify the description of proposed on-site flows of runoff. Conveyance of runoff from impervious surfaces is described in Section 3.8.4 as overland flow, and incorporation of restored areas is discussed in the same section. Locations, design details, and dimensions for all existing drainage structures are included in the site drainage section added to Section 2.3.4.1, Page 2.3-64, of the SCA and in text form for proposed structures in the response to SFWMD-25.

3.8.3 Construction Phase Stormwater Runoff

During construction, all 10 of the areas described in Section 3.8.2 will require active management of stormwater runoff. The power block area (Figure 3.8-1) will be sloped to convey as much of its runoff as possible to the construction runoff pond. Where necessary, this runoff will be collected in sumps and pumped to that pond. The pond is sized to hold more than 30,000 cubic feet (ft^3), which is equivalent to the wet retention criteria specified in 3.2.2.2 (3) of the BOR. Runoff in excess of the retention amount will be discharged via an overflow weir to the Dania Cut-Off Canal. From the pond, the retained water will percolate into the groundwater.

The west construction laydown area and water treatment area (Figure 3.8-1), except for potential chemical spill areas within the water treatment area which will be diked and drained to the wastewater treatment facility, will be sloped to drain into the existing stub canal percolation pond as overland flow. This pond, which was created from the discharge canal of older units which were retired, is large enough to percolate the entire storm volume (567,000 ft^3) from a total area of 10.4 acres which includes these 1.8 acres. It discharges by percolation and meets the description in 3.2.2.6 of the BOR as an existing water body.

The equalization basin area (Figure 3.8-2) has no runoff. Until its construction is complete, its western portion will serve as a percolation pond for rainfall upon itself and the northern portion of the wastewater treatment area. The remainder of the equalization basin area and the wastewater treatment area (which will be within the central construction parking/laydown area) and construction facilities area (Figure 3.8-2) will be sloped to drain to the existing evaporation percolation pond. The total storm volume of about 837,000 ft^3 of water from an area of about 10 acres will be percolated from the existing evaporation/percolation pond (Figure 3.8-2) (located within the equalization basin area). An overflow from that pond to the existing cooling canal/pond system will accommodate overflow should storms in excess of the design storm occur. That cooling/canal pond system meets the description in 3.2.2.6 of the BOR as an existing water body.

The east construction parking area and east construction laydown area (Figure 3.8-2) will be surrounded by a discharge swale which will provide dry detention for the entire storm volume (estimated at 452,000 ft^3 for these areas). An overflow from the swale to the existing cooling pond will accommodate flows in excess of the design storm.

During installation of the new gas line (Figure 3.8-3), only a small portion of the on-site corridor will be affected at any given time. Both sides of each affected area will be lined with turbidity screens prior to excavation. After pipe installation and backfill, the affected areas will be seeded with a quick-growing grass. The turbidity screens will be left in place until the grass is well-established.

3.8.4 Operational Phase Stormwater Runoff

Only four of the areas discussed in Section 3.8.3 will still require active management of stormwater runoff after construction is complete. The west construction laydown area shown on Figure 3.8-1; the construction facilities area, east construction parking area, and east construction laydown area shown on Figure 3.8-2; and the corridor surrounding the new gas line shown on Figure 3.8-3 will not be incorporated within the project after construction. These areas will be restored essentially to their original contours so that stormwater runoff will be as presently exists. A description of the existing drainage for these areas is included in Section 2.3.4.1 of this SCA. The remaining four areas are discussed in the following sections.

The power block area runoff and the water treatment area runoff (Figure 3.8-1) will be handled the same way during operation as during construction (see Section 3.8.3).

Rainfall onto the equalization basin area and runoff from the wastewater treatment area will be treated by the wastewater treatment system, as described in Section 3.6.1.1.

SITE DRAINAGE

This description refers to the calculation labeled No. 56 and included within Appendix 10.7. As described therein, the site comprises a total of about 392 acres. Of this, the eastern portion (202 acres, see Figure 2.1-6) includes about 177 acres of cooling canal/pond system open water and about 25 acres of pervious land made up of dikes and shoreline. Rainfall on this acreage runs off into the canal/pond system or percolates into the ground.

The western portion of the site (about 190 acres) includes about 139 acres in the northern section which is vegetated and low (less than 5 ft-msl) and from which rainfall does not generally run off, but percolates into the ground. This northern section includes some 2.5 acres of impervious area which drains to the other 139 acres which does not normally have runoff.

The remainder of the site (southwest portion) includes the existing steam electric generating station, 12 gas turbines, and associated facilities. Figures 2.3-19A and 2.3-19B depict the drainage within the western and eastern portions of the plant area.

As shown on these figures, there are eight separate stormwater outfalls, designated collectively as OSN 005 Nonequipment Area Storm Water under the existing NPDES permit (see Page 10.1.1-24 of the SCA). The four southern outfalls receive overland flow from Units 1 through 5 areas (Units 1, 2, and 3 are retired) and from the parking area southeast of Units 4 and 5, and discharge it to the Dania Cut-Off Canal. These discharges are via 8-inch-diameter pipes, as shown in Figure 2.3-19C. The four northern outfalls receive flow from the gas turbine area (gas turbines and gas turbine repair shop). These discharges are via 6- or 8-inch pipes similar to those depicted in Figure 2.3-19C.

Drainage from the remainder of this portion of the site generally percolates into the ground or, when near one of the adjacent water bodies, runs overland directly into that water body.

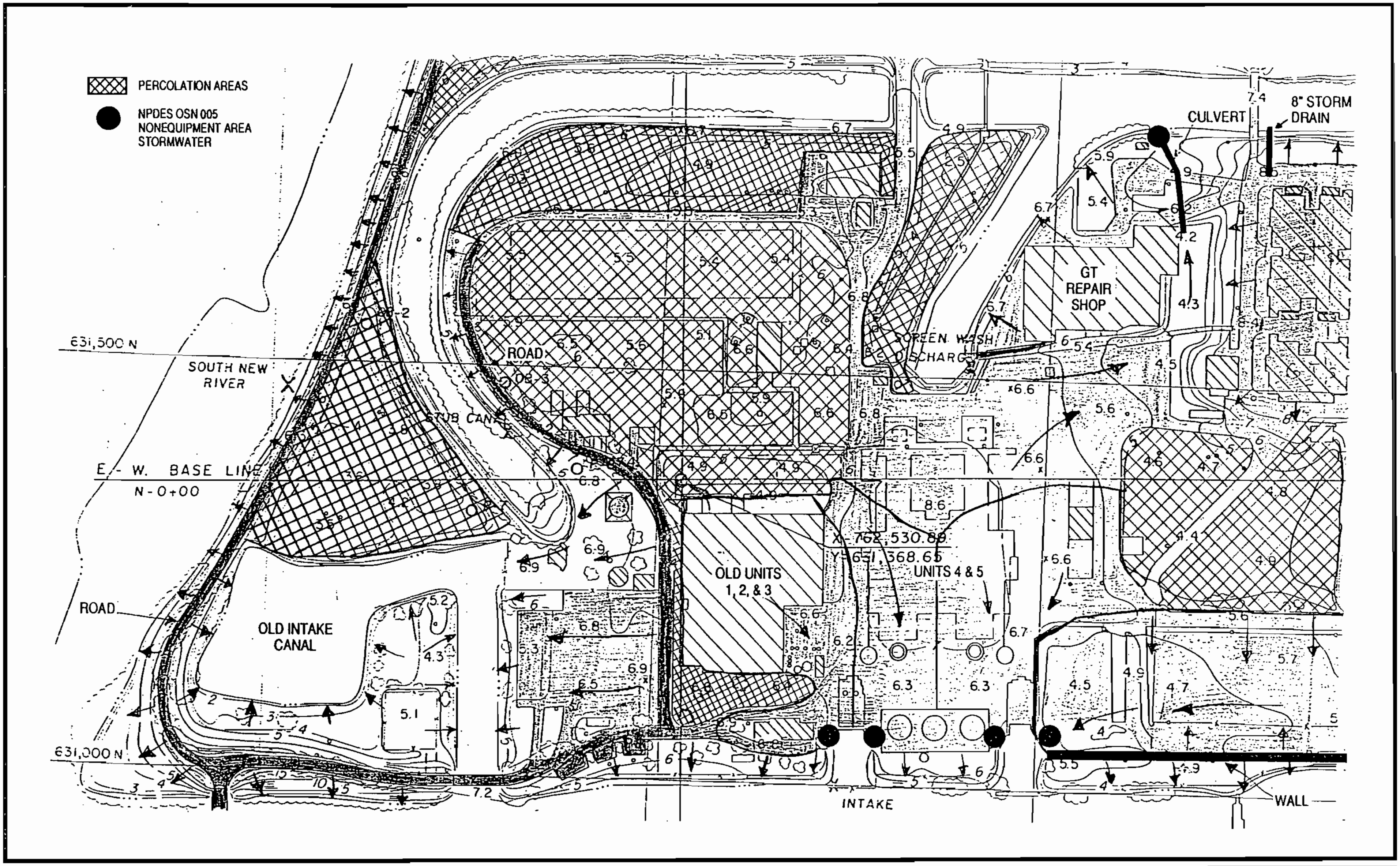


Figure 2.3-19A **WESTERN PORTION OF EXISTING PLANT AREA DRAINAGE**

Lauderdale Repowering Project

FPL

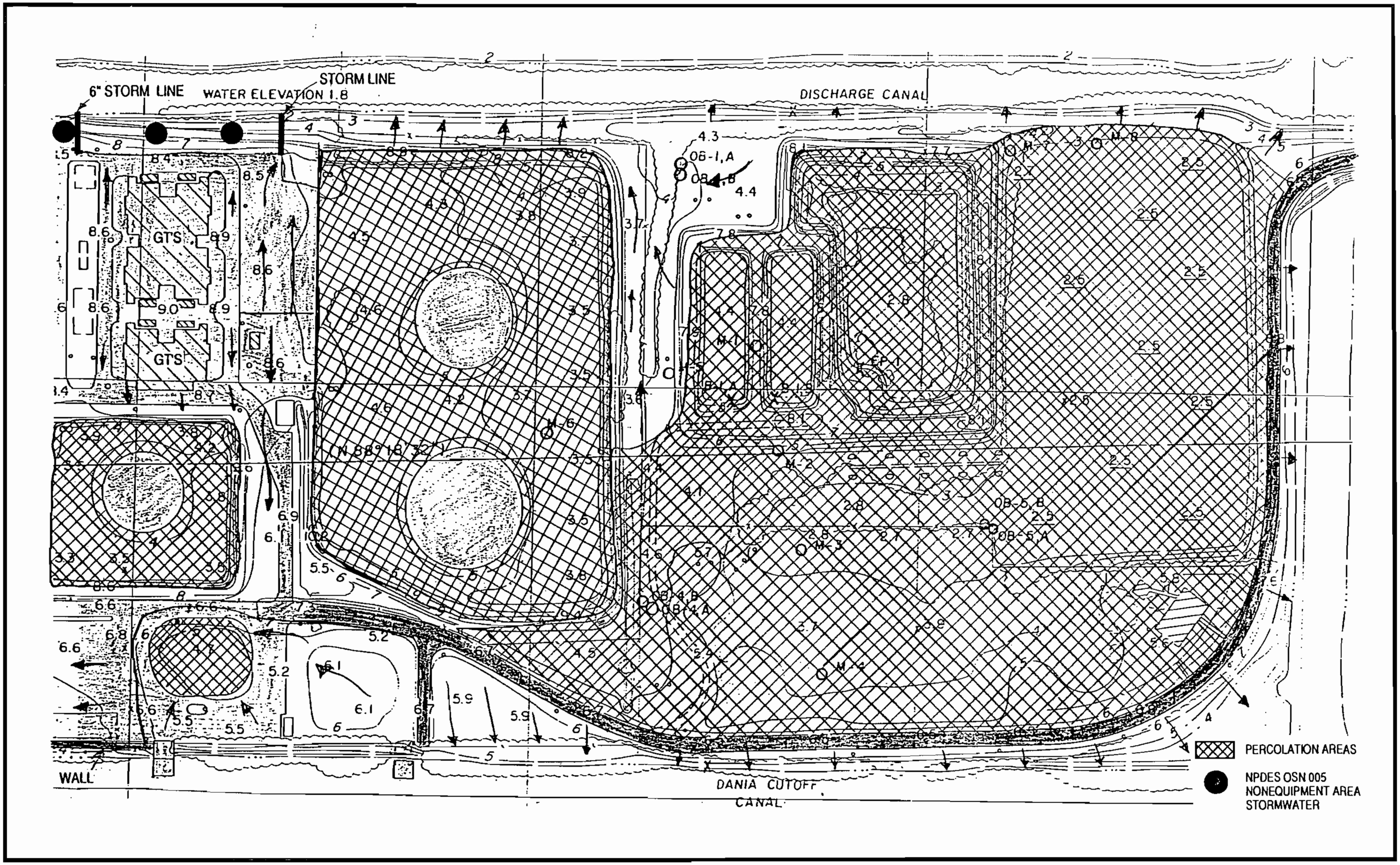


Figure 2.3-19B **EASTERN PORTION OF EXISTING PLANT AREA DRAINAGE**

Lauderdale Repowering Project

FPL

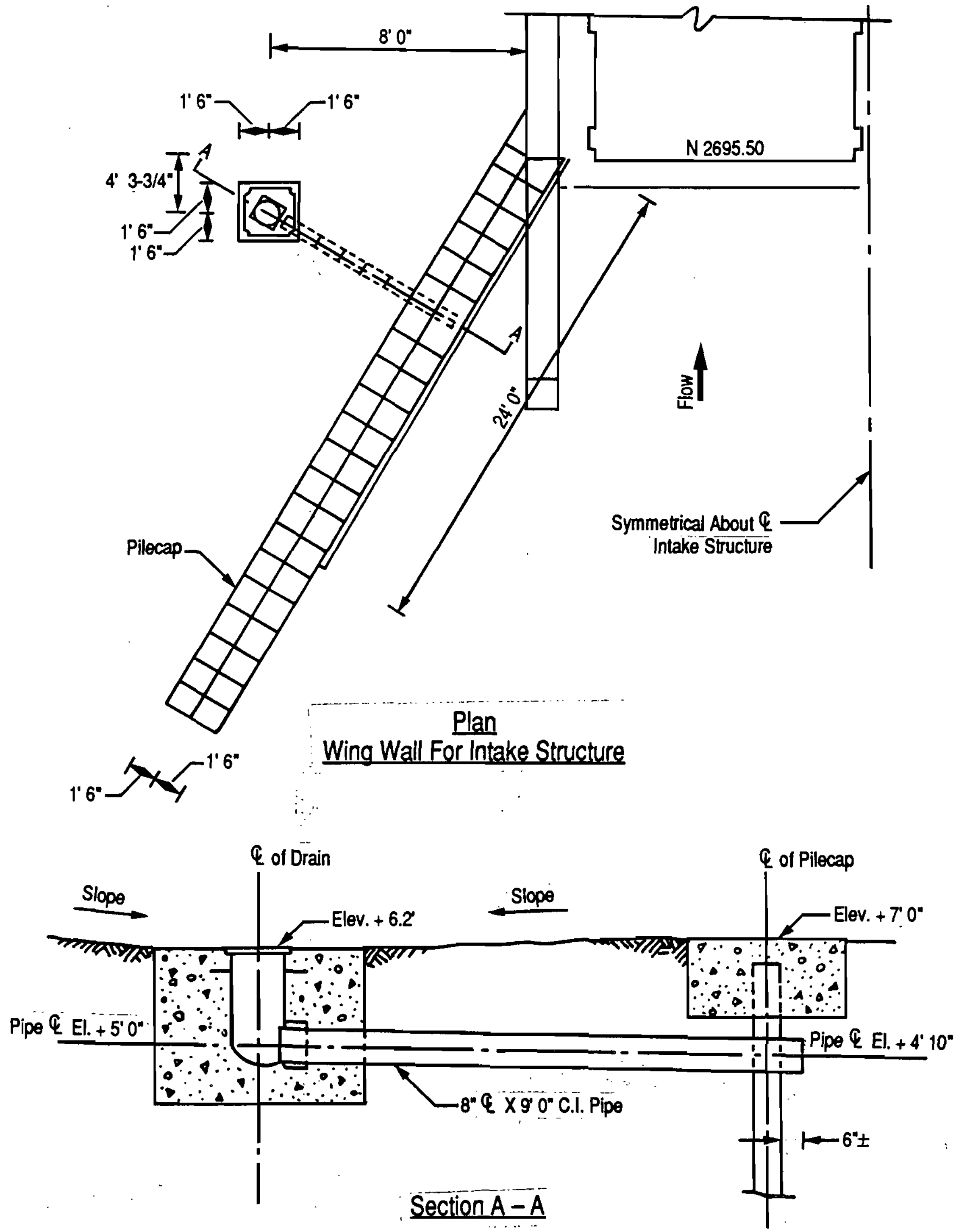


Figure 2.3-19C TYPICAL STORMWATER DISCHARGE PIPES TO DANIA CUT-OFF CANAL

Lauderdale Repowering Project

FPL

The above discussion refers only to what is considered non-equipment area or uncontaminated runoff. The types of areas which might be expected to produce equipment area/contaminated runoff are the boiler area, the gas turbine areas, the water pretreatment area, and the fuel oil storage and handling areas. Figure 2.3-19D depicts the existing pretreatment system used to prevent contaminated runoff from leaving the site. Briefly, this system passes potentially oily water through oil traps and discharges the effluent to groundwater through the stub canal or diked areas. These oil traps are presently either replaced with modern oil/water separators or supplemented with belt-type skimmers. Similarly, runoff from other areas of potential contamination (e.g., chemicals from water plant, boiler cleaning acid from boilers) is discharged to groundwater via either the stub canal or the SSB/EEP.

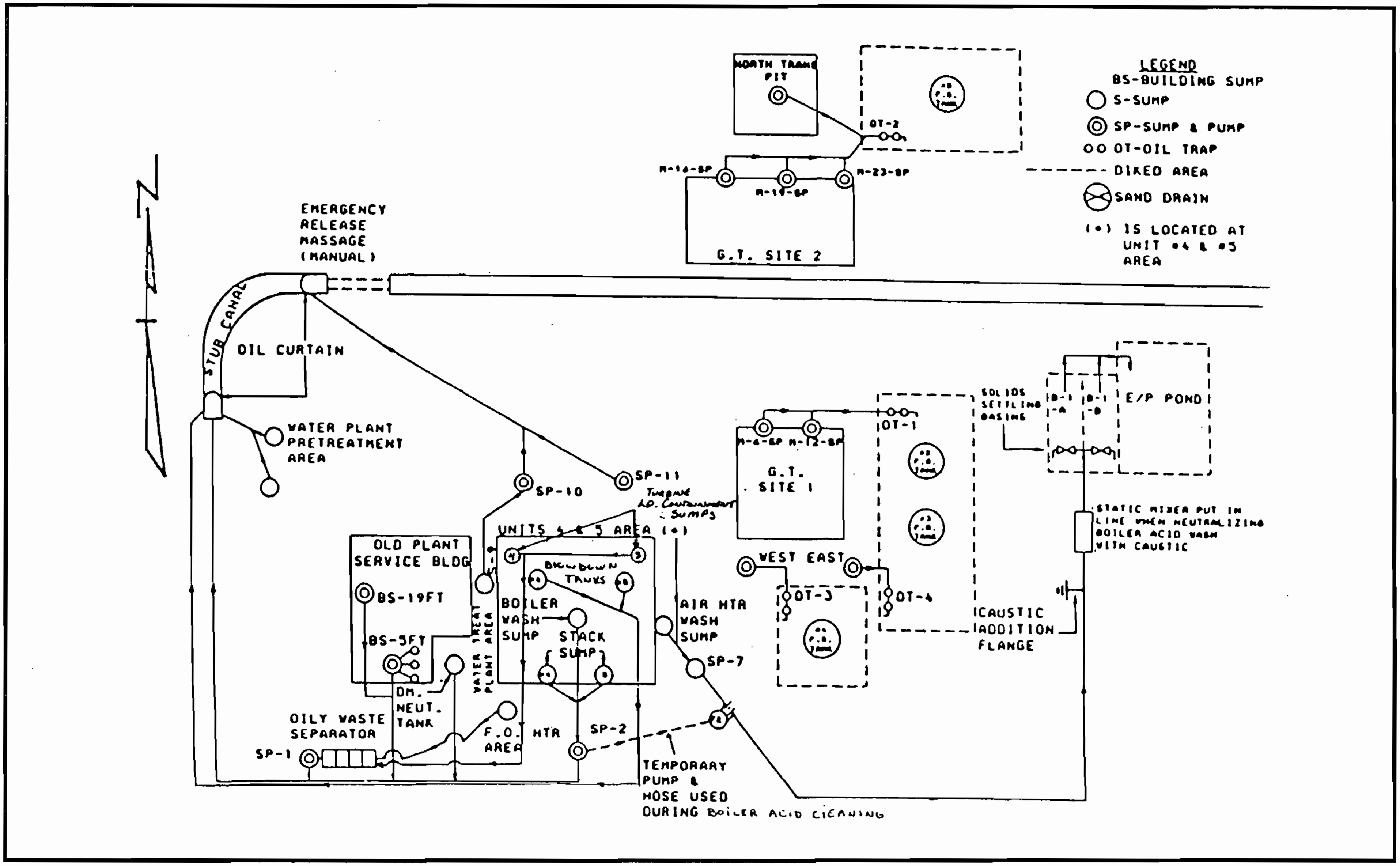


Figure 2.3-19D CONTAMINATED RUNOFF PRETREATMENT

Lauderdale Repowering Project

FPL

SFWMD-22

<u>Comment</u>: 3.8 <u>On-Site Drainage</u>--Please provide flood routings so that staff can verify allowable discharge. This project should be limited to pre-development discharge rates during the 25-year, 3-day design event.

<u>Response</u>: Flood routings are in process. FPL will provide the routings when they become available.

SFWMD-23

Comment: 3.8 On-Site Drainage--District criteria (paragraph 3.2.2.2.b of the Basis of Review, Volume IV, S.F.W.M.D. Permit Information Manual) requires that commercially or industrially zoned projects provide at least one half inch of dry detention or retention pretreatment as part of the required retention/detention, unless reasonable assurances can be offered that hazardous materials will not enter the project's surface water management system. Please redesign your system to meet this criteria. Please elaborate on the measures which are proposed to prevent surface and/or groundwater contamination that may result from normal operation and/or maintenance activities.

Response: FPL offers reasonable assurance that hazardous materials will not enter the project's surface water management system. The existing site is protected by the existing pretreatment system as described in the response to SFWMD-21 and the revised site drainage section of SCA Section 2.3.4.1. Areas affected by repowering are protected as described in SCA Sections 3.6.1, 3.7.3, 3.8.3, and 3.8.4. Briefly, this involves the collection and treatment of all project-associated potentially oily or chemically contaminated runoff within the proposed central wastewater treatment facility (see Figure 3.6.1).

SFWMD-24

Comment: 3.8 On-Site Drainage--Please provide additional details on the Water Quality Best Management Practices to be incorporated in the existing/proposed surface water management system in the text and on the plans provided as Figures 3.8-1, 3.8-2 and 3.8-3. Also, please elaborate further on the best management practices (described in Section 3.8.3) which will be used to prevent or minimize off-site discharges and any potential off-site impacts due to the various on-site construction activities.

Response: Sections IV, V, and VI of the document entitled "Licensing Constraints/Guidelines to Construction Activities", Revision 4, are reproduced on the following pages. It is FPL's intention to include this document in each construction package so that all contractors performing the on-site construction work will abide by it. It is FPL's further intention to revise this document, when appropriate, to incorporate specific conditions of certification and then to re-issue it to all contractors. As part of their submittals within construction packages, each appropriate contractor will be required to submit a description of its specific management practices which will be utilized to ensure compliance.

IV. ACTIVITIES IN JURISDICTIONAL WATERS OF THE STATE

There may be some activities such as dredging and filling operations which impact jurisdictional waters (waters of the state and waters of the U.S.). Such operations will be subject to the terms and conditions of the COE Permit for Activities in Surface Waters and SCA conditions. Other activities may also indirectly impact jurisdictional waters. The Contractor responsible for such activities must adhere to the following:

- Modifications of intake and/or discharge structures shall be done in a manner to minimize turbidity. Turbidity screens should be used to minimize turbidity. Specific limits of turbidity will be specified upon receipt of such limitations.

- Turbidity control measures for other construction-related activities should include, but not be limited to, hay bales, turbidity curtains, sodding, mulching, and seeding employed to prevent violation of water quality standards.

- Onsite construction and access roads should avoid wetlands and be located in surrounding uplands.

- Placement of fill in wetland areas shall not occur without specific direction from FPL.

- All personnel associated with the construction of the project shall be instructed about the presence of manatees in the area and the need to avoid collisions with manatees.

- All vessels associated with the project shall operate at "no wake" speeds at all times while in shallow waters, or channels where the draft of the boat provides less than 3 feet clearance of the bottom.

- Boats used to transport personnel shall be shallow draft vessels, preferably of the light displacement category, where navigational safety permits.

- All personnel should be advised that there are civil and criminal penalties for harming, harassing, or killing manatees, which are protected under the Endangered Species Act and the Marine Mammal Protection Act.

- Contractor shall be held responsible for any manatee harmed, harassed, or killed as a result of the construction of the Project.

- Any collision with a manatee shall be reported immediately to the District Engineer of the COE, FPL's onsite manager, and the F&WS in Jacksonville.

- Contractor shall inform all personnel that the Gopher Tortoise and Eastern Indigo Snake, species classified as "Species of Special Concern" and "Threatened," respectively, may be encountered during construction. Due to their classifications, hunting, harming, or killing these animals is subject to civil and criminal penalties. Information to aid in the identification of these animals will be provided to each Contractor. To preclude inadvertent harm and to assure proper handling, any siting of these animals shall be reported immediately to the FPL onsite manager.

V. WATER DISCHARGES AND RUNOFF CONTROL

Each Contractor will be responsible for complying with the following requirements pertaining to water discharges:

- Water discharges into any jurisdictional waters during construction shall be in accordance with all applicable provisions of Chapter 17-3, Florida Administrative Code (FAC), and 40 Code of Federal regulations (CFR), Part 423, "Effluent Guidelines and Standards for Steam Electric Power Generating Point Source Category," except as provided within the conditions of certification.

- There shall be no discharge of polychlorinated biphenyl compounds.

- Exposed or disturbed soil shall be protected as soon as possible to minimize silt and sediment laden runoff.

- Construction dewatering effluent shall be treated prior to release into the plant discharge canal when appropriate to limit the discharge of excess suspended solids. The discharge of construction dewatering liquids shall not cause excess turbidity beyond 800 meters from the discharge to the existing canal/cooling pond system. Specific limits will be specified upon receipt of such limitations. Construction dewatering effluent shall be discharged only to the existing plant discharge canal.

- To the extent practicable, water for concrete truck washing shall be recycled.

The Contractor is responsible for complying with all applicable provisions of Chapter 17-25 FAC, and the following requirements pertaining to stormwater runoff:

- During construction, appropriate measures (as identified in the items below) shall be used to settle, filter, treat or absorb any potentially silt-containing or pollutant laden stormwater runoff to minimize the suspended solids and turbidity in the runoff, wherever such runoff leaves the area in which Contractor is working. Specific site certification conditions will be cited herein when they become available. Oil and grease limits will be specified when such limitations are received.

- Erosion Control measures shall consist at the minimum of sediment traps, barriers, berms, or vegetative planting. Exposed or disturbed soil shall be protected as soon as possible to minimize silt and sediment laden runoff. The pH of the runoff shall be kept within the range of 6.0 to 8.5 at the point of discharge (POD) from Contractor's area of responsibility.

- Sedimentation will be controlled by use of sediment control basins and traps, filter berms, straw bales, perforated riser pipes at drainage structures or other applicable devices as appropriate.

- All runoff shall be directed to a retention pond provided by FPL. Depending upon completion of the Runoff Pond, this retention pond may be either the existing SSB/EP pond, the existing stub canal, the existing canal/cooling pond system, or, when complete, the Runoff Pond.

- Concrete trucks leaving the site after delivery shall be hosed down only at a paved truck washing area.

VI. CHEMICAL, SANITARY, AND SOLID WASTE DISPOSAL

The Contractor is obligated to assure that:

- Disposal of sanitary wastes from construction toilet facilities shall be in accordance with applicable regulations of the FDER and the BCEQCB.

- Sanitary wastes shall be handled by portable toilet units, temporary units, and permanent units provided by the Contractor. Temporary units shall be located near and throughout the power block area. Collection of these wastes shall be by Contractor; they shall be transported to a municipal sanitary waste treatment facility.

- Solid wastes resulting from construction shall be transported offsite for disposal by an FPL approved Contractor and shall be disposed of in accordance with the applicable regulations of Chapter 17-7, FAC. The Contractor shall submit a plan for approval by the Engineer outlining the methods to be used in handling and disposal of solid wastes as part of its environmental protection program which shall include the following restrictions:

  a. Waste materials such as scrap wood and iron shall be taken to an open area specified by FPL where they will be separated and stock piled for salvage. Portions of construction debris may also be used as fill material on-site at the direction of FPL.

  b. General waste materials shall be disposed of in dumpsters for collection and possible disposal at the county landfill or other suitable and approved local landfill areas.

c. Garbage and waste materials, such as discarded food products, shall be placed in suitably marked containers.

d. Chemical waste, such as fuel and lubricants, shall be placed in holding tanks for periodic removal and transport to salvage locations or disposal at appropriate off-site locations.

e. Metal cleaning wastes from construction activities shall be collected and disposed of in an off-site location or be treated in the plant wastewater treatment facility.

f. Heavy equipment is to be refueled only in those designated areas equipped to control spills.

SFWMD-25

Comment: 3.8 On-Site Drainage--Please provide cross sections of the proposed detention/retention area(s) including bottom and inlet grate elevations. In order for a retention/detention area to be considered dry, the bottom elevation must be at least 1 inch above the control elevation.

Response: There are six such areas proposed, as follows:

1. Old intake canal area,
2. Old stub canal,
3. Existing SSB/EPP,
4. New runoff pond,
5. East construction area discharge swale, and
6. Cooling canal/pond system

Responses for each of these areas follow:

1. The old intake canal area has been proposed to be filled so as to become a dry retention area. The existing and proposed cross sections are shown in Appendix 10.1.4 of the SCA (refer to Pages 10.1.4-29 through 10.1.4-34 of the SCA). This retention area will empty by percolation and will retain the full design storm volume. It thus has no control elevation. Inflow is non-point source overland flow; thus, there is no inlet grate.
2. In the late 1970s, FPL proposed, and the state department of pollution control and EPA approved, the use of the old Units 1, 2, and 3 discharge canal as a wastewater percolation pond. At that time, it was sealed off from the rest of the cooling canal/pond system and renamed the stub canal percolation pond. Cross sections were measured and are shown in Figure SFWMD 25-1. FPL believes that this stub canal qualifies, under Section 3.2.2.6 of the BOR, as an existing water body both as a manmade area (b) and a previously degraded area (a). Under the Lauderdale Repowering Project, this area will be able to retain the entire design storm.

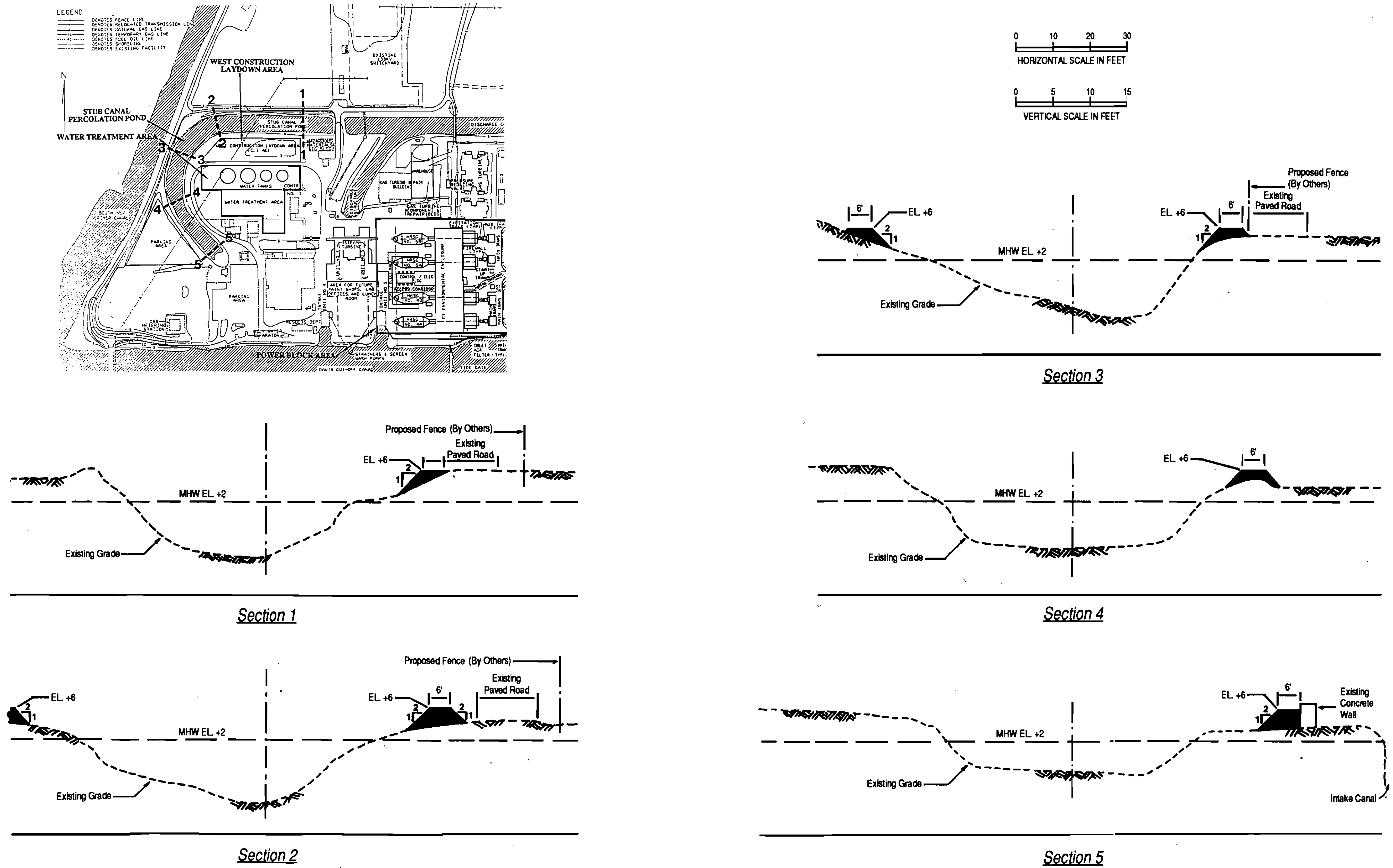
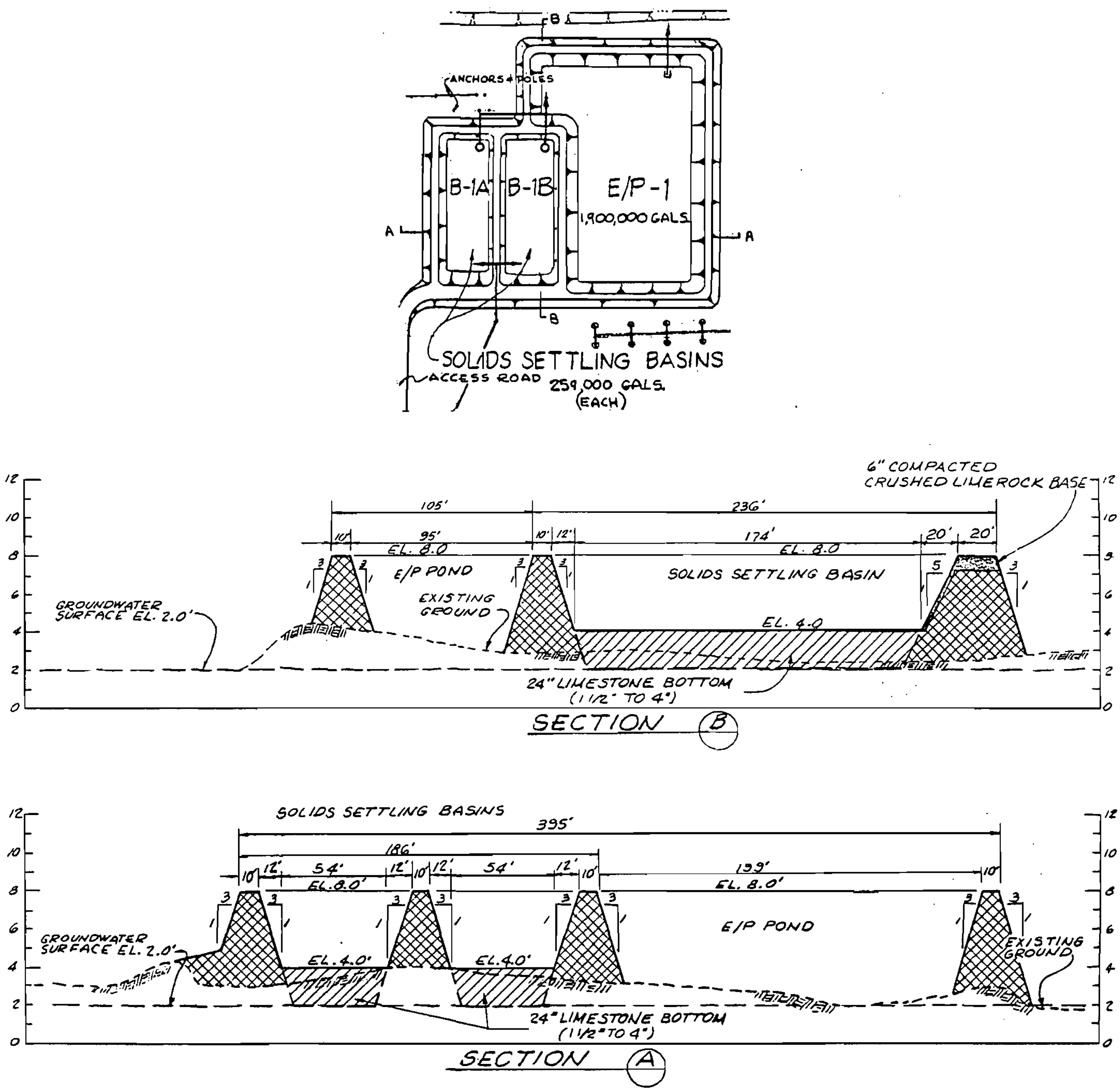


Figure SFWMD25-1 CROSS SECTIONS OF THE STUB CANAL PERCOLATION POND

Lauderdale Repowering Project

FPL

3. At the same time the stub canal percolation pond was installed, the SSB/EPP was also installed as part of the plant wastewater system. Cross sections are presented in Figure SFWMD25-2.
4. The new runoff pond will exclusively manage stormwater resulting from the area affected by the power block. Detailed design of this facility is not yet complete; however, it is being sized to provide dry retention as required under 3.2.2.2 (3) of the BOR. The control structure will be similar in nature to the one at FPL's Canaveral Plant which diverts the first flush of rainfall to the retention device and then bypasses subsequent flows.
5. The east construction area discharge swale is a temporary structure whose purpose is to provide dry retention for stormwater runoff from the east construction parking and east construction laydown areas while these areas are being used during construction. Subsequently, this property will revert to Alandco and will be managed under Alandco's existing surface water management plan which has already been permitted. Please note that, as shown on SCA Figure 3.8-2, this drainage swale is 100 ft wide and, in fact, has been designed to meet all requirements of 3.2.4.4(1) of the BOR, even though this feature is being sized for dry retention.
6. As noted in the response to SFWMD-21, the cooling canal/pond system is considered an existing water body being used for retention/detention purposes. As noted in the response to SFWMD-20 (specifically, Page 3 of Calculation 56), it forms about 177 acres of water management area and comprises nearly 45 percent of the site. Cross sections of this water body can be determined from SCA Figure 2.3-14.



NOTES:

1. COMPACTED FILL SHOWN THUS: REFER TO SPECIFICATION C513
2. BACKFILL SHOWN THUS:
3. CONTINUOUS INTEGRAL LINER 30 MILS MINIMUM THICKNESS.

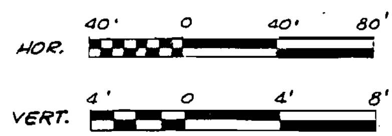


Figure SFWMD25-2 CROSS SECTIONS OF THE SSB/EPP

Lauderdale Repowering Project

FPL

SFWMD-26

Comment: 3.8 On-Site Drainage--Please provide water quality calculations which verify that the proposed detention/retention volume meets District criteria (paragraph 3.2.2.a.1, 2, or 3 of the Basis of Review, Volume IV, Permit Information Manual).

Response: Preliminary calculations are provided in SCA Appendix 10.7. These calculations verify that stormwater from areas affected by repowering will be managed in accordance with the requirements for wet detention under 3.2.2.2a 3 of the BOR.

With respect to the existing site surface water management system, the Lauderdale Plant currently holds a valid Industrial Wastewater Permit from DER (IO-06-158722) and a valid Direct Discharge Industrial Wastewater Facility License from Broward County (IWH-102), both of which cover the plant stormwater discharges to both groundwater and surface water. The plant also currently holds a valid NPDES permit from EPA (FL 0001503) which regulates the site stormwater discharge to surface waters.

SFWMD-27

Comment: 3.8 On-Site Drainage--Please note that all wet detention/retention areas must meet dimensional criteria specified in paragraph 3.2.4.4.1.b of the Basis of Review, Volume IV, Permit Information Manual. Storage for water quality and/or quantity purposes may not be claimed in areas that do not meet this criteria (for example, the proposed discharge swale around the parking lot).

Response: The response to SFWMD-25 tabulated the six retention/detention areas at the site. The old intake canal will become a dry retention area. The old stub canal and the existing SSB/EPP are part of the existing wastewater treatment system and can be used as-is under 3.2.2.6a and b of the BOR. The new runoff pond and east discharge swale will meet the referenced dimensional criteria. Finally, the existing cooling canal/pond system can be used as-is under 3.2.2.6 b and c of the BOR.

SFWMD-28

<u>Comment</u>: 3.8 <u>On-Site Drainage</u>--District criteria (paragraph 3.2.2.8, Basis of Review, Volume IV, Permit Information Manual) require that above ground pond dikes shall not be located within 200 feet of water bodies or 100 feet of dry retention/detention areas. Please provide documentation which demonstrates that the proposed separation between the existing/proposed sewage treatment and equalization ponds and the retention pond/dry retention areas of the proposed surface water management system meets these criteria.

<u>Response</u>: There is no sewage treatment pond; sewage is being piped to an off-site POTW, except for remote areas being served by septic tanks. Neither of these include any aboveground dikes.

SFWMD-29

Comment: 3.8 On-Site Drainage--District criteria (paragraph 3.2.2.1, Basis of Review, Volume IV, Permit Information Manual) require that "Projects shall be designed so that discharges will meet State water quality standards, as set forth in Chapter 17-3, Florida Administrative Code." Please elaborate on how those standards will be met.

Response: Sections 5.1, 5.2, 5.3, 5.4, and 5.5 of the SCA describe in detail how the Lauderdale Repowering Project will continue to meet the state water quality standards described in Chapter 17-3, F.A.C., as the existing plant now does (see response to SFWMD-26).

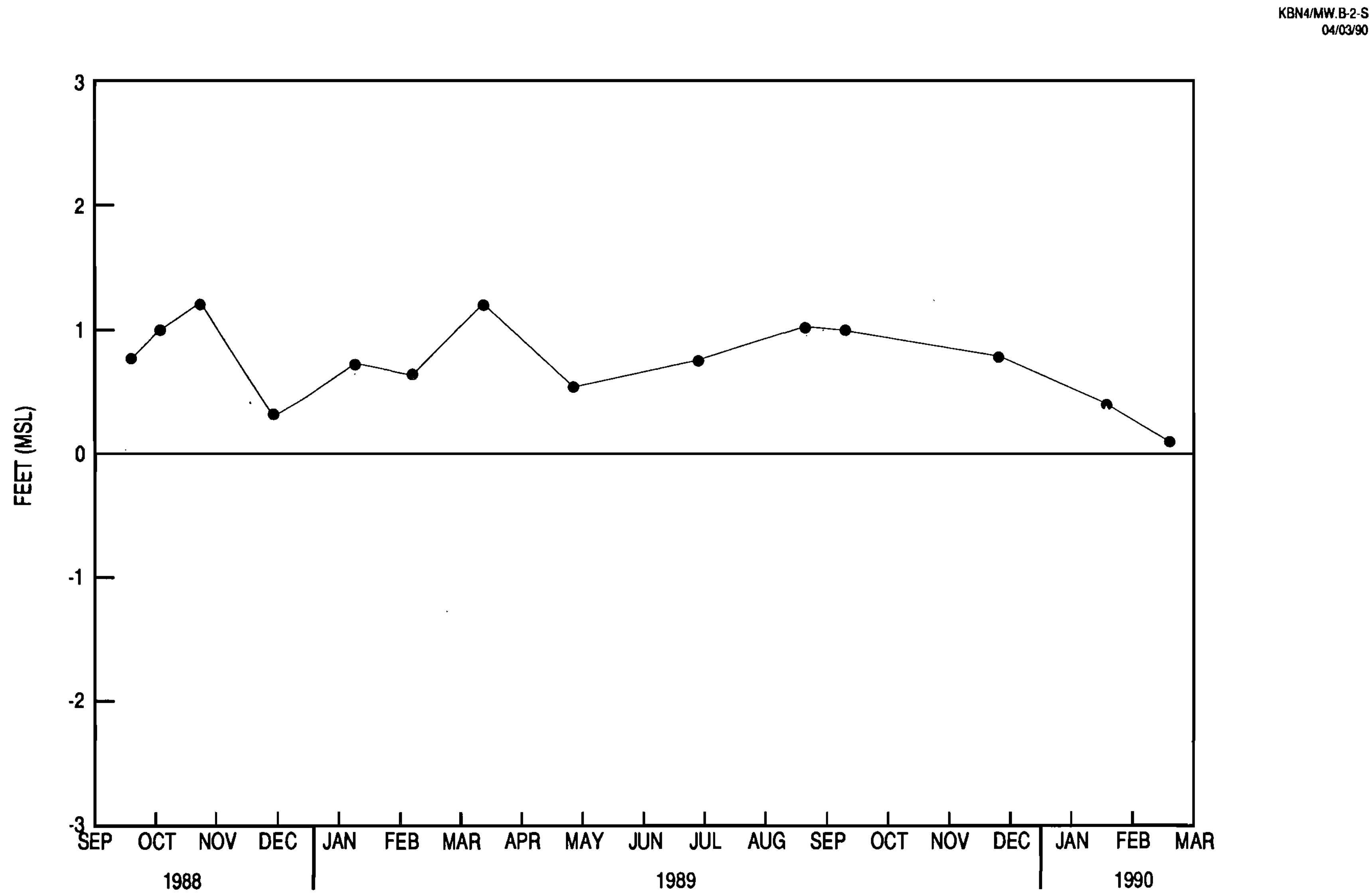
SFWMD-30

<u>Comment</u>: 4.3 <u>Groundwater Impacts</u>--Please provide a site plan for the proposed dewatering operations which shows the location of the well points and indicate the maximum depth of the dewatering operations. These dewatering operations should also be incorporated into the model discussed in question 8 in order to assess any impacts associated with the construction activities. Should it be found that impacts will occur as a result of the proposed dewatering activities, please indicate what measures will be taken to offset any potential impacts.

<u>Response</u>: At the time the SCA was filed, a nominal amount of dewatering was expected but not yet detailed. Groundwater levels have been monitored in the proposed power block area since September 1988. Probably as a result of the ongoing drought, on-site groundwater levels in the power block area are extremely low (see Figure SFWMD30-1), near 0 ft-msl. If the water levels remain this low during construction, virtually no dewatering will be required because excavations below elevation 0 ft-msl are not presently anticipated.

The dewatering operations will be incorporated into the groundwater modeling performed in conjunction with the hydrogeologic investigation being conducted at the site.

See the response to SFWMD-7 for a more complete description of the hydrogeologic investigation conducted at the FPL Lauderdale facility.



SFWMD-71

Figure SFWMD30-1 **WATER-LEVEL MEASUREMENTS IN MONITORING WELL B-2**

Lauderdale Repowering Project

FPL

SFWMD-31

Comment: 4.4 Ecological Impacts--What mitigative measures are proposed to compensate for the existing wetlands which will be lost due to the proposed construction activities associated with the repowering project in the area east of the existing solid settling basins and evaporation/percolation ponds?

Response: Approximately 2.5 acres of existing forested wetlands will be filled for construction of the wastewater treatment facility. As mitigation for this impact to wetlands, FPL proposes to create approximately 2.5 acres of forested wetlands on-site. Four potential areas have been identified. These include:

1. Restoration of an artificially deepened area just north of the discharge canal and east of the isolated wetland to be filled.
2. Restoration of the artificially deepened dead-end finger canal at the southeast property boundary.
3. Creation of approximately 0.5 acre of wetland from existing upland located northeast of the proposed wastewater treatment facility. This would be performed after use of the existing uplands during construction.
4. Creation of a forested wetland buffer from existing uplands southeast of the existing plant access road.

A mitigation proposal is being developed for the wetland permit applications.

SFWMD-32

Comment: 4.7 Impact on Landmarks and Sensitive Areas--Depending on the response to question 8 under section 2.3.3 (Site Water Budget and Area Users), this section may need to be revised.

Response: The comment is noted. Refer to the response to SFWMD-8.

SFWMD-33

Comment: 4.11 Variances--As a result of the responses to the foregoing questions, please identify any variances to District right-of-way, water use and/or surface water management criteria which may be required as a result of the proposed construction activities.

Response: At this time, FPL does not believe that any variances from district permitting criteria will be required for any uses or facilities as a result of construction activities associated with the Lauderdale Repowering Project. If a need for any such variances is identified, FPL will provide the required notice at least 120 days before the scheduled certification hearing, in accordance with Rule 17-17.141(2)(e), F.A.C.

SFWMD-34

Comment: 5.3 Impacts on Water Supplies--Depending on the responses to the questions listed under section 2.3.3 (Site Water Budget and Area Users), the sections under 5.3.2 (Groundwater) and 5.3.3 (Drinking Water) may need to be revised to reflect the results from additional data and analysis.

Response: Results of the hydrogeologic investigation conducted at the FPL Lauderdale facility will address the need for revisions to Section 5.3.2 (Groundwater) and Section 5.3.3 (Drinking Water). Necessary revisions will be incorporated into the hydrogeologic report prepared for the site and submitted to SFWMD.

Refer to the response to SFWMD-7 for a more complete description of the hydrogeologic investigation conducted at the FPL Lauderdale site.

SFWMD-35

Comment: 5.3 Impacts on Water Supplies--Please supply details of the numerical salinity modeling used to generate the data presented in Table 5.3-1. Why was there a marked salinity change in the simulation between 1000 and 2000 feet downstream of the plant intake instead of between the plant intake and 1000 feet downstream?

Response: The model results indeed showed that the marked salinity change occurred between the plant intake and 1,000 ft downstream. A transcription error was found in Table 5.3-1, where three rows of numbers were misaligned. This error was corrected in Errata 1.

SFWMD-36

<u>Comment</u>: 5.3 <u>Impacts on Water Supplies</u>--Once construction is complete, will additional groundwater withdrawals for irrigation purposes be required to service the proposed repowering project in addition to those authorized by the existing General Water Use Permit issued to FP&L on April 21, 1988? If so, please provide a map showing the location of the proposed withdrawal facilities and complete the enclosed Table A and/or Table B regarding withdrawal facility specifications. The proposed/existing irrigation withdrawals should also be incorporated into the modeling conducted in response to question 8 above.

<u>Response</u>: Additional groundwater withdrawals for irrigation purposes will not be required to service the Lauderdale Repowering Project.

SFWMD-37

<u>Comment</u>: 5.3 <u>Impacts on Water Supplies</u>--Please note that, depending on the outcome of the District's analyses of the proposed water withdrawals and surface water management system design, additional monitoring requirements may be requested through the sufficiency review process for this application and/or through the District's recommended certification conditions for the proposed repowering project. At a minimum, water quality monitoring at each outfall structure for the surface water management system will be required due to the industrial nature of the site.

<u>Response</u>: The comment is noted.

SFWMD-38

<u>Comment</u>: 5.4 <u>Solid/Hazardous Waste Disposal Impacts</u>--What contingency provisions are planned in the event of a fuel or other type of hazardous material spill?

<u>Response</u>: The Oil and Hazardous Material (OHM) Manual contains the SPCC and emergency response plan. These manuals are available at the Lauderdale Plant.

SFWMD-39

Comment: 5.11 Resources Committed--Depending on the responses to the questions listed under section 2.3.3 (Site Water Budget and Area Users), this section may need to be revised.

Response: The comment is noted.

SFWMD-40

Comment: 5.12 Variances--As a result of the responses to the foregoing questions, please identify any variances to District right-of-way, water use and/or surface water management permitting criteria which may be required as a result of the operation of the proposed repowering project.

Response: At this time, FPL does not believe that any variances from permitting criteria will be required for any uses or facilities as a result of operation of the Lauderdale Repowering Project. If a need for any such variances is identified, FPL will provide the required notice at least 120 days before the scheduled certification hearing, in accordance with Rule 17-17.141(2)(e), F.A.C.

SFWMD-41

Comment: Appendix 10.4 Existing Permits--Following is a discussion of the existing right-of-way occupancy permits issued by the District for the uses/facilities associated with the FP&L Ft. Lauderdale Power Plant where possible discrepancies between authorized, existing and proposed uses may exist. As noted earlier, these potential discrepancies should be addressed prior to and/or concurrent with the certification process for the proposed repowering project.

Permit Number 1927-5. The correct permit number is 1927-15. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. If the authorized use will support the new repowering project, then any changes required in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 1939-4. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. In addition, if the facilities authorized are no longer being used, they should be removed. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 1941-22. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. If the facilities authorized are no longer being used, they should be removed. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 482. The correct permit number is 483. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. If the facilities authorized are no longer being used, they should be removed. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 502. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. If there are additional existing, but unauthorized facilities, such as an oil line, at this site, a permit modification should be requested. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 532. The correct permit number is 552. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. If the authorized

SFWMD-41 (Continued)

use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria. Permit Number 6564. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 6720. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 7055. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Response: FPL will address the concerns raised by the district in this comment as part of the application for modification and consolidation of permits, where any discrepancies or discontinued uses will be addressed. See also the responses to SFWMD-3 and SFWMD-4.

SFWMD-42

<u>Comment</u>: Appendix 10.4 <u>Existing Permits</u>--In addition, the following right-of-way occupancy permit authorizations are missing from this list:

Permit Number 1941-21. If the authorized use is no longer part of the facilities used at this site, a request to cancel the permit should be submitted. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 83. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 1943. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

Permit Number 2269. If the authorized use will support the new repowering project, then any changes in the authorized facilities must be clarified and approved, subject to current criteria.

<u>Response</u>: Comment is noted. See response to SFWMD-4.

Florida Department of Environmental Regulation

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

Bob Martinez, Governor   Dale Twachtmann, Secretary   John Shearer, Assistant Secretary

February 16, 1990

Mr. Claude Arrington
Division of Administrative Hearing
The Desota Building
1230 Apalachee Parkway
Tallahassee, Florida 32399-1550

Dear Mr. Arrington:

RE: FPL Lauderdale Repowering Project Power Plant Site Certification Application PA 89-26, DOA # Case No. 89-00636

The Department has reviewed the above referenced power plant siting application for the Lauderdale Repowering Project for sufficiency as required by Chapter 17-17, Florida Administrative Code. The Department hereby finds the application insufficient in the following areas:

1. Lack of verification of the quantity of natural gas fired in unit 5 (Table 2-11)
2. Lack of historical data of actual VOC emissions/fuel usage for CTs (done for Units 4 and 5 in tables 2-10, 2-11).
3. Will the proposed fuel/heat input restrictions on the CTs and repowered units 4 and 5 be temporary in nature, or will they be permanent?
4. Explain the compliance verification procedure to be used to demonstrate daily or weekly compliance with the restriction mentioned in 3 above, which will be based on 75 ^{o}F ambient conditions.
5. Submit a construction permit application to document the existing facility as minor for VOCs.
6. Please provide more detailed specifications for equipment details specifications.
7. The thermal discharge of the cooling water to the surface water may have certain impact on the temperature of the on-site ground water in the surficial aquifer; although it may not be of hazardous nature, yet it should be addressed.

8. The Surface Water Quality data presented in 2.3, Tables 2.3-9 & 2.3-10 did not include results for Cyanide, Bromine and Bromates which are listed in FAC Rule 17-3.121 (Class III Surface Water Standards).

9. The results for Table 2.3-9 & 2.3-10 showed violations for Dissolved Oxygen, pH, Copper, Iron, Selenium and Mercury as compared to FAC Rule 17-3.121. It is assumed that results from station 1, located at Lauderdale Plant intake structure on the Dania Cut-Off Canal, are background valves and were subtracted from the Stations 2, 3, 4 and 5 results, if the background results were in violation of the Class III standards. The following table(s) present the violations of the Class III Water Quality Standard. (see attached)

10. The above violations of Class III Standards need to be explained. The source(s) of contamination and or the cause of the violations need to be determined. Additional details above and beyond the footnote, need to be presented to document the suspected contamination for Mercury.

11. FP&L's current permit, Permit/Certification Number 10-06-158722 Specific Condition #1 reads as follows:

    1. "The water quality at the perimeter of the Zone of discharge and the Mixing Zone shall be consistent at all times with the water quality standards set forth in Chapter 17-3, Florida Administrative Code (FAC). Should conditions of the waters within the Zone of discharge or the Mixing Zone warrant, the permittee may be required by the Department to upgrade, reduce or cease the discharge of effluent into the Zone of discharge and adopt an laternate method of disposal."

    Due to the noted violation, Specific Condition #1 should be implemented or FP&L should petition the Deptartment for site specific alternative water quality criteria through use of FAC Rule 17-3.031.

12. Section 5.2.3 Measurement Programs Subsection 5.2.3.2 Ground Water stated that "After the use of the SSB/EPP is discontinued, the ground water monitoring program will be discontinued." The Ground Water Monitoring Program should be continued for one year after the SSB/EPP is discontinued, at the time a review of the data will indicate if the program should be continued or discontinued.

13. Section 3.5.4 Process Water System indicated many waste stream being treated in a on-site process water treatment system then discharged to the cooling

canal/pond system. The treated effluent should be tested for all the parameters listed in FAC 17-3.061 and 17-3.121 annually.

14. Surface water monitoring stations 1 through 5 should be monitored quarterly for the parameters listed in Sections 17-3.061 and 17-3.121, F.A.C.

15. A limitation on heat input to duct burners per last sentence of Section 4.2 (page 4-3) of PSD APP to 90.62 x 10^6BTU/hr may be needed. The facility may escape NSPS subpart Db because it is less than 100 x 10^6 BTU/hr

16. It appears that repowering this plant can be accomplished without filling hte finger canal connected to the Dania Cut-Off Canal and the South New River Canal. Please justify the need for the canal filling.

17. Please be aware that mitigation may be needed to offset the loss of open water and fringe area.

18. Ft. Lauderdale FPL Repowering RO Discharge is Probably in Violation of Pre Treatment Requirements.

19. How are the following waste streams to be handled: Combustion turbine wash water, Chemical lab wastes, what Biocide, where is discharge of proposed process water treatment system, and R.O. reject?

20. Why not tie rest of the septic tanks in to a central sewer; Via low pressure sewers if necessary.

21. Please provide breakdown of fuel consumption between HRSG's and gas turbines.

22. Please provide economics of using SCR for oil firing. Molecular sieve catalysts have been proven on oil fired operations.

23. Please address the possibility of using HRSG's with low NOx burners. A review of previous permits indicates HRSG's capable of meeting 0.1 lb/MMBtu for NOx emissions.

24. The non-regulated pollutants antimony, barium, cobalt, radionuclides, zinc, and chlorine are identified for gas/oil combustion in the publication "Control Technologies for Hazardous Air Pollutants." These pollutants should be addressed a part of the BACT.

25. Application should address the possibility of using "improved combusters" which are capable of limiting NOx to 25 ppm.

26. Provide basis for using capable recovery factor with 12 percent interest over 30 years for annualized capital cost on Tables 4-4, 4-5, and 4-6.

27. Provide basis for using levelizing factor with 12 percent interest, 30 years, and 5 percent escalation rate levelized annual cost on Tables 4-4, 4-5, and 4-6.

28. Provide responses to EPA Region IV's comments regarding BACT (copy of letter attached).

Also attached are letters from the South Florida Regional Planning Council, EPA and the South Florida Water Management District.

Sincerely,

Hamilton S. Oven

Hamilton S. Oven, Jr., P.E.
Administrator Office of
Siting Coordination
Division of Air Resources
Management

HSO

Attach:

cc: Gary Smallridge
Sheppard Moore

Enclosure

BEST AVAILABLE COPY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

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D...

Ms. Patricia G. Adams, Planner
Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RE: Florida Power and Light Company (FPL), Lauderdale Repowering Project (PSD-FL-145)

Dear Ms. Adams:

This is to acknowledge receipt of the above referenced facility's application for a prevention of significant deterioration (PSD) construction permit, transmitted by your letter dated January 6, 1990. As discussed between Mr. Barry Andrews of FDER and Ahmed Amanulah of my staff on February 7, 1990, we have the following comments regarding this application.

FPL is proposing a Combustion Turbine Repowering Project at the Lauderdale Plant site, which will consist of replacing the existing steam generators for Units 4 and 5 with combustion turbines (CTs) and heat recovery steam generators (HRSGs) operating as a combined cycle plant.

Each repowered unit will consist of two CTs each with its own HRSG. This combined cycle power plant is projected to burn natural gas as the primary fuel and No. 2 fuel oil as an alternate fuel. Each repowered unit will have a nominal generating capacity of 480 MW.

Our major point of concern is in regards to the BACT determinations for NO_x. The applicant proposed wet injection as the control technology for NO_x, rejecting the use of Selective Catalytic Reduction (SCR). The basis for rejection, according to the applicant, was significant adverse energy, economic and environmental impacts.

The major environmental concerns raised by the applicant appear to be the possibility of ammonia slip, the possibility of the formation of SO_3 and ammonium bisulfate, the deactivation of the catalyst due to plugging from sulfur oxides, and the disposal problems related to changing out any vanadium pentoxide catalysts - a hazardous waste under RCRA regulations. What the applicant fails to point out, however, is that there are SCR systems on the market which do not use vanadium pentoxide, or any other metal, as a catalyst. For example, one SCR system makes use of a ceramic molecular sieve to promote the reaction. The ceramic catalyst system has been applied on gas

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Mr. Clair Fancy
Deputy Bureau Chief
Florida Department of Environmental
Regulation
Twin Towers Office Bldg.
2600 Blair Stone Rd.
Tallahassee, FL 32399-2400

turbines and diesel engines. The system does not promote the conversion of SO_2 to SO_3 and has virtually no catalyst poisoning, plugging or masking problems. The ammonia slip is also limited. In addition, the catalyst is not considered a hazardous waste.

The energy impacts described by the applicant are not those which would put a strain on the local energy supply or which appear to be significantly different than typical plant energy usage.

The economic impacts provided by the applicant consist of a incremental cost effectiveness of $6,424 per ton of NO_x removed. Apparently the number is derived from dividing the total annualized costs by the incremental reduction from wet injection to SCR. This analysis does not provide the total cost per ton of NO_x removed.

The applicant's argument regarding the adverse effects of SCR usage while firing #2 fuel oil also appears to be unjustified. We have contacted other Regions where similar types of combustion turbines are currently operating with SCR controls. Most of these turbines use natural gas as the primary fuel and No. 2 fuel oil as a backup fuel.

Information from Region I also indicates that a SCR system is continuously being utilized, even while the turbine fires oil.

Also, a feasibility study by the Stationary Source Committee of the Northeast States for Coordinated Air Use Management (NESCAUM) on emission limits for gas turbines (October 1988) revealed that sulfur containing fuels could present somewhat of a problem in promoting the use of SCR in the Northeast. However, information recently obtained from Japan and Europe show that as of April 1986, SCR experience extends back eight and a half years on oil-fired boilers, eight years on gas, and six and a half on coal. Japan currently has at least 22 SCR units for coal-fired boilers, 55 SCR units for oil-fired boilers, and 13 SCR units for liquid natural gas (LNG) boilers. In general, figures show that with coal, SCR catalyst life is 2-3 years; 4-7 years with oil; and with LNG or gas, catalyst life is in excess of 6 years. During the initial installations of SCR units, NO_x reductions averaged 30 percent. With operating experience, more recent installations show reductions in most cases of 70-80%.

In any case, the justifications presented by the applicant for rejecting SCR as a control technology do not appear to be convincing. There are SCR technologies on the market which do not have a hazardous waste by-product. SCR has been applied in the United States on gas and fuel oil fired turbines and diesel engines. It would seem, then, that technical feasibility is not an issue, and, achieving a lower NO_x emission limit than the proposed 42 ppm and 65 ppm for a combined cycle unit is not improbable.

Thank you for the opportunity to review these packages. If you have any questions regarding these comments, please contact Ahmed Amanulah of my staff at (404) 347-2864.

Sincerely yours,

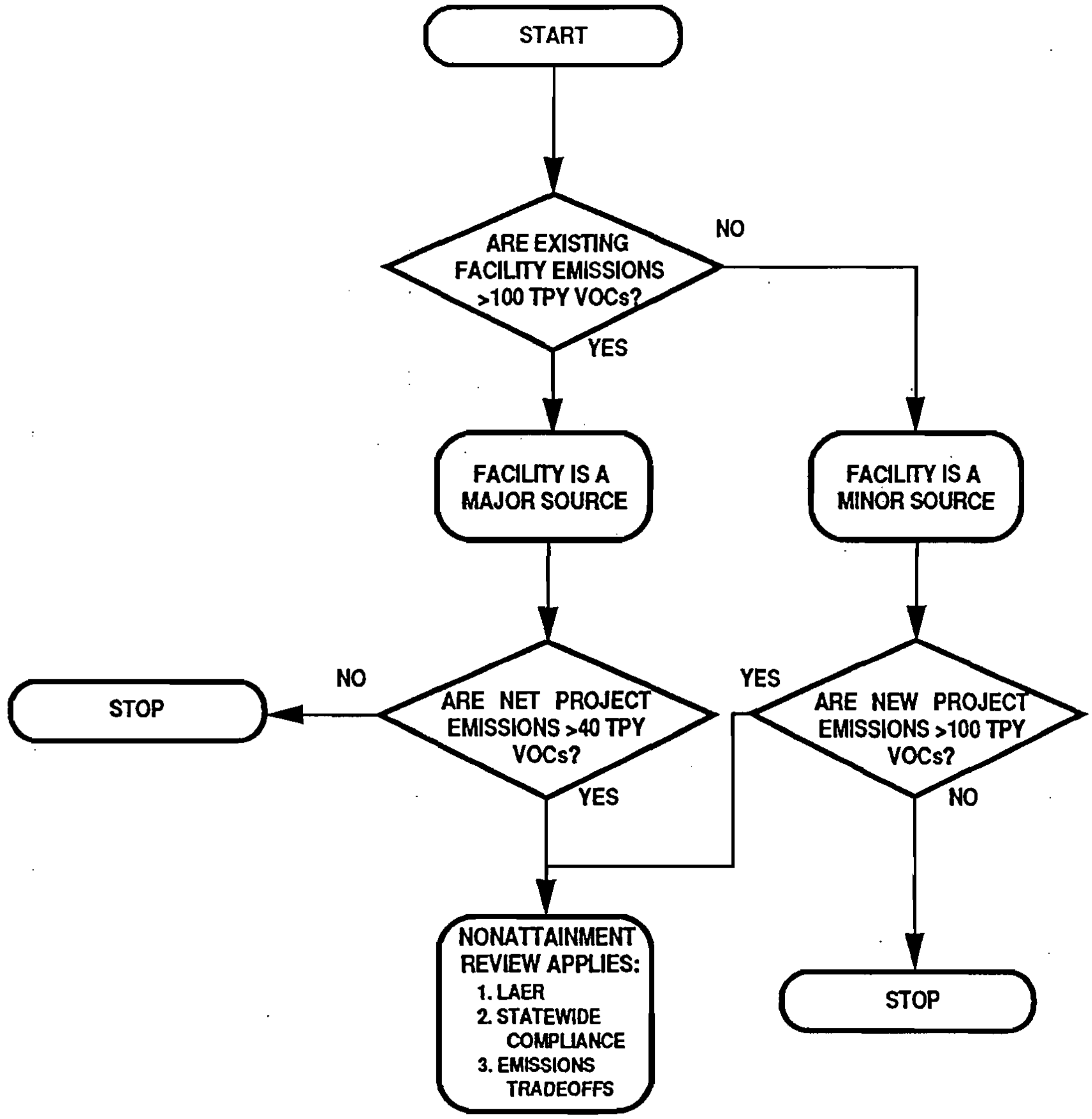
Wayne J. Aronson /for

Bruce P. Miller, Chief
Air Programs Branch
Air, Pesticides, and Toxics
Management Division

cc: Clair Fancy, FDER
Barry Andrews, FDER

01-23-1990

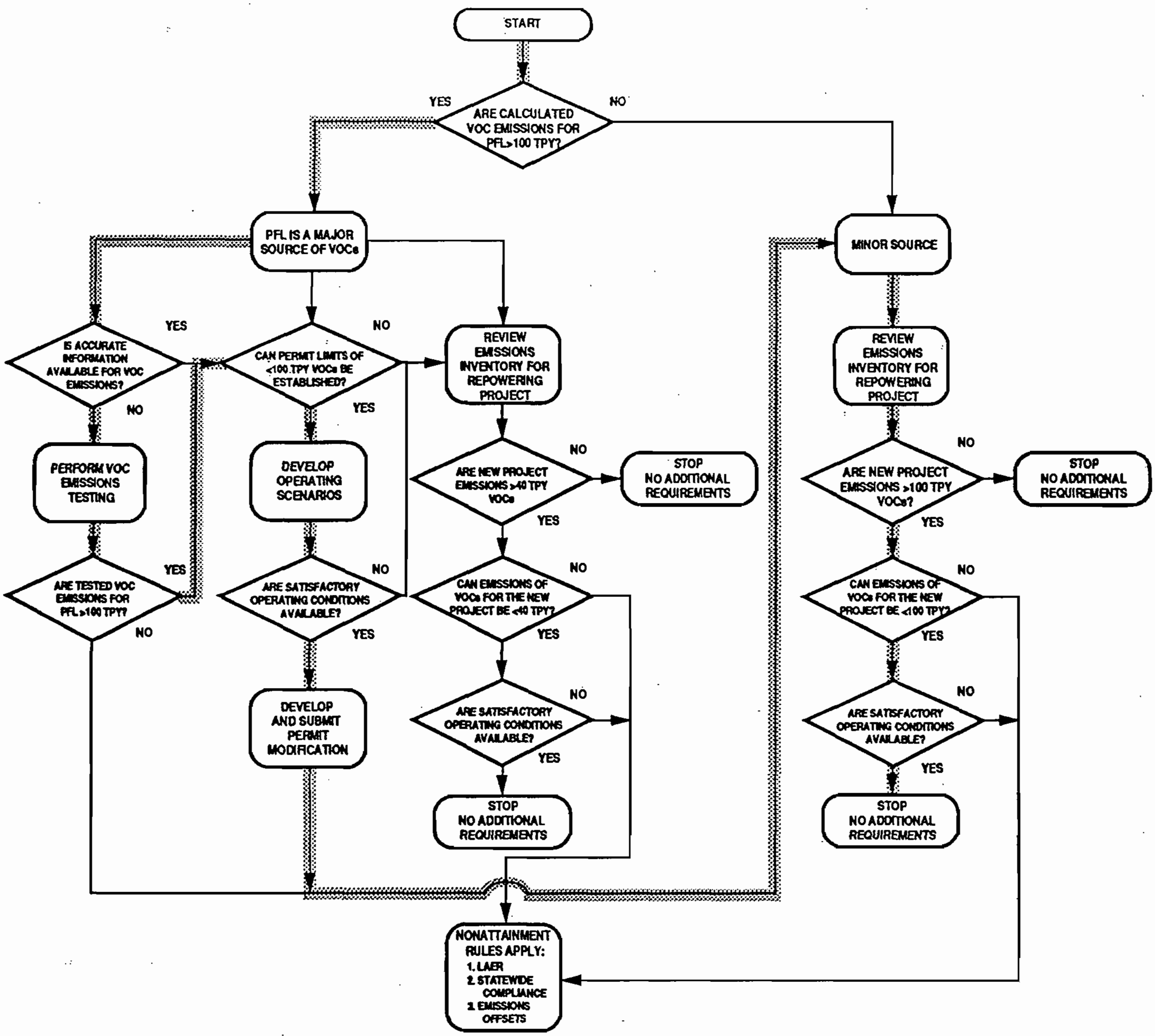
KBN 4
FPL OVERHEADS
1/90ph



FLOW DIAGRAM OF NONATTAINMENT REVIEW TO MINOR AND MAJOR SOURCES

Lauderdale Repowering Project

FPL



FLOW DIAGRAM OF POTENTIAL OUTCOMES FOR LAUDERDALE REPOWERING PROJECT

Lauderdale Repowering Project

FPL

Summary of VOC Emissions
Limiting Strategy

Units	Potential Emissions	Comments
Existing[a]		
GTs 1-24	90.9 TPY	Limit annual heat input; Table 2-13
Storage Tanks	9.0 TPY	Table 2-5
	99.9 TPY	
Repowered		
CTs/HRSGs	111.9 TPY	Limit annual heat input; Table 2-7
Storage Tanks	4.3 TPY	See Tables 2-5 and 2-6
Reductions from 4 and 5	-16.3 TPY	See Tables 2-10 and 2-11
	99.9 TPY	

[a]Existing Units 4 and 5 will be shut down prior to the operation of the repowered units.

Table 2-5. Maximum Emissions of VOCs From Storage Tanks

Description	No. 3 Tank New	No. 3 Tank Old	No. 2 Tank Potential	No. 4 Tank Removed	No. 5 Tank Potential
Type of Liquid Stored	No. 2 Fuel Oil	No. 6 Fuel Oil	No. 2 Fuel Oil	No. 2 Fuel Oil	No. 2 Fuel Oil
Tank Volume (gallons)	6,300,000	6,300,000	3,360,000	2,310,000	3,150,000
Total Annual Throughput (gallons)	418,965,980	29,429,000	515,968,586	806,260	515,968,586
Turnovers Per Year	66.5	4.7	153.6	0.35	163.80
Molecular Weight of Vapor	130.0	190.0	130.0	130.0	130.0
Storage Temperature (°F)	75.0	75.0	75.0	75.0	75.0
Vapor Pressure at Storage Temperature (PSIA)	0.0105	0.0001	0.0105	0.0105	0.0105
Tank Diameter (ft)	150.0	150.0	120.0	100.0	120.0
Average Vapor Space Height (ft)	24.0	24.0	20.0	20.0	19.0
Average Diurnal Temperature Change (°F)	20.0	20.0	20.0	20.0	20.0
Paint Factor	1.33	1.33	1.33	1.33	1.33
Product Factor	1.0	1.0	1.0	1.0	1.0
Turnover Factor	0.5	1.0	0.4	1.0	0.4
Breathing Losses (lb/yr)	3730.9	189.3	2310.8	1685.7	2251.2
(tons/yr)	1.9	0.09	1.2	0.8	1.1
Working Losses (lb/yr)	6862.7	10.1	6761.3	26.4	6761.3
(tons/yr)	3.4	0.0050	3.4	0.0	3.4
Total Emissions (tons/yr)	5.3	0.1	4.5	0.9	4.5

Table 2-6. Summary of Maximum Average Regulated Air Emissions From the Lauderdale Repowering Project

Pollutant	4 CTs/HRSGs[a] (TPY)	Storage Tank (TPY)	Total[b] (TPY)
Particulate Matter[c]	831.7	NA	189.8
Sulfur Dioxide[c]	12,337.7	NA	12,337.7
Nitrogen Oxides[c]	6,050.6	NA	6,050.6
Carbon Monoxide[d]	1,658.4	NA	1,745.5
Volatile Organic Compounds[c]	111.9	4.3[e]	116.2
Lead[c]	0.10	NA	0.210
Arsenic[c]	0.099	NA	0.099
Beryllium[c]	0.059	NA	0.059
Mercury[d]	0.352	NA	0.352
Fluorides[c]	0.761	NA	0.761
Sulfuric Acid Mist[c]	1,538	NA	1,538

[a]HRSGs only fired with natural gas and when natural gas is fired in CT.
[b]Does not include creditable emission decreases for Units 4 and 5.
[c]Based on oil firing at 75°F ambient temperature and 81.8 percent capacity factor (operation at full load).
[d]Based on natural gas firing at 75°F ambient temperature and 100 percent capacity factor; includes emissions from HRSGs, i.e., 96.4 TPY for CO and 0.014 TPY for mercury.
[e]Net emissions increase from storage tanks (Tank No. 3 with No. 2 fuel oil minus Tank No. 3 on No. 6 oil minus Tank No. 4 on No. 2 fuel oil: 5.3 - 0.1 - 0.9 = 4.3).

Note: NA = not applicable.
neg. = negligible.
TPY = tons per year.

Table 2-7. Annual Heat Input Limitations for Repowered Units

	Natural Gas[a]				No.2 Fuel Oil			Total	
	Capacity Factor[b] (%)	Heat Input (10^9 Btu)	VOCs (TPY)		Capacity Factor[b] (%)	Heat Input (10^{12} Btu)	VOCs (TPY)	Capacity Factor[b] (%)	VOCs (TPY)
If the Capacity Factor and Associated Heat Input on Natural Gas is equal to:	0.0	0.0	0.0	Then the Capacity Factor and Associated Heat Input on No. 2 Fuel Oil can be equal to or less than:	81.8	47,213.9	111.9	81.8	111.9
	5.0	2,970.4	2.5		79.9	46,140.1	109.4	84.9	111.9
	10.0	5,940.8	5.1		78.1	45,066.3	106.8	88.1	111.9
	15.0	8,911.1	7.6		76.2	43,992.5	104.3	91.2	111.9
	20.0	11,881.5	10.2		74.4	42,918.7	101.7	94.4	111.9
	25.0	14,851.9	12.7		72.5	41,844.9	99.2	97.5	111.9
	30.0	17,822.3	15.3		70.0	40,404.0	95.8	100.0	111.0
	35.0	20,792.6	17.8		65.0	37,518.0	88.9	100.0	106.7
	40.0	23,763.0	20.4		60.0	34,632.0	82.1	100.0	102.4
	45.0	26,733.4	22.9		55.0	31,746.0	75.2	100.0	98.1
	50.0	29,703.8	25.5		50.0	28,860.0	68.4	100.0	93.9
	55.0	32,674.1	28.0		45.0	25,974.0	61.6	100.0	89.6
	60.0	35,644.5	30.5		40.0	23,088.0	54.7	100.0	85.3
	65.0	38,614.9	33.1		35.0	20,202.0	47.9	100.0	81.0
	70.0	41,585.3	35.6		30.0	17,316.0	41.0	100.0	76.7
	75.0	44,555.6	38.2		25.0	14,430.0	34.2	100.0	72.4
	80.0	47,526.0	40.7		20.0	11,544.0	27.4	100.0	68.1
	85.0	50,496.4	43.3		15.0	8,658.0	20.5	100.0	63.8
	90.0	53,466.8	45.8		10.0	5,772.0	13.7	100.0	59.5
	95.0	56,437.1	48.4		5.0	2,886.0	6.8	100.0	55.2
	100.0	59,407.5	50.9		0.0	0.0	0.0	100.0	50.9

[a]Natural gas firing includes both CT and supplemental firing; the ammount of supplemental firing is proportional to CT capacity factor.
[b]Capacity Factor in this context is the percent of full load operation at 75°F ambient conditions.

Table 2-10. Hours of Operation and Fuel Usage for Lauderdale Units 4 and 5

Year	Unit 4 Operation (hours)	Unit 4 Natural Gas (10^6 ft^3)	Unit 4 No. 6 Fuel Oil (10^3 gal)	Unit 5 Operation (hours)	Unit 5 Natural Gas (10^6 ft^3)	Unit 5 No. 6 Fuel Oil (10^3 gal)
1988	1,623	1,279	3,460	2,317	1,937	3,948
1987	2,086	2,110	993	2,173	2,089	1,785
1986	1,615	1,857	0	2,113	2,356	468
1985	1,876	2,103	983	1,289	1,309	1,343
1984	1,724	938	6,268	1,574	818	5,498
1983	1,943	1,049	7,208	1,677	792	6,871
1982	1,899	1,611	3,397	2,587	1,957	5,481
1981	2,895	16,884	402	3,100	2,590	20,803
1980	4,376	2,161	20,301	4,208	1,788	21,098
1979	5,341	2,796	22,605	4,925	1,870	25,203
1978	4,871	1,937	20,983	6,461	4,046	20,849
1977	4,273	2,220	15,103	5,342	11,147	3,900
1976	5,821	2,958	18,766	7,360	4,991	18,472
1975	6,593	3,160	23,507	6,126	3,609	19,736
1974	6,669	2,756	29,413	6,576	2,367	31,794
1973	8,151	2,281	43,285	8,295	1,799	48,808
1972	8,764	5,979	36,036	7,311	4,434	32,928
1971	6,671	4,525	403	8,414	5,610	22,384
1970	8,449	6,015	18,358	8,681	6,769	328
1969	7,030	3,753	13,440	6,984	3,811	11,970
Average	4,634	3,419	14,246	4,876	3,304	15,183

Note: 10^6 ft^3 = million cubic feet.
10^3 gal = thousand gallons.

Table 2-11. Actual Representative Emissions of Regulated Pollutants, Lauderdale Units 4 and 5

Parameter	Unit No. 4 Natural Gas	Unit No. 4 No. 6 Fuel Oil	Unit No. 5 Natural Gas	Unit No. 5 No. 6 Fuel Oil	TOTAL
Natural Gas Burned (10^6 ft^3/yr)	3,419		3,876		7,295
No. 6 Fuel Oil					
(gal/yr)		14,246,000		15,183,000	29,429,000
(% sulfur)		0.964		0.964	
Emission Factor	lb/10^6 scf	lb/1,000 gal	lb/10^6 scf	lb/1,000 gal	
PM	3	12.64[a]	3	12.64[a]	
PM10	3	8.97[a]	3	8.97[a]	
Sulfur Dioxide	0.6	151.3[b]	0.6	151.3[b]	
Nitrogen Oxides	550	67	550	67	
Carbon Monoxide	40	5	40	5	
Volatile Organic					
Compounds (methane)	0.3	0.28	0.3	0.28	
(non-methane)	1.4	0.76	1.4	0.76	
Lead	Neg.	0.0042	Neg.	0.0042	
Fluoride	Neg.	0.052	Neg.	0.052	
Mercury	0.011	0.00048	0.011	0.00048	
Beryllium	Neg.	0.00063	Neg.	0.00063	
Arsenic	Neg.	0.0029	Neg.	0.0029	
Sulfuric Acid	Neg.	5.8	Neg.	5.8	
Emission Rate (TPY)					
PM	5.13	90.03	5.81	95.96	196.93
PM10	5.13	63.92	5.81	68.13	143.00
Sulfur Dioxide	1.026	1,078.05	1.163	1,148.96	2,229.20
Nitrogen Oxides	940.23	477.24	1,065.90	508.63	2,992.00
Carbon Monoxide	68.38	35.62	77.52	37.96	219.47
Volatile Organic					
Compounds (methane)	0.51	1.99	0.58	2.13	5.21
(non-methane)	2.39	5.41	2.71	5.77	16.29
Lead	Neg.	0.0299	Neg.	0.0319	0.0618
Fluoride	Neg.	0.370	Neg.	0.395	0.765
Mercury	0.0188	0.00342	0.02132	0.00364	0.04719
Beryllium	Neg.	0.00449	Neg.	0.00478	0.00927
Arsenic	Neg.	0.0207	Neg.	0.0220	0.0427
Sulfuric Acid	Neg.	41.31	Neg.	44.03	85.34

[a]Based on equation: 10 S + 3, where S = sulfur content. PM10 is 71 percent of PM emissions.
[b]Based on equation: 157 S, where S = sulfur content

Note: 10^6 ft^3/yr = million cubic feet per year.
gal/yr = gallons per year.
Neg. = negligible.
TPY = tons per year.

Table 2-13. Annual Heat Input Limitations for Gas Turbines

	Natural Gas				No.2 Fuel Oil			Total	
	Capacity Factor[a] (%)	Heat Input (10^9 Btu)	VOCs (TPY)		Capacity Factor[a] (%)	Heat Input (10^9 Btu)	VOCs (TPY)	Capacity Factor[a] (%)	VOCs (TPY)
If the Capacity Factor and Associated Heat Input on Natural Gas is equal to:	0.0	0.0	0.0	Then the Capacity Factor and Associated Heat Input on No. 2 Fuel Oil can be equal to or less than:	98.6	139,911.1	90.9	98.59	90.9
	5.0	7,379.4	12.5		85.0	120,602.1	78.4	89.98	90.9
	10.0	14,758.8	25.1		71.4	101,293.2	65.8	81.38	90.9
	15.0	22,138.3	37.6		57.8	81,984.2	53.3	72.77	90.9
	20.0	29,517.7	50.2		44.2	62,675.2	40.7	64.16	90.9
	25.0	36,897.1	62.7		30.6	43,366.3	28.2	55.56	90.9
	30.0	44,276.5	75.3		17.0	24,057.3	15.6	46.95	90.9
	35.0	51,656.0	87.8		3.3	4,748.4	3.1	38.35	90.9
	36.2	53,470.7	90.9		-0.0	(0.0)	-0.0	36.23	90.9

[a]Capacity factor in this context is the percent of full load operation at 75°F ambient conditions.

Table 3-3. Net Increase in Emissions Due to the Lauderdale Repowering Project Compared to the PSD Significant Emission Rates

Pollutant	Emissions (TPY)				
	Potential From Proposed Units 4 & 5[a]	Reductions From Existing Units 4 & 5	Net Increase in Emissions	Significant Emission Rate	PSD Review
Sulfur Dioxide	12,338	2,229	10,109	40	Yes
Particulate Matter (TSP)	832	196.2	636	25	Yes
Particulate Matter (PM10)	832	143	689	15	Yes
Nitrogen Dioxide	6,051	2,992	3,059	40	Yes
Carbon Monoxide	1,658	219.5	439	100	Yes
Volatile Organic Compounds	116.2	16.3	99.9	NA	No[b]
Lead	0.21	0.062	15	0.6	No
Sulfuric Acid Mist	1,538	85.3	1,453	7	Yes
Total Fluorides	0.76	0.765	<0.1	3	No
Total Reduced Sulfur[c]	NEG	NEG	NEG	10	No
Reduced Sulfur Compounds[c]	NEG	NEG	NEG	10	No
Hydrogen Sulfide[c]	NEG	NEG	NEG	10	No
Asbestos[c]	NEG	NEG	NEG	0.007	No
Beryllium	0.059	0.0093	0.05	0.0004	Yes
Mercury	0.35	0.047	0.30	0.1	Yes
Vinyl Chloride[c]	NEG	NEG	NEG	1	No
Benzene[c]	NEG	NEG	NEG	0	No
Radionuclides[c]	NEG	NEG	NEG	0	No
Inorganic Arsenic	0.10	0.0427	0.06	0	Yes

[a]See Table 2-6.
[b]Nonattainment pollutant; PSD review does not apply.
[c]Emissions of these pollutants considered not to have any emission rate increase.

Note: NEG = Negligible.

Florida Department of Environmental Regulation

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

Bob Martinez, Governor | Dale Twachtmann, Secretary | John Shearer, Assistant Secretary

December 6, 1989

Mr. Wayne Aronson, Chief
Program Support Section
U.S. EPA, Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Dear Mr. Aronson:

RE: Florida Power and Light
Lauderdale Repowering Project
PSD-FL-145

Enclosed for your review and comment is the above referenced PSD permit application. If you have any comments or questions, please contact Pradeep Raval, Barry Andrews, or Tom Rogers at the above address or at (904)488-1344.

Sincerely,

Patricia G. Adams

Patricia G. Adams
Planner
Bureau of Air Regulation

/pa

Enclosure

Florida Department of Environmental Regulation
Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400
Bob Martinez, Governor · Dale Twachtmann, Secretary · John Shearer, Assistant Secretary

December 6, 1989

Mrs. Chris Shaver, Chief
Policy, Planning and Permit Review Branch
Dept. of Interior, National Park Service
Post Office Box 25287
Denver, Colorado 80225

Dear Mrs. Shaver:

RE: Florida Power and Light
Lauderdale Repowering Project
PSD-FL-145

Enclosed for your review and comment is the above referenced PSD permit application. If you have any comments or questions, please contact Pradeep Raval, Barry Andrews, or Tom Rogers at the above address or at (904)488-1344.

Sincerely,

Patricia G. Adams

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Bureau of Air Regulation

/pa

Enclosure