Florida Power & Light Company, P.O. Box 078768, West Palm Beach, FL 33407-0768

FPL

May 13, 1992

Mr. A. Alexander, P.E.
Deputy Assistant Secretary
Florida Department of Environmental
Regulation
Central Florida District
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803-3767

Re: Florida Power & Light Company
Sanford Unit No. 4 - Orimulsion Co-firing
Air Operating Permit No. AO64-132055
Request for Amendment

Dear Mr. Alexander:

Following the successful Orimulsion test burn at Sanford Unit No. 4 last year, Florida Power & Light Company (FPL) has continued to evaluate the potential for using this fuel on a more permanent basis. Analyses are ongoing concerning conversion of certain generating units to fire one hundred percent Orimulsion (involving retrofitting of appropriate pollution control equipment), but no final decisions have yet been made. Based on our experience with co-firing of Orimulsion and natural gas at Sanford Unit No. 4 during the test burn and more recently under the amended air operation permit, FPL has concluded that this fuel mixture offers substantial benefits in its own right.

With this letter and the attached documents, FPL respectfully requests amendment of air operation permit number AO64-132055 to authorize continued co-firing of Orimulsion at Sanford Unit No. 4. No construction or physical modification is required to co-fire Orimulsion in Unit No. 4 because all necessary facilities are currently in place. The specific permit amendments we propose are provided in Exhibit A. Information supporting this request, including facility descriptions, emissions data, impact analyses and regulatory considerations, is supplied in Exhibit D. (The Department's air permit application was used to provide a convenient format for presentation of this information.) Also enclosed is FPL check No. 046 in the amount of $250.00 in payment of the Department's permit amendment fee.

The emission limits we propose for co-firing are equal to or lower than those currently applicable to Unit No. 4:

POLLUTANT	CURRENT LIMIT	PROPOSED CO-FIRING LIMIT
SO_2	2.75 lb/MMBTU	1.6 lb/MMBTU
PM	.1/.3 lb/MMBTU	.1/.3 lb/MMBTU
Opacity	40/60 percent	35/60 percent

The plant is capable of varying the natural gas and Orimulsion fuel ratio as needed, based on the sulfur content of the Orimulsion received, to ensure that emissions do not exceed the limits proposed above. With these emission limits, the maximum Orimulsion component in the co-firing mixture is approximately 40 percent on a megawatt load basis. An Orimulsion to natural gas ratio in the range of 35/65 will be more typical of actual co-firing operations.

During certain operating conditions, Orimulsion, natural gas, and residual oil will be co-fired. Under these conditions, the amount of Orimulsion and natural gas co-fired will be reduced, but in proportion to meet the proposed emission limits. Residual oil will be used to make up any difference between the load with Orimulsion/natural gas co-firing and full load. For example, if natural gas and Orimulsion make up 50 percent of full load, the ratio will be approximately 30:20 with the remaining 50 percent load made up by firing residual oil. The amount of Orimulsion and residual oil used during co-firing will meet the proposed emission limits.

Co-firing in accordance with the proposed permit amendments will result in actual sulfur dioxide and particulate matter emission rates well within the range experienced in recent years with Unit No. 4 burning No. 6 fuel oil, as indicated graphically in Exhibits B and C. Visible emissions during co-firing will also be in the same range as when No. 6 oil is burned in Unit No. 4. The co-firing emission rates for other regulated and unregulated air pollutants are generally equal to or lower than those from No. 6 oil, as shown in Exhibit D, Tables A-1 and A-2.

Overall, co-firing of Orimulsion and natural gas as proposed compares favorably with use of No. 6 oil in Sanford Unit No. 4 from an environmental, aesthetic, and economic viewpoint. The absence of public reaction or concern over the past two months, when the unit was co-firing on most days, certainly supports this conclusion. In addition, co-firing Orimulsion in Unit No. 4 will result in fuel cost savings to FPL's customers of approximately $6 million per year, with even more substantial savings projected in future years. These economic benefits, along with the fuel flexibility and diversity provided by Orimulsion, make co-firing a logical and attractive option pending final decisions about conversion to 100 percent Orimulsion.

The Department's continued consideration and cooperation in connection with the use of Orimulsion at the Sanford Plant is very much appreciated. If there are any questions on the enclosed, or if additional information would be helpful, please do not hesitate to call Elsa Bishop or me.

Sincerely,

C. D. Henderson

Charles D. Henderson
Acting Manager
Air & Water Permitting & Programs
Florida Power & Light Company

cc: Steve Smallwood (w/o attachments)
Clair Fancy (w/o attachments)
Cindy Phillips (with attachments)
Charles Collins (with attachments)
Tom Hansen (with attachments)
Ken Kosky (with attachments)
Peter Cunningham (with attachments)
Elsa A. Bishop (with attachments)

Attachments

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

FEDERAL EXPRESS

May 29, 1991

Mr. A. Alexander, Deputy Assistant Secretary
State of Florida
Department of Environmental Regulation
Central Florida District
3319 Maguire Blvd., Suite 232
Orlando, Florida 32803

RE: **Sanford Plant, Unit No. 4**
Orimulsion Test Burn
Consent Order OGC File No. 91-0523

Dear Mr. Alexander:

Enclosed please find a copy of the signed Consent Order OGC File No. 91-0523, and a Cashier Check No. 2273973 in the amount if $17,249.00 dated 5/13/91 to pay the settlement of the violations described in the attached Warning Notice.

If you have any questions, please call me at (407) 697-6930.

Sincerely,

Martin A. Smith, Ph.D
Manager
Environmental Affairs Permitting and Programs
Florida Power & Light Company

MAS:jm

Enclosure

cc: Cindy Phillips - DER/TAll

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

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

LEGAL CASE TRACKING SYSTEM
ENFORCEMENT CASE ENTRY FORM

TO: Larry Morgan
Office of General Counsel

FROM: Caroline Shine

DATE: 5/1/91

This form accompanied by: Completed
_____ ~~Draft~~ Consent Order _____ Draft N.O.V. _____ Case Report

The following information may be used for entry in the Legal Case Tracking System.

Case Name: Florida Power & Light

Case Alias: _____

Responsible Office: Central District County Volusia

District Contact: Charles Collins

Program Area: AP 2nd Program Area _____

Date Compliance/Enforcement Case Opened by District 11/23/91

Permit/Application Number: AC64-180842

Facility ID Number: _____

Comments: Short form C.O.

----------FOR OGC USE ONLY----------

OGC NUMBER: 91-0523 Date Case Opened: _____

OGC ATTORNEY ASSIGNED: Schwartz

Send Copies To:

- ✓ Originator
- ____ Wetland Resource Management
- ____ Local Govt Wastewater Financial Assistance
- ____ Air Quality Planning & Regulation
- ____ Waste Planning Regulation
- ____ Leigh O'Shields State Lands Management
- ____ Mr. Ron Silver, U.S. Army Corps
- ____ Surface Water Management
- ____ Groundwater Protection
- ____ Water Facilities Planning & Regulation
- ____ Waste Cleanup
- ____ _____ (Other)
- ____ _____ (Other)

Revised August 1988

Florida Department of Environmental Regulation

Central District • 3319 Maguire Boulevard, Suite 232 • Orlando, Florida 32803-3767

Lawton Chiles, Governor

Carol M. Browner, Secretary

CERTIFIED
P 399 919 076

OCD-AP-91-358

Mr. Martin A. Smith, Ph.D., Manager
Environmental Permitting Program
Florida Power & Light Company
Post Office Box 078768
West Palm Beach, Florida 33407-0768

Re: Proposed Final Agency Action (Consent Order)
in Case of Florida Power & Light Company
OGC File No. 91-0523 (Revised)

Dear Mr. Smith:

The purpose of this letter is to complete the resolution of the violation(s) previously alleged by the Department of Environmental Regulation ("DER") in the Warning Notice AP-91-193, dated January 23, 1991, and Warning Notice AP-91-194 dated February 14, 1991, which are attached, together with any other violations of permit AC64-180842, which the Department has knowledge of prior to entry of this order. The corrective actions required to bring your facility into compliance have been performed. However, you must pay to the Department the amount of $16,749.00 to complete settlement of the violations described in the attached Warning Notice, along with $500.00 to reimburse the DER's costs, for a total of $17,249.00. This payment must be made to "The Department of Environmental Regulation" by cashier's check or money order and shall include thereon the OGC number assigned above and the notation "Pollution Recovery Fund". The payment shall be sent to the Central District Office, 3319 Maguire Boulevard, Suite 232, Orlando, Florida 32803-3767, within 30 days of your signing this letter.

Your signing of this letter constitutes your agreement to the terms of the letter. After this letter has been countersigned by the DER and filed with the Clerk of the DER, the letter shall constitute a consent order, which is final agency action of the DER, the terms and conditions of which may be enforced in a court of competent jurisdiction pursuant to Sections 120.69 and 403.121, Florida Statutes. Failure to comply with the terms of this letter once signed by you shall constitute a violation of Section 403.161(1)(b), Florida Statutes.

The DER by countersigning this letter, waives its right to seek judicial imposition of damages, or civil penalties for the violations described above. By signing this letter, you waive your rights as described on the back of this document in the Notice of Rights. If you do not sign and return this letter to the Department at the Central District address given above by April 23, 1991, it will be assumed that you are not interested in settling this matter according to the terms described herein, and this matter will be referred to the Department's Office of General Counsel with a recommendation that formal enforcement action be taken against you.

Sincerely,

cm

A. Alexander, P.E.
Deputy Assistant Secretary

4-18-91
Date

For: FLORIDA POWER & LIGHT COMPANY

By: _____

Date: 4/23/91

For: STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

_____

A. Alexander, P.E.
Deputy Assistant Secretary

ENTERED this 30 day of April, 1991 in Orlando, Florida.

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

_____ 4/30/91
CLERK Date

AA/csj

NOTICE OF RIGHTS

Persons whose substantial interests are affected by the proposed agency action described in this document have a right, pursuant to Section 120.57, F.S., to petition for an administrative determination (hearing) on the proposed action. The Petition must contain the information set forth below and must be filed (received) in the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within 21 days of receipt of this notice. A copy of the Petition must also be mailed at the time of filing to the (persons named) above at the address indicated. Failure to file a petition within the 21 days constitutes a waiver of any right such person has to an administrative determination (hearing) pursuant to Section 120.57, F.S.

The petition shall contain the following information:
(a) The name, address, and telephone number of each petitioner; the Department's identification number and the county in which the subject matter or activity is located; (b) A statement of how and when each petitioner received notice of the Department's action or proposed action; (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action; (d) A statement of the material facts disputed by petitioner, if any; (e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action; (f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; (g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action;

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this Notice. Persons whose substantial interests will be affected by any decision of the Department with regard to the subject agency (proposed) action have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 21 days of receipt of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed.

* * * * * * * * * * * * * * *

A party who is adversely affected by this Final Order is entitled to Judicial Review pursuant to Section 120.68, F.S. Review proceedings are governed by the Florida Rules of Appellate Procedure. Such proceedings are commenced by filing one copy of a Notice of Appeal with the Agency Clerk of the Division of Administrative Hearings and a second copy, accompanied by filing fees prescribed by law, with the District Court of Appeal, First District, or with the District Court of Appeal in the Appellate District where the party resides. The Notice of Appeal must be filed within 30 days of rendition of the Order to be reviewed.

Florida Department of Environmental Regulation
Central District • 3319 Maguire Boulevard, Suite 232 • Orlando, Florida 32803-3767 • 407-894-7555
Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary
Alex Alexander, Deputy Assistant Secretary

CERTIFIED
P 399 919 041

WARNING NOTICE
OWN-AP-91-193

Mr. Martin A. Smith, Ph.D., Manager
Environmental Permitting Program
Florida Power & Light Company
Post Office Box 078768
West Palm Beach, Florida 33407-0768

Volusia County-AP
PSD-FL-0150, AC64-180842
Unit 4, Orimulsion Project

Dear Mr. Smith:

Under Chapter 403, Florida Statutes, the Department of Environmental Regulation was delegated the power and duty to control and prohibit pollution of air and water in accordance with the law, rules and regulations promulgated by the department.

You are hereby placed on notice that the department has reason to believe that you are presently operating in violation of Section 403.161, Florida Statutes, and department rules and regulations, as noted on the attached sheet(s).

Section 403.161(1) provides that whoever commits a violation of that Section shall be liable to the state for any damage caused and for civil penalties of up to $10,000 per day during which the violation occurs.

Accordingly, you are hereby advised to respond to the specific violations within 10 days from receipt hereof.

You should direct your response and any questions concerning this Warning Notice to Caroline Shine or Charles Collins, Air Resource Management, at (407) 894-7555 or write to the above address.

Sincerely,

A. Alexander, P.E.
Deputy Assistant Secretary

1-23-91
Date

AA/csj

WARNING NOTICE
OWN-AP-91-193

Rules Violated

Section 403.161 (1)(b), Florida Statutes - Prohibition to fail to obtain any required permit or to fail to comply with any rule, regulation, order, permit or certification issued by the Department.

Violations of Permit AC64-180842, Specific Conditions:

1. Specific Condition 3(c) - Steady state visible emission allowable of 60% opacity.
   VE - 1/14/91 highest 6 minute 85% opacity.
   VE - 1/17/91 highest 6 minute 96.8% opacity.

2. Specific Condition 3(c) - Visible emissions in excess of 3 hour per 24 hour period for soot blowing, startup, shutdown and load changes.

Florida Administrative Code Rule 17-4.160(6) - The permittee shall properly operate the facility, control, and related appurtenances that are installed and used by the permittee to achieve compliance with the conditions of the permit.

Remarks (e.g., explanatory statement)

On January 14 and 17, 1991, Department representatives visited your Sanford Power Plant facility, located at Lake Monroe, off U.S. Highway 17-92, Volusia County, Florida. The Department representatives conducted visible emission observations of the Unit #4 stack, and on both days the stack emissions exceeded 60 percent opacity during steady state operations. On further investigation, the representatives found no documentation that the continuous opacity monitor had been maintained, calibrated, and evaluated respective to Performance Specification Test 40 CFR Part 60, Appendix B. The monitor recorded 85% opacity during a full 100% span check conducted while the representatives were at the site. Further, the opacity strip chart documentation indicated that on November 16 and 17, 1990, excessive emissions were recorded for more than 3 hours within a 24 hour period.

The visible emissions observed by the Department representatives, the failure to properly calibrate and maintain the opacity CEM, and the excess emissions are violations of the above Florida Rules and Statutes.

Within 5 days from the receipt of this letter please submit to the Department, the following information:

1. Opacity Strip Charts - January 16 through January 21, 1991.
2. Mega Watt (Load) Strip Charts - January 16 through January 21, 1991.
3. Documentation of all Performance Specification of the opacity monitoring test as shown in Table 1,1 of 40 CFR Part 60, Appendix B.
4. Submit a corrective action plan to immediately abate the emissions from the plant.

Within 10 days from the receipt of this letter, please contact Caroline Shine at 407-894-7555 to discuss and resolve the above violations.

Florida Department of Environmental Regulation
Central District • 3319 Maguire Boulevard, Suite 232 • Orlando, Florida 32803-3767 • 407-894-7555
Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary
Alex Alexander, Deputy Assistant Secretary

CERTIFIED
P 399 919 055

WARNING NOTICE
OWN-AP-91-194

Mr. Martin A. Smith, Ph.D., Manager
Environmental Permitting Program
Florida Power & Light Company
Post Office Box 078768
West Palm Beach, Florida 33407-0768

Volusia County-AP
PSD-FL-0150, AC64-180842
Unit 4, Orimulsion Project - Permit Violation

Dear Mr. Smith:

Under Chapter 403, Florida Statutes, the Department of Environmental Regulation was delegated the power and duty to control and prohibit pollution of air and water in accordance with the law, rules and regulations promulgated by the department.

You are hereby placed on notice that the department has reason to believe that you are presently operating in violation of Section 403.161, Florida Statutes, and department rules and regulations, as noted on the attached sheet(s).

Section 403.161(1) provides that whoever commits a violation of that Section shall be liable to the state for any damage caused and for civil penalties of up to $10,000 per day during which the violation occurs.

Accordingly, you are hereby advised to respond to the specific violations within 10 days from receipt hereof.

You should direct your response and any questions concerning this Warning Notice to Caroline Shine or Charles Collins, Air Resource Management, at (407) 894-7555 or write to the above address.

Sincerely,

cmc

A. Alexander, P.E.
Deputy Assistant Secretary

2-14-91
Date

AA/csj
cc

WARNING NOTICE
OWN-AP-91-194

Rules Violated

Section 403.161 (1)(b), Florida Statutes - Prohibition to fail to obtain any required permit or to fail to comply with any rule, regulation, order, permit or certification issued by the Department.

Violations of Permit AC64-180842, Specific Conditions:

1. Specific Condition 3(c) - Steady state visible emission allowable of 60% opacity.
   Volusia County VE on 1/23/91 during steady state at 99.6% opacity.
   Volusia County VE on 1/24/91 during steady state at 100% opacity.

2. Specific Condition 3(c) - Visible emissions in excess of 3 hour per 24 hour period for soot blowing, startup, shutdown and load changes.

Remarks (e.g., explanatory statement)

The Department has reviewed strip charts of opacity and load data submitted by your company on January 17, 30 and January 31, 1991, regarding operation of Orimulsion - Unit 4 project at your Sanford Power Plant. On January 23 and 24, 1991, a Volusia County representative observed visible emissions of 99% and 100% opacity for greater than 6 minutes during steady operation. The Department has determined from these charts, and the Volusia County representative VE observation, that the unit has been operating in violation of the above Florida Rules and Statutes, on the following days (excluding those previously cited on Warning Notice AP-91-193):

January 18, 21, 22, 23, 24, 1991

Within 10 days from the receipt of this letter, please contact Caroline Shine at 407-894-7555 to discuss and resolve the above violations.

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

CARLOS ALVAREZ
JAMES S. ALVES
BRIAN H. BIBEAU
ELIZABETH C. BOWMAN
WILLIAM L. BOYD, IV
RICHARD S. BRIGHTMAN
PETER C. CUNNINGHAM
THOMAS M. DEROSE
WILLIAM H. GREEN
WADE L. HOPPING
FRANK E. MATTHEWS
RICHARD D. MELSON
WILLIAM D. PRESTON
CAROLYN S. RAEPPLE
GARY P. SAMS
ROBERT P. SMITH, JR.
CHERYL G. STUART

KATHLEEN BLIZZARD
RICHARD W. MOORE
ANGELA R. MORRISON
MARIBEL N. NICHOLSON
DIANA M. PARKER
LAURA BOYD PEARCE
GARY V. PERKO
MICHAEL P. PETROVICH
DAVID L. POWELL
DOUGLAS S. ROBERTS
CECELIA C. SMITH

OF COUNSEL
W. ROBERT FOKES

MEMORANDUM

TO: Cindy Phillips,
Department of Environmental Regulation

FROM: Bill Green and Angela Morrison

DATE: April 30, 1991

RE: Florida Power & Light Company
Orimulsion Test Burn - Permit Amendment

Pursuant to our conversation this morning, we are providing the Department with proposed language for amendments to the existing test burn permit. If you have any questions, please call us. Also, could you please send us a copy of your letter to Tom Hansen, Region IV, Environmental Protection Agency. Thank you again for your cooperation and support during this project.

Permit No. AC-64-180842 should be amended as follows (underlining shows additions, and strike-throughs show deletions):

Specific Conditions:

3. c) Visible Emissions: When Unit 5 is in operation, Steady-state - 60% opacity; Excess emissions, not to exceed 3 hours per 24-hour period, for soot-blowing, startup, shutdown and load changes - 100% opacity; Excess emissions, not to exceed 2 hours per 24-hour period, for malfunction - 100% opacity.

d) When Unit 5 is off-line, Visible Emissions from effective date of this amendment until May 31, 1991, or until 90 full-capacity equivalent burn days have elapsed since January 9, 1991, whichever occurs first: Steady-state - 80% opacity; Excess emissions, not to exceed 3 hours per 24-hour period, for soot-blowing, startup, shutdown and load changes - 100% opacity; Excess emissions, not to exceed 2 hours per 24-hour period, for malfunction - 100% opacity. If the unit operates for at least 10 hours in any 24-hour period, the 2 hours (per 24-hour period) of excess emissions of 100% opacity previously allowed for malfunction may be used for malfunction and/or soot-blowing.

2. Permitted Fuels: Unit 4 shall be fired with Orimulsion Fuel, No. 6, Residual Oil, No. 2 Fuel Oil, or Natural Gas only. By separate permit amendments, the Department has temporarily restricted Units 3 and 5 to be fired only with Natural Gas and/or Fuel Oil with a sulfur content limit equivalent to 1.1 lb SO2/MMBtu~~, and, until May 31, 1991, has restricted Unit 5 from operating at all, during such times as Orimulsion is combusted in Unit 4.~~

and Permit No. AO-64-132060 for Sanford Unit No. 5 should be amended as follows:

(2) Permitting Fuels:

This source shall only be fired with natural gas, No. 2 Fuel Oil and/or No. 6 Fuel Oil with equivalent sulfur content (by weight) of one percent (1%) or less. ~~Prior to June 1, 1991, this unit shall not operate during such times as Orimulsion is combusted in Unit No. 4.~~

WHG/bjh:MemPhillip

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

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MICHAEL P. PETROVICH
DAVID L. POWELL
DOUGLAS S. ROBERTS
CECELIA C. SMITH

OF COUNSEL
W. ROBERT FOKES

April 29, 1991

RECEIVED
APR 29 1991
DER-BAQM

Mr. Clair Fancy
Division of Air Resources Management
Bureau of Air Quality Management
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: Request for Interpretation of Permit Conditions and Order Authorizing Research and Testing; Florida Power & Light Company; Orimulsion Test Burn; Sanford Unit No. 4

Dear Clair:

As I relayed to you earlier, Florida Power & Light Company's generating system is experiencing unusually high peak demands at the present time. Last week, because of unusually hot weather at this time of year, record electricity demands led to a request by the Company that its customers voluntarily conserve power for the rest of the week, especially during late afternoons (see attached press release). The situation is particularly delicate because five of the Company's 31 major generating units are undergoing scheduled maintenance this month to prepare for the normally much-higher electricity demands that occur during the summer. In addition, three units experienced forced outages last week due to major equipment problems. Because of this situation, the ability to operate Sanford Unit No. 5 could be critical in FPL's efforts to meet demand.

The original Orimulsion test relief granted by your order dated October 4, 1990, allowed Sanford Unit No. 5 to be utilized during the Unit No. 4 testing as long as 1% or less sulfur content fuel oil was combusted in Unit No. 5. In February, 1991, the Department and the Environmental Protection Agency relaxed, until May 31, 1991, the original Orimulsion test burn opacity emission limitations (from 60%

steady state to 80% steady state, and from 3 hours per day excess emissions to 5 hours per day excess emissions) in order to allow the Company to cope with the unusual and unexpected combustion characteristics of Orimulsion. As part of that further relaxation of opacity limitations, the Company agreed to drop Unit No. 5 off-line entirely while Orimulsion was combusted in Unit No. 4 under the relaxed limits. That agreement was reflected in the approvals of the two agencies, as well.

The relaxed test burn limits that went into effect at the end of February will expire on May 31, 1991, some five weeks from now. The Company has a substantial inventory of Orimulsion fuel at this time and wishes to continue testing Orimulsion until the end of May in efforts to complete the test on schedule and to reduce Orimulsion inventory to allow receipt of oil for operation subsequent to completion of the test burn. During that time, it may also need to bring Unit No. 5 on line from time to time to meet unusually high customer demand. Further experience with Orimulsion fuel has shown that the Company can meet the original, more stringent, Unit No. 4 Orimulsion test burn opacity burn limitations (i.e. the 60% steady state emissions/3 hours per day excess emissions) at reduced loads.

We have reviewed the agency documentation in this matter and believe that it would be consistent with the intent of both the Department and the Environmental Protection Agency to interpret the February, 1991 approvals as presently allowing the Company two options prior to May 31, 1991, depending upon whether Unit No. 5 is operated:

> (1) during any day that Unit No. 5 <u>is not</u> operated, the 1991 further relaxed opacity emission limitations would apply to Unit No. 4. (80% steady state/5 hours per day excess emissions), or
>
> (2) during any day that Unit No. 5 <u>is</u> operated with 1% or less sulfur content oil, Unit No. 4 must comply with the pre-February, 1991 test burn opacity emission limitations (60% steady state/3 hours per day excess emissions).

Under this interpretation, the Company would have the flexibility that it needs to continue the test on schedule and still meet system demand. The intent of the February, 1991 approvals was to assure that Unit No. 5 was not operated when the highest opacity emissions were allowed at Unit No. 4. Our interpretation satisfies that goal.

We would like to ask the Department and the Environmental Protection Agency to confirm the correctness of our interpretation. If you agree with our interpretation, then no further permit modifications or State Implementation Plan revisions would be required in order to allow the Company to operate under the terms of either permit condition as required to complete the testing and to meet system load requirements through May 31, 1991. Clearly, such an interpretation would greatly assist Florida Power & Light Company and the customers it serves without increasing the environmental impacts above levels that have already been approved for the test burn.

We would appreciate your consideration and guidance on this interpretation at your earliest convenience so that system dispatch may react accordingly.

Respectfully submitted,

Angela R. Morrison

for William H. Green
Attorney for Florida Power & Light Company

WHG/bjh:ltrfancy2
Enclosure

cc: Mr. Tom Hanson, EPA
Mr. Alex Alexander, DER

Revised

Florida Power & Light Company
Corporate Communications Dept.
P.O. Box 029100
Miami, Florida 33102
(305) 552-3894 or 552-3895
April 25, 1991

FOR IMMEDIATE RELEASE

**FPL SETS APRIL RECORD
FOR ELECTRICITY DEMAND**

MIAMI -- Florida Power & Light Company, which set an April record for electricity demand Wednesday (4/24) because of unusually hot weather, is asking customers to voluntarily conserve power for the rest of the week -- especially during late afternoons.

Unseasonably hot spring weather that set temperature records in several cities, combined with planned and unplanned generating unit maintenance outages, leaves FPL with a narrower-than-normal margin of power production to fill high demand. While the heat wave is having the greatest effect on central and south Florida, utilities around the state are alerting customers to be mindful of good energy conservation practices over the next several days.

Unless the weather pattern changes or cooling rain falls later today, FPL may match or exceed the April record of 12,363 megawatts recorded between 5 and 6 p.m. Wednesday. Voluntary conservation, coupled with FPL's plans to implement pre-arranged programs to reduce business and residential use, should provide FPL with adequate power reserves to meet customers' needs.

• more -

Customers can help most by adjusting air conditioning thermostats to 78 degrees or more and avoiding the use of all non-essential electric appliances, such as dishwashers and clothes dryers, especially between the hours of 3 p.m. and 7 p.m.

Seven of FPL's 31 major generating units are undergoing scheduled maintenance this month in preparation for the high electricity demands that occur daily during the summer. In addition, one generating unit is out of service for unexpected repairs that should be completed by the weekend.

# # #

ADT/dt

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: John Glunn

FROM: Cindy Phillips

SUBJECT: ORIMULSION STACK TEST RESULTS

DATE: June 4, 1991

Attached are FP&L's April 8, 1991 stack test results (for particulate matter and metals) obtained while firing Orimulsion.

I have yet to receive the vanadium pentoxide stack test results. As soon as I receive them, I will send you a copy.

If you have any comments or concerns, please let me know.

TABLE 2-17

APRIL 8, 1991, 90 - 100% LOAD, PARTICULATE AND METALS TESTS

Unit No. 4 Stack

	6-S-M5/MMTL-1	6-S-M5/MMTL-2	6-S-M5/MMTL-3	Average
Run Date	4/08/91	4/08/91	4/08/91	
Run Start Time	0744	1130	1540	
Run Finish Time	1028	1423	1810	
Test Train Parameters:				
Volume Of Dry Gas Sample, SCF *	80.260	81.342	80.326	
Percent Isokinetic:	101.9	102.5	100.6	
Flue Gas Parameters:				
CO_2, Percent By Volume, Dry	12.8	12.8	12.8	12.8
O_2, Percent By Volume, Dry	4.3	4.3	4.3	4.3
Temperature, °F	395	412	418	408
Air Flow Rate, Dry SCFM *	818,101	810,197	829,578	819,292
Air Flow Rate, Wet ACFM	1,573,097	1,595,404	1,618,436	1,595,646
Excess Air, Percent	24	24	24	24
Filterable Particulate:				
Concentration, grains/DSCF *	0.120	0.0939	0.0925	0.102
Emission Rate, lb/hr	845	652	658	718
Emission Rate, lb/million Btu	0.199	0.155	0.153	0.169
Antimony:				
Concentration, grains/DSCF *	2.19E-006	1.04E-006	1.52E-006	1.58E-006
Emission Rate, lb/hr	0.0154	0.00722	0.0108	0.0111
Emission Rate, lb/million Btu	3.62E-006	1.72E-006	2.52E-006	2.62E-006

(20° C) -- 29.92 Inches of Mercury (Hg)

(Continued next page)

TABLE 2-17 (Continued)

APRIL 8, 1991, 90 - 100% LOAD, PARTICULATE AND METALS TESTS

Unit No. 4 Stack

	6-S-M5/MMTL-1	6-S-M5/MMTL-2	6-S-M5/MMTL-3	Average
Arsenic:				
Concentration, grains/DSCF *	1.58E-006	1.41E-006	1.44E-006	1.48E-006
Emission Rate, lb/hr	0.0111	0.00980	0.0103	0.0104
Emission Rate, lb/million Btu	2.62E-006	2.33E-006	2.39E-006	2.45E-006
Barium:				
Concentration, grains/DSCF *	ND	7.59E-006	ND	2.53E-006
Emission Rate, lb/hr	ND	0.0527	ND	0.0176
Emission Rate, lb/million Btu	ND	1.25E-005	ND	4.17E-006
Beryllium:				
Concentration, grains/DSCF *	4.54E-008	3.89E-008	2.73E-008	3.72E-008
Emission Rate, lb/hr	3.18E-004	2.70E-004	1.94E-004	2.61E-004
Emission Rate, lb/million Btu	7.50E-008	6.43E-008	4.51E-008	6.15E-008
Cadmium:				
Concentration, grains/DSCF *	3.08E-006	3.41E-006	3.84E-006	3.44E-006
Emission Rate, lb/hr	0.0216	0.0237	0.0273	0.0242
Emission Rate, lb/million Btu	5.09E-006	5.64E-006	6.35E-006	5.69E-006
[illegible]:				
Concentration, grains/DSCF *	1.35E-005	1.21E-005	9.99E-006	1.19E-005
Emission Rate, lb/hr	0.0944	0.0843	0.0710	0.0832
Emission Rate, lb/million Btu	2.22E-005	2.01E-005	1.65E-005	1.96E-005

(20° C) -- 29.92 Inches of Mercury (Hg)
Corrected used as zero (0)

(Continued next page)

TABLE 2-17 (Continued)

APRIL 8, 1991, 90 - 100% LOAD, PARTICULATE AND METALS TESTS

Unit No. 4 Stack

	6-S-M5/MMTL-1	6-S-M5/MMTL-2	6-S-M5/MMTL-3	Average
Copper:				
Concentration, grains/DSCF *	8.84E-006	7.02E-006	5.76E-006	7.21E-006
Emission Rate, lb/hr	0.0620	0.0487	0.0410	0.0506
Emission Rate, lb/million Btu	1.46E-005	1.16E-005	9.53E-006	1.19E-005
Lead:				
Concentration, grains/DSCF *	ND	ND	ND	ND
Emission Rate, lb/hr	ND	ND	ND	ND
Emission Rate, lb/million Btu	ND	ND	ND	ND
Manganese:				
Concentration, grains/DSCF *	1.27E-005	1.06E-005	1.31E-005	1.21E-005
Emission Rate, lb/hr	0.0890	0.0738	0.0929	0.0852
Emission Rate, lb/million Btu	2.10E-005	1.76E-005	2.16E-005	2.01E-005
Mercury:				
Concentration, grains/DSCF *	1.21E-007	1.50E-007	1.10E-007	1.27E-007
Emission Rate, lb/hr	8.49E-004	1.04E-003	7.79E-004	8.89E-004
Emission Rate, lb/million Btu	2.00E-007	2.48E-007	1.81E-007	2.10E-007
Nickel:				
Concentration, grains/DSCF *	0.00238	0.00213	0.00211	0.00221
Emission Rate, lb/hr	16.7	14.8	15.0	15.5
Emission Rate, lb/million Btu	0.00394	0.00353	0.00349	0.00365

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)
ND - Not detected used as zero (0)

(Continued next page)

TABLE 2-17 (Continued)

APRIL 8, 1991, 90 - 100% LOAD, PARTICULATE AND METALS TESTS

Unit No. 4 Stack

	6-S-M5/MMTL-1	6-S-M5/MMTL-2	6-S-M5/MMTL-3	Average
Phosphorus:				
Concentration, grains/DSCF *	2.06E-005	1.87E-005	1.60E-005	1.84E-005
Emission Rate, lb/hr	0.144	0.130	0.114	0.129
Emission Rate, lb/million Btu	3.40E-005	3.10E-005	2.65E-005	3.05E-005
Selenium:				
Concentration, grains/DSCF *	9.46E-006	7.04E-006	6.46E-006	7.65E-006
Emission Rate, lb/hr	0.0663	0.0489	0.0459	0.0537
Emission Rate, lb/million Btu	1.56E-005	1.16E-005	1.07E-005	1.26E-005
Silver:				
Concentration, grains/DSCF *	3.08E-006	2.47E-006	ND	1.85E-006
Emission Rate, lb/hr	0.0216	0.0171	ND	0.0129
Emission Rate, lb/million Btu	5.09E-006	4.08E-006	ND	3.06E-006
Thallium:				
Concentration, grains/DSCF *	ND	ND	ND	ND
Emission Rate, lb/hr	ND	ND	ND	ND
Emission Rate, lb/million Btu	ND	ND	ND	ND
Vanadium:				
Concentration, grains/DSCF *	0.00938	0.00854	0.00845	0.00879
Emission Rate, lb/hr	65.8	59.3	60.1	61.7
Emission Rate, lb/million Btu	0.0155	0.0141	0.0140	0.0145

68° F (20° C) -- 29.92 Inches of Mercury (Hg)
Not detected used as zero (0)

(Continued next page)

TABLE 2-17 (Continued)

APRIL 8, 1991, 90 - 100% LOAD, PARTICULATE AND METALS TESTS

Unit No. 4 Stack

	6-S-M5/MMTL-1	6-S-M5/MMTL-2	6-S-M5/MMTL-3	Average
Zinc:				
Concentration, grains/DSCF.*	2.42E-005	1.80E-005	2.31E-005	2.18E-005
Emission Rate, lb/hr	0.170	0.125	0.164	0.153
Emission Rate, lb/million Btu	4.00E-005	2.98E-005	3.81E-005	3.60E-005

68° F (20° C) -- 29.92 Inches of Mercury (Hg)

APPENDIX A.6.a

A. TEST RESULTS

6. April 8, 1991,90-100% Load

a. Particulate and Metals

FIELD DATA AND RESULTS TABULATION

Power and Light Company, Sanford, FL

Unit No. 4 Stack

	DATE	OPERATOR
MMTL-1	4/08/91	Charles G. MacRae
MMTL-2	4/08/91	Charles G. MacRae
MMTL-3	4/08/91	Charles G. MacRae

		6-S-M5/MMTL-1	6-S-M5/MMTL-2	6-S-M5/MMTL-3
	Run Start Time	0744	1130	1540
	Run Finish Time	1028	1423	1810
	Net Traversing Points	24	24	24
	Net Run Time, Minutes	120.00	120.00	120.00
	Nozzle Diameter, Inches	0.230	0.232	0.230
	Pitot Tube Coefficient	0.840	0.840	0.840
	Dry Gas Meter Calibration Factor	0.9816	0.9816	0.9816
	Barometric Pressure, Inches Hg	30.00	30.00	30.00
	Avg. Pressure Differential of Orifice Meter, Inches H_2O	1.60	1.67	1.64
	Volume Of Metered Gas Sample, Dry ACF	86.600	89.168	87.785
	Dry Gas Meter Temperature, Degrees F	103	112	110
	Volume Of Metered Gas Sample, Dry SCF*	80.260	81.342	80.326
	Total Volume of Liquid Collected in Impingers & Silica Gel, ml	316.0	329.5	293.0
	Volume of Water Vapor, SCF*	14.874	15.510	13.792
	Moisture Content, Percent by Volume	15.6	16.0	14.7
	Dry Mole Fraction	0.844	0.840	0.853
	Carbon Dioxide, Percent By Volume, Dry	12.8	12.8	12.8
	Oxygen, Percent By Volume, Dry	4.3	4.3	4.3
	Fuel Factor	1.297	1.297	1.297
	Gas Molecular Weight, lb/lb-Mole, Dry	30.22	30.22	30.22
	Gas Molecular Weight, lb/lb-Mole, Wet	28.31	28.26	28.43
	Flue Gas Static Pressure, Inches H_2O	-1.60	-1.50	-1.50
	Absolute Flue Gas Pressure, Inches Hg	29.88	29.89	29.89
	Flue Gas Temperature, Degrees F	395	412	418
Delta-p	Average Velocity Head, Inches H_2O	1.0189	1.0263	1.0552
	Flue Gas Velocity, Feet/Second	72.89	73.93	74.99
	Stack/Duct Area, Square Inches	51,794	51,794	51,794
Qsd	Volumetric Air Flow Rate, Dry SCFM*	818,101	810,197	829,578
Qaw	Volumetric Air Flow Rate, Wet ACFM	1,573,097	1,595,404	1,618,436
	Isokinetic Sampling Rate, Percent	101.9	102.5	100.6
	Excess Air, Percent	24	24	24
	F-Factor, DSCF/Million Btu	9,190	9,190	9,190

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)

(Continued next page)

FIELD DATA AND RESULTS TABULATION
(Continued)

PLANT: Florida Power and Light Company, Sanford, FL

		6-S-M5/MMTL-1	6-S-M5/MMTL-2	6-S-M5/MMTL-3
	Filterable Particulate			
mg	Catch Weight, Milligrams	626.6	495.1	481.3
gr/DSCF	Concentration, grains/DSCF *	0.120	0.0939	0.0925
lb/hr	Emission Rate, lb/hr	845	652	658
lb/mmBtu	Emission Rate, lb/million Btu	0.199	0.155	0.153
	Antimony			
fwt	Formula Weight, lb/lb-Mole	121.75	121.75	121.75
ug	Catch Weight, Micrograms	11.4	5.48	7.92
gr/DSCF	Concentration, grains/DSCF *	2.19E-006	1.04E-006	1.52E-006
lb/hr	Emission Rate, lb/hr	0.0154	0.00722	0.0108
lb/mmBtu	Emission Rate, lb/million Btu	3.62E-006	1.72E-006	2.52E-006
	Arsenic			
fwt	Formula Weight, lb/lb-Mole	74.92	74.92	74.92
ug	Catch Weight, Micrograms	8.24	7.44	7.52
gr/DSCF	Concentration, grains/DSCF *	1.58E-006	1.41E-006	1.44E-006
lb/hr	Emission Rate, lb/hr	0.0111	0.00980	0.0103
lb/mmBtu	Emission Rate, lb/million Btu	2.62E-006	2.33E-006	2.39E-006
	Barium			
fwt	Formula Weight, lb/lb-Mole	137.33	137.33	137.33
ug	Catch Weight, Micrograms	< 40	40	< 40
gr/DSCF	Concentration, grains/DSCF *	< 7.69E-006	7.59E-006	< 7.68E-006
lb/hr	Emission Rate, lb/hr	< 0.0539	0.0527	< 0.0546
lb/mmBtu	Emission Rate, lb/million Btu	< 1.27E-005	1.25E-005	< 1.27E-005
	Beryllium			
fwt	Formula Weight, lb/lb-Mole	9.01	9.01	9.01
ug	Catch Weight, Micrograms	.236	.205	.142
gr/DSCF	Concentration, grains/DSCF *	4.54E-008	3.89E-008	2.73E-008
lb/hr	Emission Rate, lb/hr	3.18E-004	2.70E-004	1.94E-004
lb/mmBtu	Emission Rate, lb/million Btu	7.50E-008	6.43E-008	4.51E-008
	Cadmium			
fwt	Formula Weight, lb/lb-Mole	112.41	112.41	112.41
ug	Catch Weight, Micrograms	16	18	20
gr/DSCF	Concentration, grains/DSCF *	3.08E-006	3.41E-006	3.84E-006
lb/hr	Emission Rate, lb/hr	0.0216	0.0237	0.0273
lb/mmBtu	Emission Rate, lb/million Btu	5.09E-006	5.64E-006	6.35E-006
	Chromium			
fwt	Formula Weight, lb/lb-Mole	52.00	52.00	52.00
ug	Catch Weight, Micrograms	70	64	52
gr/DSCF	Concentration, grains/DSCF *	1.35E-005	1.21E-005	9.99E-006
lb/hr	Emission Rate, lb/hr	0.0944	0.0843	0.0710
lb/mmBtu	Emission Rate, lb/million Btu	2.22E-005	2.01E-005	1.65E-005
	Copper			
fwt	Formula Weight, lb/lb-Mole	63.55	63.55	63.55
ug	Catch Weight, Micrograms	46	37	30
gr/DSCF	Concentration, grains/DSCF *	8.84E-006	7.02E-006	5.76E-006
lb/hr	Emission Rate, lb/hr	0.0620	0.0487	0.0410
lb/mmBtu	Emission Rate, lb/million Btu	1.46E-005	1.16E-005	9.53E-006

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)
< Indicates the value is below the detection limit.

(Continued next page)

FIELD DATA AND RESULTS TABULATION
(Continued)

PLANT: Florida Power and Light Company, Sanford, FL

		6-S-M5/MMTL-1	6-S-M5/MMTL-2	6-S-M5/MMTL-3
	Lead			
fwt	Formula Weight, lb/lb-Mole	207.19	207.19	207.19
ug	Catch Weight, Micrograms	< 20	< 20	< 20
gr/DSCF	Concentration, grains/DSCF *	< 3.85E-006	< 3.79E-006	< 3.84E-006
lb/hr	Emission Rate, lb/hr	< 0.0270	< 0.0264	< 0.0273
lb/mmBtu	Emission Rate, lb/million Btu	< 6.36E-006	< 6.27E-006	< 6.35E-006
	Manganese			
fwt	Formula Weight, lb/lb-Mole	54.94	54.94	54.94
ug	Catch Weight, Micrograms	66	56	68
gr/DSCF	Concentration, grains/DSCF *	1.27E-005	1.06E-005	1.31E-005
lb/hr	Emission Rate, lb/hr	0.0890	0.0738	0.0929
lb/mmBtu	Emission Rate, lb/million Btu	2.10E-005	1.76E-005	2.16E-005
	Mercury			
fwt	Formula Weight, lb/lb-Mole	200.59	200.59	200.59
ug	Catch Weight, Micrograms	.63	.79	.57
gr/DSCF	Concentration, grains/DSCF *	1.21E-007	1.50E-007	1.10E-007
lb/hr	Emission Rate, lb/hr	8.49E-004	1.04E-003	7.79E-004
lb/mmBtu	Emission Rate, lb/million Btu	2.00E-007	2.48E-007	1.81E-007
	Nickel			
fwt	Formula Weight, lb/lb-Mole	58.71	58.71	58.71
ug	Catch Weight, Micrograms	12400	11250	11000
gr/DSCF	Concentration, grains/DSCF *	0.00238	0.00213	0.00211
lb/hr	Emission Rate, lb/hr	16.7	14.8	15.0
lb/mmBtu	Emission Rate, lb/million Btu	0.00394	0.00353	0.00349
	Phosphorus			
fwt	Formula Weight, lb/lb-Mole	30.97	30.97	30.97
ug	Catch Weight, Micrograms	107	98.8	83.3
gr/DSCF	Concentration, grains/DSCF *	2.06E-005	1.87E-005	1.60E-005
lb/hr	Emission Rate, lb/hr	0.144	0.130	0.114
lb/mmBtu	Emission Rate, lb/million Btu	3.40E-005	3.10E-005	2.65E-005
	Selenium			
fwt	Formula Weight, lb/lb-Mole	78.96	78.96	78.96
ug	Catch Weight, Micrograms	49.2	37.1	33.6
gr/DSCF	Concentration, grains/DSCF *	9.46E-006	7.04E-006	6.46E-006
lb/hr	Emission Rate, lb/hr	0.0663	0.0489	0.0459
lb/mmBtu	Emission Rate, lb/million Btu	1.56E-005	1.16E-005	1.07E-005
	Silver			
fwt	Formula Weight, lb/lb-Mole	107.87	107.87	107.87
ug	Catch Weight, Micrograms	16	13	< 10
gr/DSCF	Concentration, grains/DSCF *	3.08E-006	2.47E-006	< 1.92E-006
lb/hr	Emission Rate, lb/hr	0.0216	0.0171	< 0.0137
lb/mmBtu	Emission Rate, lb/million Btu	5.09E-006	4.08E-006	< 3.18E-006
	Thallium			
fwt	Formula Weight, lb/lb-Mole	204.37	204.37	204.37
ug	Catch Weight, Micrograms	< 20	< 20	< 20
gr/DSCF	Concentration, grains/DSCF *	< 3.85E-006	< 3.79E-006	< 3.84E-006
lb/hr	Emission Rate, lb/hr	< 0.0270	< 0.0264	< 0.0273
lb/mmBtu	Emission Rate, lb/million Btu	< 6.36E-006	< 6.27E-006	< 6.35E-006

* 68° F (20° C) -- 29.92 inches of Mercury (Hg)
< Indicates the value is below the detection limit.

(Continued next page)

FIELD DATA AND RESULTS TABULATION
(Continued)

PLANT: Florida Power and Light Company, Sanford, FL

		6-S-M5/MMTL-1	6-S-M5/MMTL-2	6-S-M5/MMTL-3
	Vanadium			
fwt	Formula Weight, lb/lb-Mole	50.94	50.94	50.94
ug	Catch Weight, Micrograms	48800	45000	44000
gr/DSCF	Concentration, grains/DSCF *	0.00938	0.00854	0.00845
lb/hr	Emission Rate, lb/hr	65.8	59.3	60.1
lb/mmBtu	Emission Rate, lb/million Btu	0.0155	0.0141	0.0140
	Zinc			
fwt	Formula Weight, lb/lb-Mole	65.38	65.38	65.38
ug	Catch Weight, Micrograms	126	95	120
gr/DSCF	Concentration, grains/DSCF *	2.42E-005	1.80E-005	2.31E-005
lb/hr	Emission Rate, lb/hr	0.170	0.125	0.164
lb/mmBtu	Emission Rate, lb/million Btu	4.00E-005	2.98E-005	3.81E-005

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)

VISIBLE EMISSION EVALUATION

Form 4961 (Non-Stocked) Rev. 10-88

Plant Sanford Unit 4 Observation Date 5-28-91

PLANT OPERATING DATA

Gross Generation (mw) 357

Fuel Type % 60 Gas 40 ~~Oil~~ Orimulsion

Particulate Test (Yes) No

Run No. 1 Type Steady State

METEOROLOGICAL DATA

Sky Condition PC

Wind Speed (mph) 5

Wind Direction (from) S-SE

Temperature (°F) 85

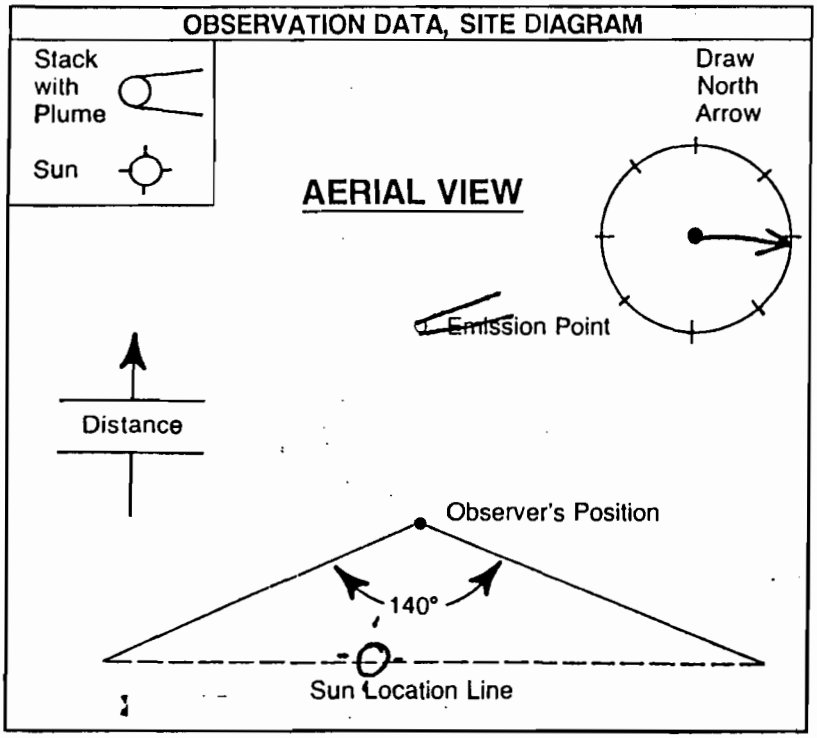
OBSERVATION DATA/SITE DIAGRAM

Observation Point (compass) E

Stack Height (ft.) 400

Distance from Stack (ft.) 1000

OBSERVATION DATA, SITE DIAGRAM



START TIME: 1035					STOP TIME: 1135				
SEC MIN	0	15	30	45	SEC MIN	0	15	30	45
1	25	20	25	20	31	25	25	30	30
2	20	25	25	20	32	30	30	30	30
3	20	20	15	15	33	25	30	30	30
4	20	20	25	30	34	30	25	30	30
5	30	30	25	25	35	30	30	30	30
6	25	25	25	25	36	30	30	30	30
7	30	30	25	25	37	30	30	30	30
8	25	25	25	30	38	30	30	30	25
9	30	30	30	30	39	25	25	30	30
10	30	30	30	30	40	30	30	30	30
11	30	30	30	30	41	30	30	30	30
12	30	30	30	30	42	30	30	25	25
13	30	30	30	30	43	25	25	30	30
14	30	30	30	35	44	30	30	30	30
15	35	30	30	30	45	30	30	30	30
16	30	30	25	25	46	30	25	25	30
17	25	25	25	25	47	30	30	30	30
18	25	25	25	25	48	30	30	25	25
19	25	20	20	20	49	25	25	30	30
20	25	25	25	25	50	30	30	30	30
21	25	25	25	30	51	30	25	30	30
22	30	30	30	30	52	30	30	30	30
23	25	25	25	25	53	25	30	30	30
24	25	30	30	30	54	30	25	25	30
25	30	30	30	30	55	30	30	25	25
26	30	30	30	30	56	25	25	30	30
27	30	30	30	30	57	25	30	30	30
28	30	30	30	30	58	30	30	30	30
29	30	30	30	30	59	25	25	25	30
30	30	25	25	30	60	30	25	25	30

3265 6710

AVERAGE OPACITY: 27.9 %

4975

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

THIS IS TO CERTIFY THAT

RON ROSINSKI has completed the STATE OF FLORIDA visible emissions evaluation training and is a qualified observer of visible emissions as specified by EPA reference method 9.

THIS CERTIFICATE EXPIRES Aug 27, 1991

Michael P. Clark
CERTIFICATE OFFICER

BEARER'S SIGNATURE

OBSERVERS SIGNATURE:

VISIBLE EMISSION EVALUATION

Form 4961 (Non-Stocked) Rev. 10/88

Plant Sanford Unit 4 Observation Date 5-28-91

PLANT OPERATING DATA

Gross Generation (mw) 355

Fuel Type % 60 Gas 40 Oil emulsion

Particulate Test (Yes) / No

Run No. 3 Type Steady State

METEOROLOGICAL DATA

Sky Condition PC

Wind Speed (mph) 5

Wind Direction (from) E

Temperature (°F) 90

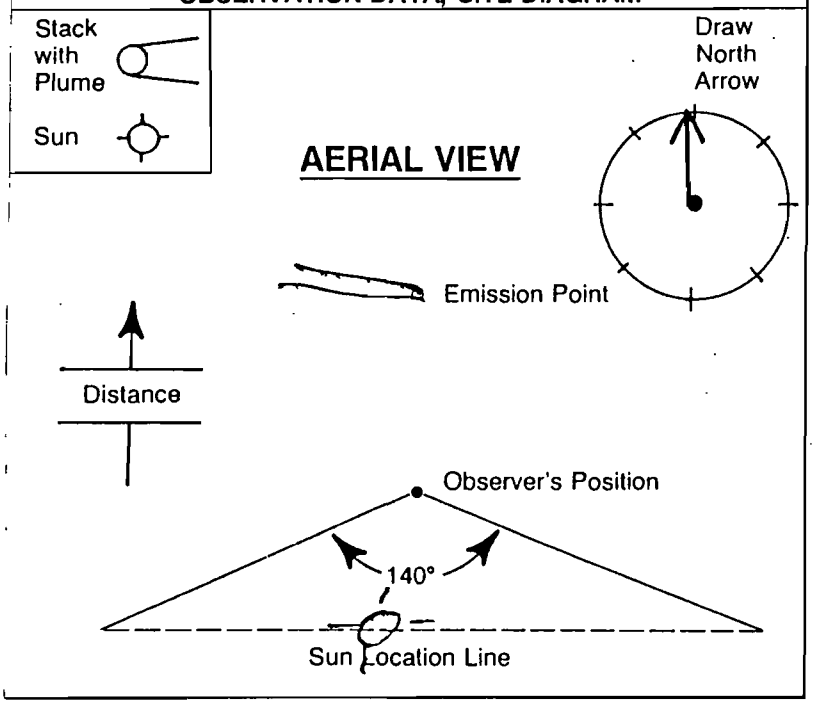
OBSERVATION DATA/SITE DIAGRAM

Observation Point (compass) S

Stack Height (ft.) 400

Distance from Stack (ft.) 1000

OBSERVATION DATA, SITE DIAGRAM



START TIME: 1433					STOP TIME: 1533				
SEC MIN	0	15	30	45	SEC MIN	0	15	30	45
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2	30	30	25	25	32	25	25	25	25
3	20	20	25	25	33	25	25	25	25
4	25	30	30	30	34	30	30	30	30
5	30	30	30	30	35	30	30	30	25
6	30	25	30	30	36	30	25	25	30
7	25	25	25	25	37	30	30	25	25
8	25	25	30	25	38	25	25	25	25
9	25	25	25	25	39	30	30	30	30
10	30	30	30	25	40	30	30	30	30
11	25	25	25	25	41	30	25	25	25
12	25	30	30	30	42	25	25	25	25
13	25	30	30	30	43	30	30	25	25
14	30	25	25	25	44	25	30	30	25
15	25	30	30	30	45	25	25	30	25
16	30	30	25	25	46	25	30	30	30
17	25	25	30	30	47	30	30	25	25
18	30	30	30	25	48	25	25	25	25
19	25	25	25	25	49	25	25	25	25
20	30	30	25	25	50	25	30	25	30
21	30	30	25	25	51	30	30	25	25
22	25	25	25	25	52	25	25	25	25
23	30	25	25	25	53	25	25	25	25
24	25	25	25	25	54	25	25	25	25
25	25	25	30	30	55	25	25	25	25
26	30	25	25	30	56	25	25	25	25
27	30	30	30	30	57	25	25	25	25
28	30	30	25	25	58	25	25	25	30
29	25	25	25	25	59	30	30	30	30
30	25	25	25	30	60	30	30	30	25

3240

AVERAGE OPACITY: 26.9 %

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

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THIS CERTIFICATE EXPIRES Aug 27, 1991

Michael P Clark
CERTIFICATE OFFICER

BEARER'S SIGNATURE

OBSERVERS SIGNATURE:

VISIBLE EMISSION EVALUATION

Form 4961 (Non-Stocked) Rev. 10/88

Best Available Copy

Plant Sanford Unit 4 Observation Date 5-29-91

PLANT OPERATING DATA

Gross Generation (mw) 367 M.W

Fuel Type % 60 Gas 40 Orimulsion

Particulate Test Yes / No

Run No. 4 Type APH Lance

METEOROLOGICAL DATA

Sky Condition Clear

Wind Speed (mph) 0-5

Wind Direction (from) S-SW

Temperature (°F) 85

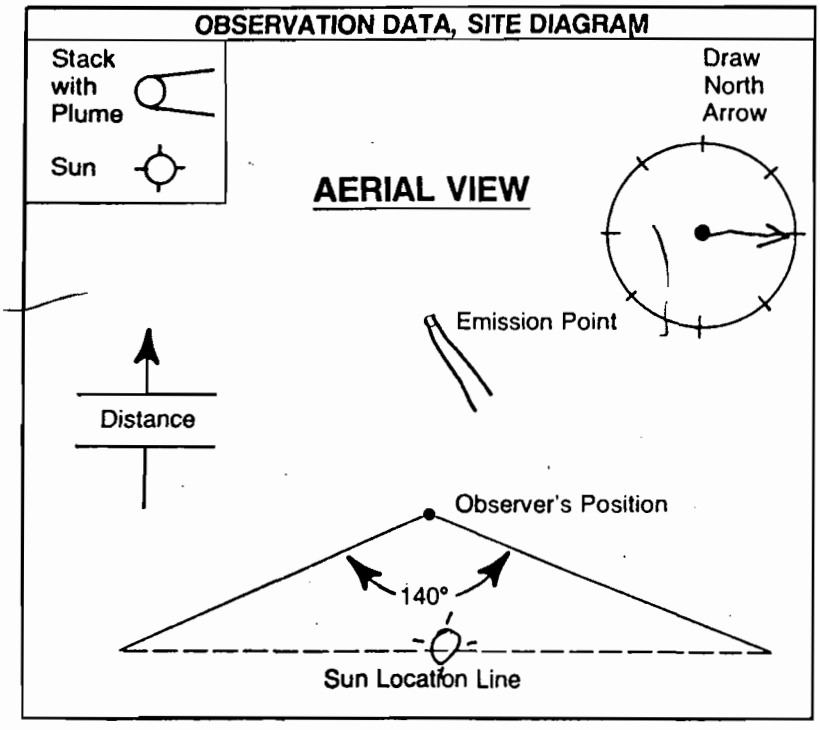
OBSERVATION DATA/SITE DIAGRAM

Observation Point (compass) East

Stack Height (ft.) 400

Distance from Stack (ft.) 1000

OBSERVATION DATA, SITE DIAGRAM



START TIME: 1016					STOP TIME: 1028				
SEC MIN	0	15	30	45	SEC MIN	0	15	30	45
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2	25	25	30	25	32				
3	25	25	30	30	33				
4	25	25	25	30	34				
5	30	30	30	25	35				
6	30	25	25	25	36				
7	30	30	30	30	37				
8	25	25	25	25	38				
9	25	30	25	30	39				
10	30	30	30	25	40				
11	25	25	30	30	41				
12	30	25	30	30	42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
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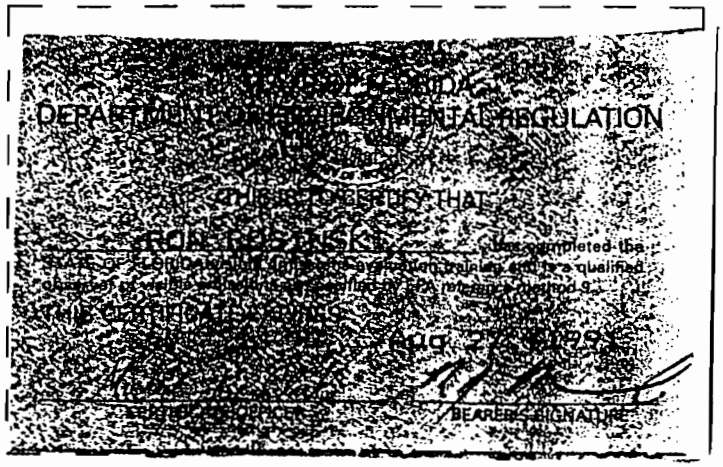
27					57				
28					58				
29					59				
30					60				



AVERAGE OPACITY: 27.3 %

OBSERVERS SIGNATURE:

VISIBLE EMISSION EVALUATION

Form 4961 (Non-Stocked) Rev. 10/88

Plant Sanford Unit 4 Observation Date 5-29-91

PLANT OPERATING DATA

Gross Generation (mw) 367

Fuel Type % 60 Gas 40 Oil/Emulsion

Particulate Test (Yes) No

Run No. 3 Type Soot Blow

METEOROLOGICAL DATA

Sky Condition Clear

Wind Speed (mph) 0-5

Wind Direction (from) SW

Temperature (°F) 90

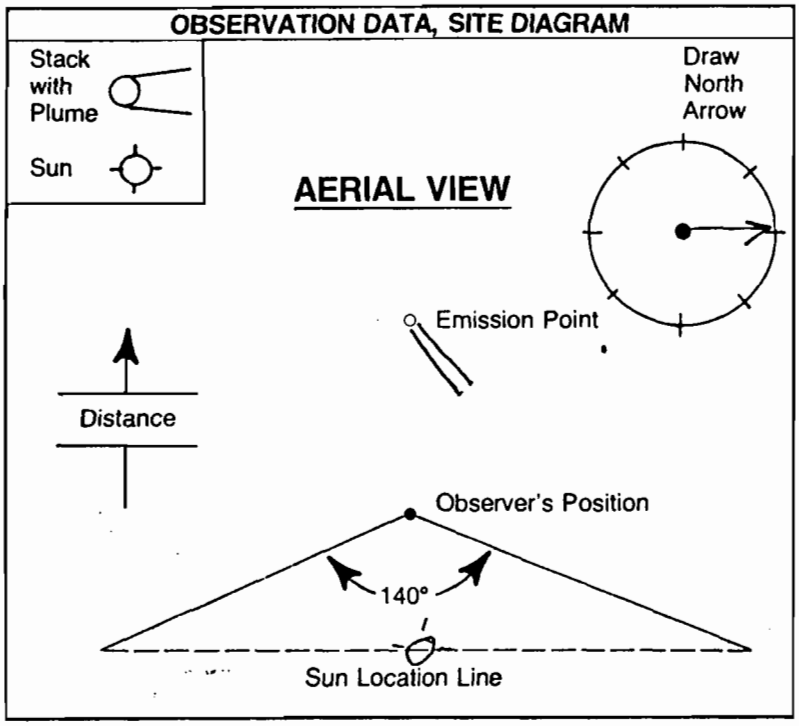
OBSERVATION DATA/SITE DIAGRAM

Observation Point (compass) E

Stack Height (ft.) 400

Distance from Stack (ft.) 1000

OBSERVATION DATA, SITE DIAGRAM



START TIME: 1110					STOP TIME: 1210				
SEC MIN	0	15	30	45	SEC MIN	0	15	30	45
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3	25	25	25	25	33	20	20	25	25
4	25	25	30	30	34	25	25	25	25
5	30	30	30	30	35	25	25	30	25
6	30	30	30	25	36	25	25	25	25
7	25	25	25	25	37	25	25	25	25
8	25	30	30	30	38	30	30	25	25
9	25	30	30	25	39	25	25	25	20
10	25	25	25	25	40	25	25	25	25
11	25	25	25	25	41	25	25	25	25
12	25	25	25	25	42	25	30	30	30
13	25	25	25	25	43	30	30	30	30
14	25	25	25	25	44	30	30	30	30
15	25	25	25	25	45	30	30	30	30
16	30	30	30	30	46	30	25	25	25
17	30	30	30	30	47	25	25	25	25
18	30	30	30	30	48	25	25	25	30
19	30	30	25	25	49	30	30	30	30
20	30	30	30	30	50	30	30	30	30
21	30	30	30	30	51	30	30	30	25
22	25	25	25	25	52	25	30	25	25
23	25	30	30	30	53	25	25	25	25
24	25	25	25	25	54	25	25	25	25
25	30	30	30	30	55	25	25	25	25
26	30	30	30	30	56	25	25	25	25
27	30	25	25	25	57	25	25	25	25
28	25	25	30	25	58	25	25	25	30
29	25	25	25	25	59	30	25	25	25
30	25	25	25	25	60	25	25	25	25

AVERAGE OPACITY: 26.6 %

OBSERVERS SIGNATURE: RJ Rosinski

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Michael P. Clark
CERTIFICATE OFFICER

RJ Rosinski
BEARER'S SIGNATURE

VISIBLE EMISSION EVALUATION

Form: 4961 (Non-Stocked) Rev. 10/88

Plant Sanford Unit 4 Observation Date 5-29-91

PLANT OPERATING DATA

Gross Generation (mw) 367

Fuel Type % 60 Gas 40 Oil Coal

Particulate Test (Yes) / No

Run No. 6 Type Soot Blow

METEOROLOGICAL DATA

Sky Condition PC

Wind Speed (mph) 0-5

Wind Direction (from) NW

Temperature (°F) 90

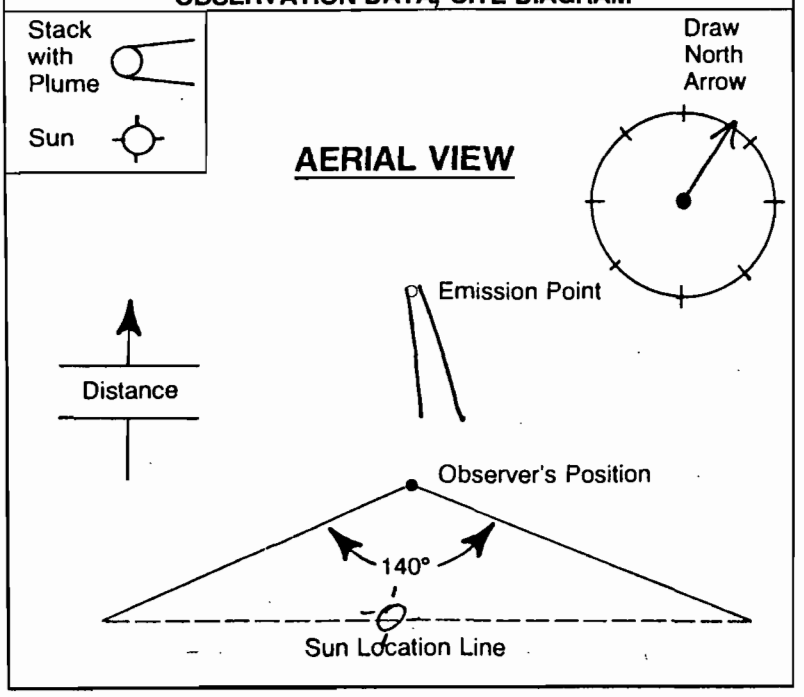
OBSERVATION DATA/SITE DIAGRAM

Observation Point (compass) SE

Stack Height (ft.) 400

Distance from Stack (ft.) 1000

OBSERVATION DATA, SITE DIAGRAM



START TIME: 1245					STOP TIME: 1257				
SEC MIN	0	15	30	45	SEC MIN	0	15	30	45
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2	25	25	25	25	32				
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4	30	25	25	25	34				
5	25	30	30	25	35				
6	25	25	25	25	36				
7	25	25	30	30	37				
8	30	25	25	25	38				
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11	25	30	30	30	41				
12	30	30	30	30	42				
13	—	—	—	—	43				
14					44				
15					45				
16					46				
17					47				
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19					49				
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21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

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Michael P. Clark
CERTIFICATE OFFICER

BEARER'S SIGNATURE

AVERAGE OPACITY: 26.4 %

OBSERVERS SIGNATURE:

PARTICULATE TEST REPORT - TYPICAL CONFIGURATION

PLANT PSN UNIT 4 SOOT or STEADY STATE SB

DATE(S) OF TEST 5-29-91 AVERAGE GROSS LOAD 362

1. Cover memo to R. N. Allen.
2. Stack Test Report Checklist.
3. Certification of Validity.
4. Computer Results Sheets. (Three runs combined)
5. Run 1 Field Data Sheets.
6. Run 1 Orsat / Impinger Sheets.
7. Run 2 Field Data Sheets.
8. Run 2 Orsat / Impinger Sheets.
9. Run 3 Field Data Sheets.
10. Run 3 Orsat / Impinger Sheets.
11. Post-Test Meter Box Calibration Check Sheets. (1 or 2)
12. Sample Processing Procedure Sheets.
13. Post-Test Thermocouple Calibration Check Sheet.
14. Oil Analysis Sheet (s).
15. Air Pollution Control Devices
16. Nozzle Calibrations.
17. Pitot Calibrations.
18. Barometer Calibration.
19. Standard Meter Calibration Sheet
20. Meter Box Calibration Sheet
21. Thermocouple Calibrations.
22. Sample Head Hook-Up Calibrations.
23. Gas Meter Thermocouple Calibrations.
24. Stack / Duct Diagram / Probe Marking

25. Test Equipment Schematic Diagram.

26. Stack Test Calculations. (4 pages)

27. Calculations for run 1 (only for steady state)

STACK TEST REPORT

CHECKLIST

PER F. A. C. CHAPTER 17-2.700(7)(C) 1.-21

1. Type: Steam Generator
2. Location: Volusia Co., Fl.
3. Designation: Existing
4. Facility Name: Sanford Power Plant
5. Owned and Operated by Florida Power & Light Company
6. Type and amount of fuels: Not applicable (F factor)
7. Means,raw data and computations of fuels: Not applicable
8. Air pollution control devices: Dust Collectors
9. Duct / stack sketch: Included
10. Date,time,and duration of run: Included
11. Method: EPA One through Four and Seventeen
12. Number and location of sampling points: Included
13. Readings and sample time: Included
14. Sampling equipment: R.A.C. and custom designed / manufactured
15. Equipment calibration data: Included
16. Filter data: Included
17. Chemical solutions: Reagent grade acetone, KOH, Oxsorbent
18. Pollutants collected: Included
19. Test crew: Included
20. Measured and calculated data: Included
21. Relation of data to emission rate: Included
22. Applicable standard and maximum emission rate: Included
23. Certification: Included

CERTIFICATION OF VALIDITY

Particulate Test Report

Plant: Sanford

Unit No.: 4

Test date: May 29, 1991

I hereby certify the information and data provided in the stack test report for tests conducted at the above facility on the above date are true and correct, to the best of my knowledge.

Robert R. Righter

R. R. Righter, REP

Emission Test Coordinator

FLORIDA POWER AND LIGHT COMPANY
POWER RESOURCES TEST SECTION
6001 VILLAGE BLVD.
WEST PALM BEACH, FLORIDA 33407

PARTICULATE EMISSION TEST

PLANT: SANFORD
UNIT: 4
TEST: SOOT BLOW
METHOD: 17

	RUN 1	RUN 2	RUN 3
DATE OF RUN	05/29/91	05/29/91	05/29/91
GROSS LOAD (MW)	362	366	361
START TIME (24-HR CLOCK)	940	1058	1215
END TIME (24-HR CLOCK)	1048	1205	1331
VOL DRY GAS SAMPLED METER COND (DCF)	45.877	45.858	45.044
BAROMETRIC PRESSURE (IN. HG)	30.11	30.11	30.11
AVG ORIFICE PRESSURE DROP (IN. H2O)	1.914	1.947	1.858
AVG GAS METER TEMP (F)	94.5	105.4	99.4
GAS METER CALIBRATION FACTOR	1.0697	1.0697	1.0697
VOL GAS SAMPLED STD COND (DSCF)	47.227	46.301	45.957
TOTAL WATER COLLECTED (G)	190.5	211.2	185.8
VOL WATER COLLECTED STD COND (SCF)	8.98	9.96	8.76
MOISTURE IN STACK GAS (% VOL)	15.98	17.70	16.01
MOLE FRACTION DRY GAS	0.840	0.823	0.840
CO2 VOL PERCENT DRY	9.90	10.00	9.60
O2 VOL PERCENT DRY	5.50	5.60	6.00
N2 VOL PERCENT DRY	84.60	84.40	84.40
MOL. WT. DRY STACK GAS (LB/LB-MOLE)	29.80	29.82	29.78
MOL. WT. WET STACK GAS (LB/LB-MOLE)	27.92	27.73	27.89
ELEV. DIFF. FROM MANOM. TO BAROM. (FT)	0.00	0.00	0.00
STACK GAS STATIC PRESSURE (IN. H2O GAGE)	-1.30	-1.30	-1.30
STACK GAS STATIC PRESSURE (IN. HG ABS.)	30.01	30.01	30.01
AVERAGE SQUARE ROOT VELOCITY HEAD	0.996	1.001	0.983
PITOT TUBE COEFFICIENT	0.84	0.84	0.84
AVG STACK TEMP (F)	372.1	376.5	378.5
STACK GAS VELOCITY STACK COND (FT/SEC)	71.28	72.06	70.65
CROSS SECTION STACK AREA (SQ FT)	359.7	359.7	359.7
STACK GAS FLOW RATE STD COND (DSCFM)	822677.3	810490.2	808967.5
STACK GAS FLOW RATE STACK COND (ACFM)	1538367.9	1555315.6	1524793.7
NET TIME OF RUN (MIN)	60	60	60
NOZZLE DIAMETER (IN)	0.250	0.250	0.250
PERCENT ISOKINETIC	101.02	100.52	99.97
PARTICULATE COLLECTED (MG)	269.7	279.1	243.1
WEIGHTED AVERAGE F FACTOR (DSCF/MILL. BTU)	8902.00	8902.00	8902.00
HEAT INPUT ORIMULSION (%)	40.0	40.0	40.0
HEAT INPUT GAS (%)	60.0	60.0	60.0
PARTICULATE EMISSIONS (GRAINS/SCF)	0.0881	0.0930	0.0816
PARTICULATE EMISSIONS (LB/MILL. BTU)	0.152	0.162	0.146

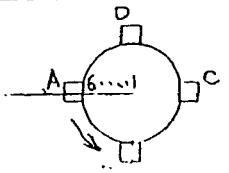
AVERAGE PARTICULATE EMISSIONS (LB/MMBTU) 0.15

NOTE: STANDARD CONDITIONS -- 68F, 29.92 in. Hg

PARTICULATE TEST FIELD DATA SHEET

Plant & Unit: PSN - 4 | Reference: 1.9 | Filter #: 81
Type of Test: SB. APH | Bar. Pressure (In.Hg): 30.05 | Nozzle #: 5 N
Method: 1 THRU 4 & 17 | Static Pressure (H2O): ~1.3 | Nozzle Diam.(In.): 0.250
Run Number: 1 SB. | Meter Box #: 2790 | ΔH@ 1.5802 Y: 1.0097
Date: MAY 29, 1991 | Inl. Pitot Leak Check: OK @ 6" H_2O | Pitot #: 1N | Cp: 0.84
Sampling Location: STACK | Fin. Pitot Leak Check: 000.0C6" H_2O | Thermocouple #: 2N
Operators: A.J. BALE | Inl. Leak Rate (cfm): OK @ 15.0 Hg | Impinger Set: E
R. R. PIGHTLING / S.C. Webb | Fin. Leak Rate (cfm): 1000 @ 18 Hg | Sample Head: E

Point #	Clock Time	Sample Time	Dry Gas Meter (704.658)	Velocity Head (in.H2O)	Orifice ΔH (in.H2O)	Dry Gas Meter Temp.(F) Inlet	Dry Gas Meter Temp.(F) Outlet	Stack Temperature (F)	Vacuum (In Hg)	Impinger Temperature (F)
A-1	0940	2.5	706.6	0.82	1.56	—	78	369	5	—
2	/	5.0	708.2	0.80	1.52	—	79	369	4	66
3	/	7.5	710.0	0.82	1.56	—	81	370	4	—
4	/	10.0	711.6	0.87	1.65	—	83	370	5	—
5	/	12.5	713.1	0.69	1.31	—	85	371	5	—
6	0955	15.0	714.730	0.64	1.22	—	87	373	5	—
B-1	0957	2.5	716.7	1.10	2.09	—	87	368	6	—
2	/	5.0	718.6	1.20	2.28	—	90	369	6	—
3	/	7.5	721.0	1.30	2.47	—	92	369	6	
4	/	10.0	723.8	1.20	2.28	—	95	368	6	—
5	/	12.5	726.1	0.95	1.81	—	97	367	6	— 66
6	1012	15.0	726.943	0.75	1.43	—	98	355	5	—
C-1	1015	2.5	728.8	1.10	2.09	—	94	370	6	—
2	/	5.0	730.9	1.10	2.09	—	98	374	6	—
3	/	7.5	732.8	1.20	2.28	—	100	377	6	64
4	/	10.0	735.2	1.50	2.85	—	101	378	7	—
5	/	12.5	737.6	1.50	2.85	—	102	380	8	—
6	1030	15.0	739.868	1.50	2.85	—	103	381	8	—
D-1	1033	2.5	741.8	0.75	1.42	—	100	378	5	—
2	/	5.0	743.4	0.89	1.69	—	102	378	6	—
3	/	7.5	745.0	0.93	1.58	—	103	375	6	—
4	/	10.0	747.0	0.89	1.69	—	104	376	6	—
5	/	12.5	748.6	0.89	1.69	—	104	376	6	63
6	1048	15.0	750.535	0.89	1.69		105	370	6	—
Average			45.877	0.996	1.914	—	94.5	372.13		



FILE: TS8/DATASHEET/PSN4.DRW

DRY MOLECULAR WEIGHT AND EMISSION RATE CORRECTION FACTOR DETERMINATION

PLANT PSN 4
DATE 5-29-91
SAMPLING TIME (24HR CLOCK) 0940 - 1048
SAMPLING LOCATION Stack
SAMPLE TYPE Integrated Bag
ANALYTICAL METHOD Method 3
AMBIENT TEMPERATURE 81
OPERATOR H Bale

COMMENTS : RUN 1
SB

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME
CO_2	9.9	—	9.9	—	9.9	—	9.9
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL O_2 READING)	15.4	5.5	15.4	5.5	15.4	5.5	5.5
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	—	—	—	—	—	—	—

$Fo\ (TEST) = \frac{20.9 - \%O_2}{\%\ CO_2}$

$Fo\ (TEST) = \frac{20.9 - 5.5}{9.9} = 1.55$

Fuel Type	Fo (calc.)
Residual Fuel Oil	1.290
Natural Gas	1.716

EPA ACCEPTABLE RANGE

Residual Fuel Oil	1.210 – 1.370
Natural Gas	1.600 – 1.836

Fo 1.44 – 1.65
60/40 gas oil

SYSTEM LEAK CHECK OK

INITIAL ORSAT ANALYZER LEAK CHECK (FLUID LEVEL) 15"@20sec / 12@20sec BUBBLER OK

FINAL ORSAT ANALYZER LEAK CHECK (FLUID LEVEL) 16@20sec / 15@20sec BUBBLER OK

Sampling Location STACK — MOISTURE — Sampling Location —
Sample Box E — Sample Box —

	Impinger Number 1	2	3	4	Impinger Number 1	2	3	4	Weighed By
Final Weight (g)	747.8	646.1	501.2	841.6	—	—	—	—	H Bale
Initial Weight (g)	587.7	636.0	499.7	822.8	—	—	—	—	H Bale
Net Weight (g)	160.1	10.1	1.5	18.8	—	—	—	—	H Bale
			Total	190.5			Total	—	

Total Impinger Wash (g) 190.5

Filter Weights

				Weighed By
Filter #	81	—	—	
Sampling Location	STACK	—	—	
Final Weight (g)	2.2972	—	—	R Rylotte
Initial Weight (g)	2.0325	—	—	H Bale
Difference (g)	0.2647	—	—	R Rylotte
Particulate Catch (mg)	264.7	—	—	R Rylotte

— Side Total Catch (mg) —

Probe Wash

				Weighed By
Beaker #	6	—	—	
Sampling Location	STACK	—	—	
Final Weight (g)	72.2847	—	—	S.C. Webb
Initial Weight (g)	72.2797	—	—	H Bale
Difference (g)	0.0050	—	—	R Rylotte
Particulate Catch (mg)	5.0	—	—	R Rylotte

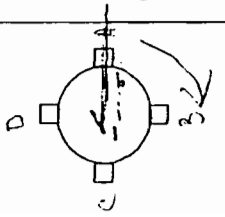
— Side Total Catch (mg) —

Total Particulate Catch (mg) 269.7

PARTICULATE TEST FIELD DATA SHEET

Plant & Unit	PSN - 4	Reference	1.9	Filter #	82
Type of Test	S.B. IK's	Bar. Pressure (in.Hg)	30.05	Nozzle #	6N
Method	1 THRU 4 & 17	Static Pressure (H2O)	-1.3	Nozzle Diam.(in.)	0.250
Run Number	2 SB	Meter Box #	2790	ΔH@	1.5803 Yi 1.0697
Date	5-29-91	Ini. Pitot Leak Check	OK @ 6" H_2O	Pitot #	IN Cp 0.84
Sampling Location	STACK	Fin. Pitot Leak Check	0.002 @ 6" H_2O	Thermocouple #	2N
Operators	H. J. BALE	Ini. Leak Rate (cfm)	0.000 @ 15 Hg	Impinger Set	F
	R.R. Righter/S.C. Webb	Fin. Leak Rate (cfm)	0.000 @ 13 Hg	Sample Head	F

Point #	Clock Time	Sample Time	Dry Gas Meter 751.010	Velocity Head (in.H2O)	Orifice ΔH (in.H2O)	Dry Gas Meter Temp.(F) Inlet	Dry Gas Meter Temp.(F) Outlet	Stack Temperature (F)	Vacuum (in Hg)	Impinger Temperature (F)
A-1	1058	2.5	753.0	0.85	1.62	—	97	373	6	—
2	/	5.0	754.7	0.79	1.50	—	100	376	6	—
3	/	7.5	756.7	0.88	1.67	—	101	387	6	—
4	/	10.0	758.7	0.95	1.81	—	103	385	6	63
5	/	12.5	760.0	0.90	1.71	—	105	384	6	—
6	1113	15.0	762.042	0.88	1.67	—	106	380	6	—
B-1	1116	2.5	763.3	1.10	2.09	—	102	375	4	—
2	/	5.0	765.5	1.30	2.47	—	104	377	7	—
3	/	7.5	768.0	1.50	2.85	—	105	380	10	64
4	/	10.0	770.2	1.60	3.04	—	106	383	10	—
5	/	12.5	772.5	1.60	3.04	—	108	383	10	—
6	1131	15.0	774.922	1.40	2.66	—	109	383	10	—
C-1	1133	2.5	777.0	1.10	2.09	—	104	371	5	—
2	/	5.0	779.0	1.30	2.47	—	106	364	8	—
3	/	7.5	780.8	1.30	2.47	—	107	371	9	—
4	/	10.0	783.4	1.10	2.09	—	108	370	7	60
5	/	12.5	785.4	1.10	2.09	—	108	371	8	—
6	1148	15.0	787.20	0.98	1.86	—	109	368	8	—
D-1	1150	2.5	789.0	0.73	1.39	—	105	371	6	—
2	/	5.0	791.1	0.77	1.46	—	105	375	6	—
3	/	7.5	792.3	0.67	1.27	—	108	376	6	61
4	/	10.0	793.8	0.64	1.22	—	108	377	6	—
5	/	12.5	795.3	0.60	1.14	—	108	377	6	—
6	1205	15.0	796.868	0.55	1.05	—	108	378	6	—
Average			45.858	1.001	1.941	—	105.42	376.46		



FILE: TSB/DATASHEET/PSN4.DRW

DRY MOLECULAR WEIGHT AND EMISSION RATE CORRECTION FACTOR DETERMINATION

NT PSD 4
E 5-29-91
IPLING TIME (24HR CLOCK) 1058-1205
IPLING LOCATION Stack
MPLE TYPE Integrated Bag
LYTICAL METHOD Method 3-
IENT TEMPERATURE 82
ERATOR H. Bala

COMMENTS: Run 2 SB Inks

GAS \ RUN 2	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME	Fo (TEST) = $\frac{20.9 - \%O_2}{\%CO_2}$
CO_2	10.0	—	10.0	—	10.0	—	10.0	Fo (TEST) = $\frac{20.9 - 5.6}{10} = 1.53$
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL O_2 READING)	15.6	5.6	15.6	5.6	15.6	5.6	5.6	Fuel Type / Fo (calc.): Residual Fuel Oil 1.290; Natural Gas 1.716
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	—	—	—	—	—	—	—	EPA ACCEPTABLE RANGE: Residual Fuel Oil 1.210 – 1.370; Natural Gas 1.600 – 1.836

SYSTEM LEAK CHECK OK

INITIAL ORSAT ANALYZER LEAK CHECK (FLUID LEVEL) 8" @ 15 sec / 12 @ 15 sec BUBBLER OK

FINAL ORSAT ANALYZER LEAK CHECK (FLUID LEVEL) 10 @ 15 sec / 15 @ 15 sec BUBBLER OK

[Fo 1.44 – 1.65]
60/40 gas/sci

Sampling Location Stack 4 — MOISTURE — Sampling Location —
Sample Box F — Sample Box —

	Impinger Number 1	2	3	4	Impinger Number 1	2	3	4	Weighed By
Final Weight (g)	819.0	614.2	477.8	844.8	—	—	—	—	H Bal
Initial Weight (g)	635.3	602.8	476.5	830.0	—	—	—	—	
Net Weight (g)	183.7	11.4	1.3	14.8	—	—	—	—	
			Total	211.2			Total	—	

Total Impinger Wash (g) 211.2

Filter Weights

Filter #	82	—	—	Weighed By
Sampling Location	Stack	—	—	
Final Weight (g)	2.4052	—	—	L Sutton
Initial Weight (g)	2.1328	—	—	H Bal
Difference (g)	0.2724	—	—	H Bala
Particulate Catch (mg)	272.4	—	—	H Bal

— Side Total Catch (mg) —

Probe Wash

Beaker #	7	—	—	Weighed By
Sampling Location	Stack	—	—	
Final Weight (g)	70.0668	—	—	S.C. Webb
Initial Weight (g)	70.0601	—	—	H Bal
Difference (g)	0.0067	—	—	Harold Bal
Particulate Catch (mg)	6.7	—	—	H Bal

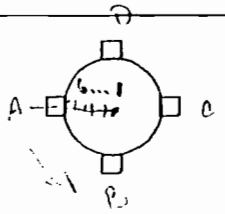
— Side Total Catch (mg) —

Total Particulate Catch (mg) 279.1

PARTICULATE TEST FIELD DATA SHEET

Plant & Unit	PSN - 4	**Reference**	1.9	**Filter #**	83
Type of Test	SB 1K	**Bar. Pressure (In.Hg)**	30.05	**Nozzle #**	1N
Method	1 THRU 4 & 17	**Static Pressure (H2O)**	-1.3	**Nozzle Diam.(In.)**	0.250
Run Number	3 SB	**Meter Box #**	2700	**ΔH@**	1.5802 **YI** 1.0697
Date	5-29-91	**Inl. Pitot Leak Check**	ok @ 6" A_2O	**Pitot #**	1N **Cp** 0.84
Sampling Location	STACK	**Fin. Pitot Leak Check**	ok @ 6 A_2O	**Thermocouple #**	2N
Operators	H. Bale	**Inl. Leak Rate (cfm)**	0.000 @ 15 Hg	**Impinger Set**	A
	R. Righter / S. Webb	**Fin. Leak Rate (cfm)**	0.10 @ 22 Hg	**Sample Head**	A

Point #	Clock Time	Sample Time	Dry Gas Meter 797.244	Velocity Head (In.H2O)	Orifice ΔH (In.H2O)	Dry Gas Meter Temp.(F) Inlet	Dry Gas Meter Temp.(F) Outlet	Stack Temperature (F)	Vacuum (In Hg)	Impinger Temperature (F)
A-1	1215	2.5	799.0	0.78	1.48	—	101	374	10	—
2	/	5.0	800.6	0.75	1.43	—	101	375	10	—
3	/	7.5	802.2	0.79	1.50	—	102	375	11	—
4	/	10.0	804.0	0.70	1.33	—	103	376	11	—
5	/	12.5	805.6	0.68	1.29	—	104	377	11	63
6	1230	15.0	807.155	0.62	1.18	—	104	377	10	—
B-1	1234	2.5	809.2	1.10	2.09	—	100	374	14	—
2	/	5.0	811.1	1.10	2.09	—	100	373	14	—
3	/	7.5	813.3	1.30	2.47	—	101	373	19	—
4	/	10.0	815.2	1.20	2.28	—	101	373	20	-65-
5	/	12.5	817.4	1.20	2.28	—	101	372	20	—
6	1249	15.0	819.385	1.20	2.28	—	101	372	20	—
C-1	13.53	2.5	821.9	1.20	2.28	—	94	379	21	—
2	/	5.0	824.0	1.20	2.28	—	95	379	21	-60-
3	/	7.5	826.0	1.10	2.09	—	96	383	20	—
4	/	10.0	827.9	1.20	2.28	—	97	382	21	—
5	/	12.5	829.8	1.10	2.09	—	97	381	21	/
6	1408	15.0	832.0	1.20	2.28	—	98	382	21	—
D-1	1316	2.5	833.4	0.81	1.54	—	95	388	13	—
2	/	5.0	835.4	0.81	1.54	—	97	381	13	61
3	/	7.5	837.0	0.84	1.59	—	98	383	14	—
4	/	10.0	838.4	0.91	1.73	—	99	384	14	—
5	/	12.5	840.5	0.84	1.59	—	100	385	14	—
6	1331	15.0	842.288	0.84	1.59	—	101	385	14	—
Average			45.044	0.983	1.858	—	99.42	378.16		



FILE: TS8/DATASHEET/PSN4.DRW

DRY MOLECULAR WEIGHT AND EMISSION RATE CORRECTION FACTOR DETERMINATION

ANT PSN 4
ATE 5-29-91
AMPLING TIME (24HR CLOCK) 1215 - 1331
AMPLING LOCATION Stack
AMPLE TYPE Integrated Bag
NALYTICAL METHOD Method 3
MBIENT TEMPERATURE 81
PERATOR H. Bale

COMMENTS : RUN 3 SB

GAS \ RUN 3	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME
CO_2	9.6		9.6		9.6		9.6
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL O_2 READING)	15.6	6.0	15.6	6.0	15.6	6.0	6.0
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)							

$Fo\ (TEST) = \frac{20.9 - \%O_2}{\% CO_2}$

$Fo\ (TEST) = \frac{20.9 - 6}{9.6} = 1.55$

Fuel Type	Fo (calc.)
Residual Fuel Oil	1.290
Natural Gas	1.716
EPA ACCEPTABLE RANGE	
Residual Fuel Oil	1.210 – 1.370
Natural Gas	1.600 – 1.836

Fo 1.44-1.65

SYSTEM LEAK CHECK OK

INITIAL ORSAT ANALYZER LEAK CHECK (FLUID LEVEL) 13"@20sec/12@15sec BUBBLER OK

FINAL ORSAT ANALYZER LEAK CHECK (FLUID LEVEL) 15@20sec/13@20sec BUBBLER OK

60/40 gas/oil

Sampling Location Stack — MOISTURE — Sampling Location —
Sample Box A — Sample Box —

	Impinger Number 1	2	3	4	Impinger Number 1	2	3	4	Weighed By
Final Weight (g)	730.1	561.3	490.0	861.8					H Bale
Initial Weight (g)	566.1	553.5	488.1	849.7					H Bale
Net Weight (g)	164.0	7.8	1.9	12.1					H Bale
			Total	185.8			Total		

Total Impinger Wash (g) 185.8

Filter Weights					Probe Wash				
Filter #	83			Weighed By	Beaker #	8			Weighed By
Sampling Location	STACK				Sampling Location	STACK			
Final Weight (g)	2.2227				Final Weight (g)	65.1902			S.C. Webb
Initial Weight (g)	1.9850				Initial Weight (g)	65.1848			H Bale
Difference (g)	0.2377				Difference (g)	0.0054			
Particulate Catch (mg)	237.7				Particulate Catch (mg)	5.4			

— Side Total Catch (mg) —

— Side Total Catch (mg) —

Total Particulate Catch (mg) 243.1

POSTTEST
METER BOX CALIBRATION CHECK
(English Units)

Standard Meter No.: 954282

DATE: 06/04/91

Pretest Y: 1.0697

Bar.Press.,Pb,in.Hg: 29.80

Std. Meter Coeff.: 0.9900

Orific e Manomeer Settin g H in. H2 O	Gas Volume Std Tes Meter Vw 3 ft	Dry Ga Meter Vd 3 ft	Temperature Std T st Mete Tw o F	Meter Outlet Td o F	Tim O min	Vacuum Setting in.	a Yi
1.89	7.980	7.602	69.3	89.0	10.0	24.0	1.0837
1.89	7.961	7.583	69.3	91.0	10.0	24.0	1.0878
1.89	7.978	7.628	68.0	92.0	10.0	24.0	1.0883
						Average	1.0866
						Correcte	1.0758

a; $Yi = \frac{(Vw)(Pb)(Td+460)}{(Vd)(Pb+(H/13.6))(Tw+460)}$

% Diff. Pretest Y -0.57

Vw = Gas volume passing through the wet test meter, cu. ft..

Vd = Gas volume passing through the dry gas meter, cu. ft..

Tw = Temp. of the gas in the wet test meter, F.

Tdi = Temp. of the inlet gas of the dry gas meter, F.

Tdo = Temp. of the outlet of the dry gas meter, F.

Td = Average temp. of the gas in the dry gas meter, F.

H = Pressure differential across orifice, in. water.

Yi = Ratio of accuracy of wet test meter to dry gas meter for each run.

Y = Average Yi for all three runs; tolerance = pretest Y +/-0.05Y.

Pb = Barometeric pressure, in. Hg.

O = Time of calibration run, min..

Meter Box Number: 2790

Calibrated by: H. J. Bale

PARTICULATE TEST SAMPLE PROCESSING PROCEDURES

Plant: Sanford

Unit No. 4

Test Date(s): May 29, 1991

Particulate Stack Test Crew for this test:

R. R. Righter (Test Coordinator)

H. J. Bale

S. C. Webb

Filters Processed Initially by: H. J. Bale

Finally by: S. C. Webb

Probe / Nozzle Washes Collected by: R. R. Righter

Processed by: S. C. Webb

Filter Processing Procedure

1. Pre-test:

A. Please note: At all times filters are handled with clean disposable gloves, or forceps.
B. Filters are examined under a strong light for irregularities, flaws, and pinhole leaks.
C. Filters are permanently marked.
D. Oven dried at 105 degrees C for two to three hours.
E. Dessicated for at least two hours.
F. Weighed to the nearest 0.1 mg.
G. Q. A. check is performed on every fifth filter.
H. Q. A. filter is redessicated and reweighed to ensure accurate weight. (+ or - 0.5 mg)

2. Post-test:

A. Filter is transferred to a clean shipping container.
B. In the laboratory, filters are oven dried at 105 degrees C for two to three hours.
C. Cooled in dessicator.
D. Weighed for final weight.

NOZZLE AND FILTER INLET WASH PROCEDURE

1. Pre-test:

   A. Only reagent grade acetone in glass containers is used

2. Post-test:

   A. Both the nozzle and the filter inlet are brushed and rinsed several times,to remove all particulate deposited.
   B. Rinsing are stored in a clean non-reactive container.
   C. Said containers are appropriately labeled, and the level of fuild is marked.
   D. In the laboratory, the individual washes (along with a blank acetone sample of similar volume) are tranferred to clean tared beakers.
   E. The wash is evaporated at ambient temperature.
   F. The beakers are dessicated for twenty four hours.
   G. The beakers are weighed to the nearest 0.1 mg.

Data verification (prior to computer calculation) by: R. R. Righter

Computer program run by: R. R. Righter

THERMOCOUPLE POSTTEST
CALIBRATION CHECK

Standard: National Bureau of Standards Thermocouple

Reference: Q.A. sec 3.1.2

Procedure: Test thermocouple and NBS thermocouple are wrapped in a heating mat. The temperature is controlled by the current flow into the mat, and is stablized at a point within 10% of the average stack temperature during the test.

Tolerance: +/- 1.5% of actual absolute temperature

Test site: PSN 4
Test Date: 05/28-29/91
Avg stack temp: 377.4

Checked date: 06/04/91
Checked by: H. J. BALE

THERMO #	LENGT ft	REF TMP. F	MEASURED TEMP F	TOLERANCE % R
1N	15	384	385	-0.12

AIR POLLUTION CONTROL DEVICES

Dust Collectors:

Run 1		Inlet	Outlet	^p
	A	16.2 in.	20.0 in.	3.8 in.
	B	15.3 in.	20.0 in.	4.7 in.
Run 2		Inlet	Outlet	^p
	A	15.0 in	20.0 in.	5.0 in.
	B	16.0 in.	20.0 in.	4.0 in.
Run 3		Inlet	Outlet	^p
	A	15.3 in.	20.0 in.	4.7 in.
	B	16.3 in.	20.0 in.	3.7 in.

Normal Operating: Less than 6.0 inches

Gas Recirculation: N/A

Run 1		Amps	Flow
	A		
	B		
Run 2		Amps	% Flow
	A		
	B		
Run 3		Amps	% Flow
	A		
	B		

Normal Operating:

General Conditions:
Dust collectors were last inspected 3/23/90.

Date 3-26-91

Tech. S.C. Webb

SAMPLE NOZZLE CALIBRATION

Reference: EPA Method 5

Procedure: Measure the inner diameter of the sampling nozzle to the nearest 0.001 inch. Repeat, until three measurements are made (using different diameters).

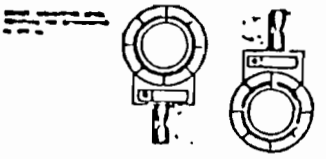
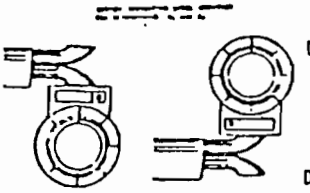
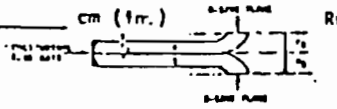
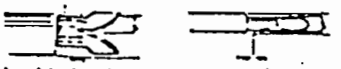
Tolerances: The difference between the high and low values should not exceed 0.004 in.

Nozzle Number	Diam.1 (in.)	Diam.2 (in.)	Diam.3 (in.)	Greatest Difference	Average Diameter
1N	0.249	0.250	0.250	0.001	0.25
2N	0.251	0.250	0.249	0.002	0.25
3N	0.250	0.250	0.250	0.000	0.25
4N	0.249	0.251	0.250	0.002	0.25
5N	0.250	0.249	0.250	0.001	0.25
6N	0.250	0.250	0.250	0.000	0.25

TYPE "S" PITOT TUBE

Inspection (Calibration)

FORM

Parameter	Measurement	Specification	Example	Measurement Instrument
Impact α_1 =	_____	(< 10°)		Degree Indicating level
Static α_2 =	_____	(< 10°)		Degree Indicating level
Static β_1 =	_____	(< 5°)		Degree Indicating level
Impact β_2 =	_____	(< 5°)		Degree Indicating level
γ =	_____	°		Degree Indicating level
θ =	_____	°		Degree Indicating level
$P_A + P_B = A$				
P_A = _____ cm (in.); P_B = _____ cm (in.)				Ruler
A = _____ cm (in.)				
D_T = _____ cm (in.)				Micrometer

Z = A sin γ = _____ cm (in.); limit is < ϕ .32 cm (< 1/8 in. .125)
W = A sin θ = _____ cm in; limit < ϕ.08 cm (< 1/32 in .03125)
Calibration Required yes _____ no _____

Pot No	α_1	α_2	β_1	β_2	γ	θ	P_A	P_B	A	D_T	Z	W	Calibration
2	2	3	2	1	3	1	0.447	0.447	0.894	0.382	0.468	0.016	
1	3	5	4	1	1	0	0.4915	0.4915	0.983	0.403	0.017	0.000	

Pitot Tube Assembly Level

Pitot No	Yes	No
2	✓	
1	✓	

Date: March 26, 1991

Calibrated By: S. C. Webb

Pitot Tube Opening Damaged

Pitot No	Yes	No
2		✓
1		✓

BAROMETER CALIBRATION

Date : 5-29-91

Tech.: H Bale

Laboratory Mercury Column Barometer	30.05	inches Hg.
Aneroid Field Barometer	30.05	inches Hg.
	0.0	Difference

Note: Adjustment will be required if the aneroid is not within 0.1 inches of mercury column barometer.

METER BOX CALIBRATI DATA
(English Unit

Date: 07/11/90

Bar Press 30.10

Standard Dry Gas Meter

Calibrated by: S. C. WEBB

Approx. Manometer Flow Rate cfm	Gas Volume: Wet Test Meter Vw ft³	Gas Volume: Dry Gas Meter Vd ft³	Temperature: Wet Test Meter Ts °F	Temperature: Dry Gas Meter Inlet Tdi °F	Temperature: Dry Gas Meter Outlet Tdo °F	Temperature: Dry Gas Meter Average Td °F	Time θ min	Dry Gas Meter Pressure ^P in. Hg	Flow Rate Q cfm	Meter Coeff. Y ds	Avg Meter Coeff. Y ads
	3.811	3.804	73.0	74.0	72.0	73.0	10.0	0.60	0.380	1.0004	
0.40	3.849	3.843	73.0	74.0	72.0	73.0	10.0	0.60	0.384	1.0001	
	3.863	3.864	73.0	74.0	72.0	73.0	10.0	0.60	0.385	0.9983	0.9996
	6.127	6.134	73.0	74.0	72.0	73.0	10.0	1.10	0.611	0.9962	
0.60	6.114	6.127	73.0	74.0	72.0	73.0	10.0	1.10	0.609	0.9952	
	6.123	6.139	73.0	74.0	70.0	72.0	10.0	1.10	0.610	0.9929	0.9947
	4.207	4.224	73.0	74.0	72.0	73.0	5.0	2.00	0.839	0.9911	
0.80	4.209	4.237	73.0	74.0	72.0	73.0	5.0	2.00	0.839	0.9886	
	4.229	4.249	73.0	74.0	72.0	73.0	5.0	2.00	0.843	0.9905	0.9900
	5.065	5.103	73.0	74.0	72.0	73.0	5.0	2.50	1.010	0.9865	
1.00	5.110	5.166	73.0	74.0	72.0	73.0	5.0	2.50	1.019	0.9832	
	5.080	5.125	73.0	74.0	72.0	73.0	5.0	2.50	1.013	0.9852	0.9850
	6.121	6.260	73.0	74.0	72.0	73.0	5.0	3.50	1.220	0.9695	
1.20	6.172	6.264	73.0	74.0	72.0	73.0	5.0	3.50	1.230	0.9770	
	6.180	6.281	73.0	74.0	72.0	73.0	5.0	3.50	1.232	0.9756	0.9740
									Average		0.9887

$$Q = 17.65 * \frac{Vs}{\theta} * \frac{Pb}{(Ts + 460)}$$

$$Yds = \frac{Vs}{Vd} * \frac{(Td + 460)}{(Ts + 460)} * \frac{Pb}{(Pb + (^P/13.6))}$$

METER BOX CALIBRATION DATA
(English Units)

Date: 01/09/91

Bar.Press.,Pb,in.Hg: 30.19

Standard Meter No. : 954282

Meter Box Number: 2790

Calibrated by: S. Webb

Orific e Manomeer Settin g H in. H2 O	Gas Volume Std Tes Meter Vw 3 ft	Dry Ga Meter Vd 3 ft	Temperature Std Te t Mete Tw o F	Dry Gas Meter Td o F	Time O min	a Yi	b H@i
0.5	6.278	5.978	71.0	93.0	15	1.0807	1.5118
1.0	8.823	8.504	68.0	95.0	15	1.0763	1.5082
2.0	8.052	7.909	68.0	99.0	10	1.0612	1.5981
3.0	9.863	9.589	68.0	99.0	10	1.0695	1.5977
4.0	11.291	10.972	67.5	99.0	10	1.0684	1.6224
5.0	12.601	12.187	68.0	95.0	10	1.0623	1.6431
					Average	1.0697	1.5802

a; $Yi = \frac{(Vw)(Pb)(Td+460)}{(Vd)(Pb+(H/13.6))(Tw+460)}$

Std Test Meter Cal 0.9893

b; $H@i = \frac{0.0317(H)}{(Pb)(Td+460)}[(Tw+460)(O)/Vw]$

Quality Assurance Handbook M8-2.3A (front side)

THERMOCOUPLE CALIBRATION DATA

STANDARD: National Bureau of Standards Thermocouple

REFERENCE: EPA Method 2.

PROCEDURE: Thermocouple and NBS thermocouple are inserted into a thermostatically controlled fluidised bath. Temperature is allowed to stabalize at approximately 300 F. Potentiometer and thermocouple readings are compared.

Tolerence: + or - 1.5% of actual absolute temperature.

Therm. Number	Length (ft)	Ref. Temp (F)	Measu ed Temp (F)	Tolerance Obtained (%)
1	15	290.0	288.0	0.267
2	15	290.0	288.0	0.267
3	15	290.0	289.0	0.133
4	15	290.0	285.0	0.667
5	15	290.0	285.0	0.667
6	15	290.0	287.0	0.400
14	10	290.0	290.0	0.000

Calibrated by: R. R. Righter
Date: 01/02/91

SAMPLE HEAD HOOK-UP THERMOMETERS
CALIBRATION PROCEDURES

Quarterly (two point calibration)

1. Place ASTM thermometer and sample head hook-up thermometer in ic bath, allow time for both to equilibrate. Compare and record readings after they have stabilized.

2. Remove both the ASTM thermometer and sample head hook-up therm ter. Dry off thoroughly and place in a room with constant temperature and humidity. Allow a period of stabilization and record readings.

Acceptance Standard: The test thermometer (sample head hook up) shall be acceptable if both temperatures are within + or - 2 F of the ASTM standard thermometer.

Note: If the thermometer is not within the tolerances, discard and calibrate one which will be satisfactory.

Termo. I.D. No.	Dial Range	Location	Reference Temp. (F) 1	2	Observed Temp. (F) 1	2	Diff. (F) 1	2
A	0-220	SHH-A	36.0	71.0	34.0	69.0	2.0	2.0
B	0-220	SHH-B	36.0	71.0	34.0	70.0	2.0	1.0
C	0-220	SHH-C	36.0	71.0	35.0	69.0	1.0	2.0
D	0-220	SHH-D	36.0	71.0	35.0	72.0	1.0	1.0
E	0-220	SHH-E	36.0	71.0	34.0	69.0	2.0	2.0
F	0-220	SHH-F	36.0	71.0	36.0	70.0	0.0	1.0

Calibrated by: R. R. Righter
Date: 04/02/91

DRY GAS METER THERMOCOUPLE
CALIBRATION PROCEDURES

Annually (two point calibration)

1. Place ASTM thermometer and dry gas meter thermocouple in a hot wat bath with temperature between 100 F - 125 F, allow time for both to equilibrate. Compare and record readings after they have stabilized.

2. Remove both the ASTM thermometer and dry gas meter thermocouple.D Off thoroughly and place in a room with constant temperature and hu midity. Allow a period of stabilization and record readings.

Acceptance Standard: The test thermocouple (dry gas meter) shall be accep table if both temperatures are within + or - 5.4 F of the ASTM standard thermometer.

Note: If the thermocouple is not within the toleranances, discard and calibrate one which will be satisfactory.

Termo. I.D. No.	Loc tion	Reference Temp. (F) 1	2	Observed Temp. (F) 1	2	Diff. (F) 1	2
7	Meter B x # 2790	119.0	66.0	119.0	66.0	0.0	0.0
8	Meter B x # 2790	119.0	66.0	119.0	66.0	0.0	0.0
9	Meter B x # 1151	118.0	66.0	118.0	66.0	0.0	0.0
10	Meter B x # 1151	118.0	66.0	118.0	66.0	0.0	0.0

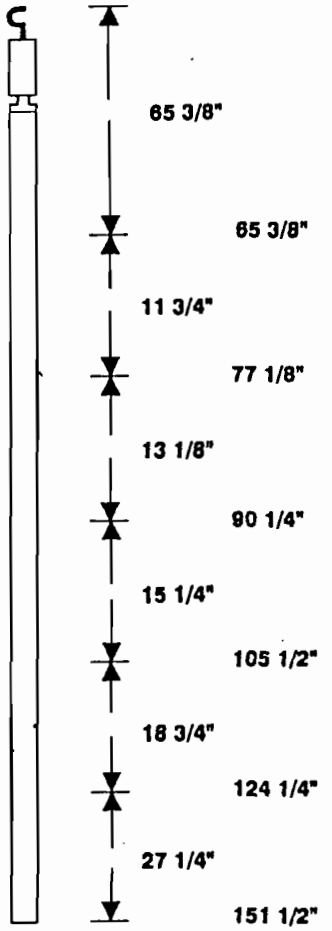
Calibrated by: S.C. Webb
Date: 01/02/91

FLORIDA POWER & LIGHT CO.
PSN UNIT No. 4

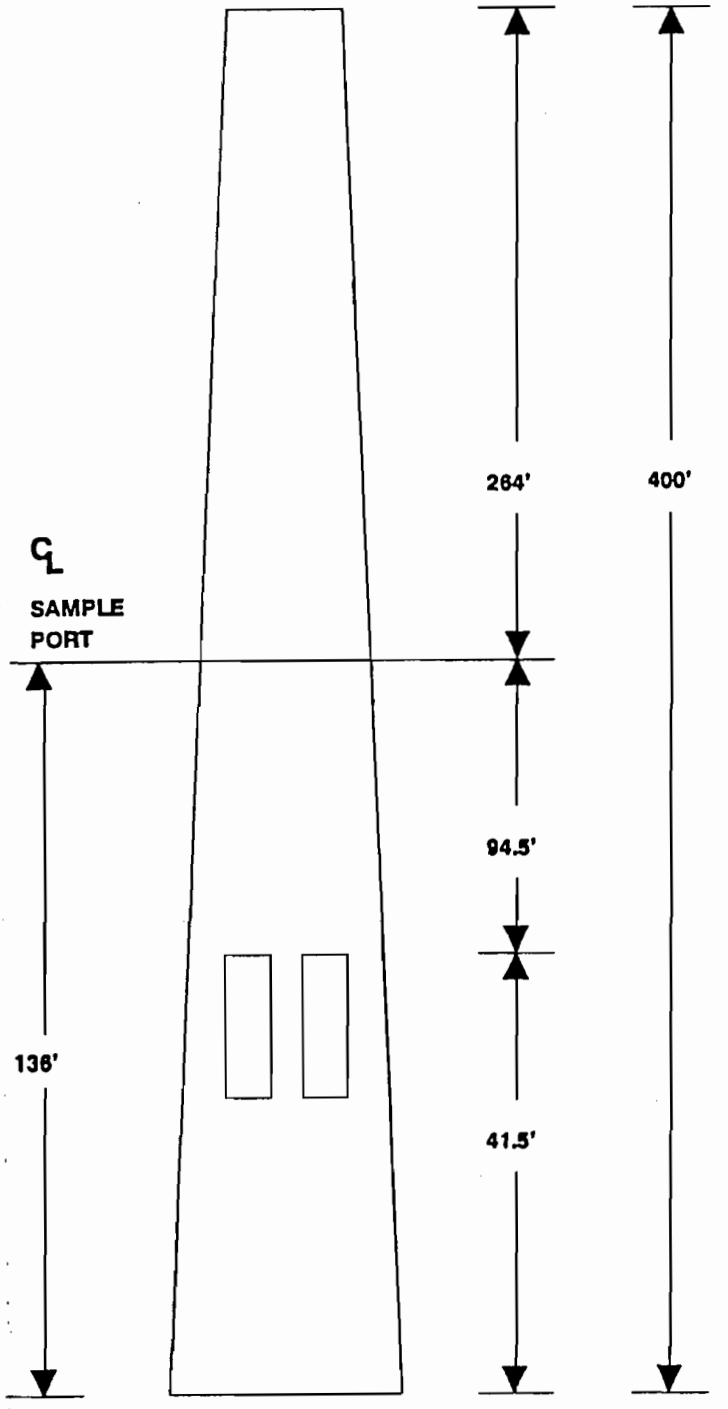
STACK SPECIFICATIONS

SAMPLING DIAMETER: 256.8 in.
SAMPLING AREA: 359.7 sq. ft.
SAMPLING PORT DEPTH: 60.0 in.
No. OF PORTS: 4
No. OF POINTS PER TRAVERSE: 6
TOTAL No. OF POINTS : 24
SAMPLING TIME PER POINT: 2.5 min.
TOTAL SAMPLING TIME: 60.0 min.
NOTE: DRAWING IS NOT TO SCALE

PROBE DIAGRAM



STACK DIAGRAM



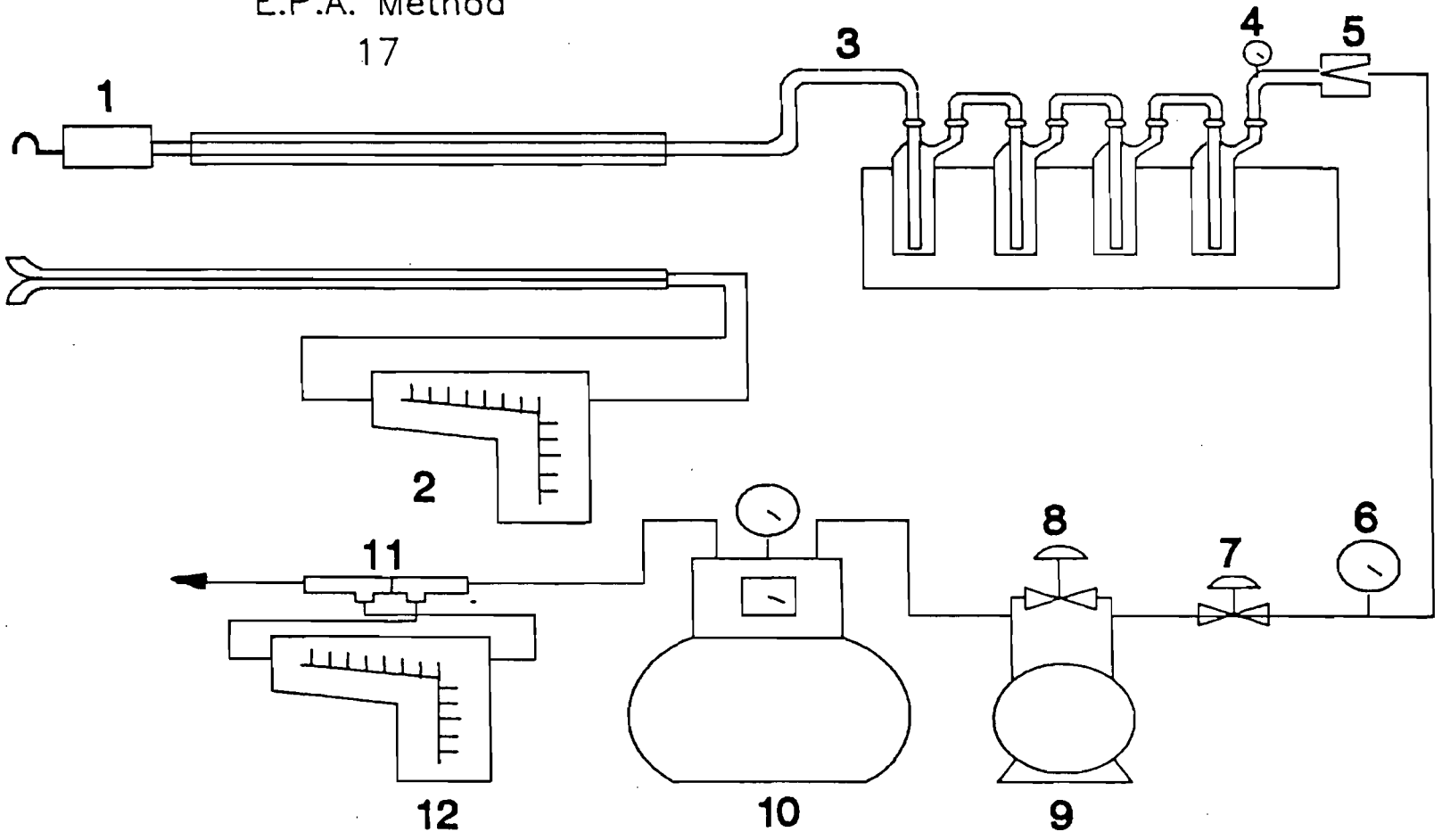
FILE: STACKSN4

R. A. C.

Stacksampler Train

E.P.A. Method

17



1. In – Stack Filter Holder
2. Pitot Manometer
3. Flexible Sample Line
4. Exit Thermometer
5. Check Valve
6. Vacuum Gauge
7. Main Valve
8. By – Pass Valve
9. Vacuum Pump
10. Dry Gas Meter
11. Orifice
12. Orifice Meter

VARIABLES USED IN STACK TEST CALCULATIONS

Vm std	Volume of gas sampled at standard conditions	DSCF
Y	Dry gas meter calibration factor	
Vm	Volume of dry gas sampled at meter conditions	DCF
Pb	Barometric pressure	in. Hg
Pm	Average orifice pressure drop	in. H2O
Tm	Average gas meter temperature	deg. F
Vw gas	Volume of water vapor collected at standard conditions	SCF
Ww	Weight of water collected in impingers	grams
%M	Percent moisture in stack gas	% Volume
Md	Mole fraction of dry gas	
MWd	Molecular weight of stack gas,dry basis	% Volume
%CO2	Percent carbon dioxide in dry stack gas	% Volume
%O2	Percent oxygen in dry stack gas	% Volume
%N2	Percent nitrogen in dry stack gas	% Volume
MW	Molecular weight of stack gas,wet basis	% Volume
Psa	Stack gas static pressure	in Hg. abs
Psg	Stack gas static pressure	in H2O gauge
E	Elevation difference between sampling point and barometer location	ft.
Cp	Pitot tube coefficient	
Vs	Stack gas velocity at stack conditions	fps
Ps	Stack gas velocity head	in. H2O
Ts	Average stack gas temperature	deg. F

Qs	Dry stack gas volumetric flow rate at standard conditions	DSCFM
Qa	Stack gas volumetric flow rate at stack conditions	ACFM
As	Cross sectional area of stack at sampling location	sq. ft.
%I	Percent isokinetic	%
Tt	Net time of test	min.
Dn	Sampling nozzle diameter	in.
F	Combustion gas production rate	SCF/MM BTU
%Gas	Percent of total heat input derived from natural gas	%
Eg	Particulate emission rate	grains/SCF
Mt	Total particulate collected	mg
Eb	Particulate emission rate	lb/MMBTU

STACK TEST CALCULATIONS

1.Volume of dry gas sampled at standard conditions, DSCF

$$Vm_{std} = 17.64\ Vm * Y * \frac{Pb + (Pm/13.6)}{Tm + 460}$$

2.Volume of water vapor at standard conditions, SCF

$$Vw_{gas} = 0.04715 * Ww$$

3.Percent moisture in stack gas

$$\%M = 100 * Vw_{gas} / (Vm_{std} + Vw_{gas})$$

4.Mole fraction dry gas

$$Md = (100 - \%M) / 100$$

5.Percent nitrogen in dry stack gas,% Volume

$$\%N2 = 100 - \%CO2 - \%O2$$

6.Molecular weight of dry stack gas,lb/lb - mole

$$MWd = (\%CO2 * 0.44) + (\%O2 * 0.32) + (\%N2 * 0.28)$$

7.Molecular weight of wet stack gas,lb/lb - mole

$$MW = (MWd * Md) + [18 * (1-Md)]$$

8.Stack gas static pressure, in. Hg abs.

$$Psa = (Psg / 13.6) + Pb - (0.001 * E)$$

9.Stack gas velocity at standard conditions, fps

$$Vs = 85.49 * Cp * \{(Ps)^{1/2}_{avg}\} * \{(Ts + 460)avg/Psa * MW\}^{1/2}$$

10.Stackgas volumetric flow rate at standard conditions,DSCFM

$$Qs = (1058.82 * Vs * As * Md * Psa) / (Ts + 460)$$

11.Stack gas volumetric flow rate at stack conditions,ACFM

$$Qa = 0.05667 * Qs * (Ts + 460) / (Psa * Md)$$

12.Percent isokinetic

$$\%I = \frac{17.326 * Vm_{std} * (Ts + 460) * Vm_{std}}{Vs * Tt * Psa * Md * (Dn)^2}$$

13.Combustion gas production rate, SCF/MMBTU

$$F = 8710 * (\%Gas/100) + 9190 * \{1 - (\% Gas/100)\}$$

14.Particulate emission rate,grains/SCF

$$Eg = 0.01543 * (Mt / Vm_{std})$$

15.Particulate emission rate, lb/MMBTU

$$Eb = F * Eg/7000 * \{20.9/(20.9 - \%O2)\}$$

Please note: Standard conditions are defined as 68 degrees f, and atomspheric pressure of 29.92 in. Hg

CALCULATIONS FOR RUN 1

1. Volume of dry gas sampled at standard conditions, DSCF

$$V_{m_{std}} = 17.64 * 45.877 * 1.0697 * \frac{30.11 + (1.914 / 13.6)}{94.5 + 460}$$

2. Volume of water vapor at standard conditions, SCF

$$V_{m_{gas}} = 0.04715 * 190.5$$

3. Percent moisture in stack gas

$$\%M = 100 * 8.98 / (47.227 + 8.98)$$

4. Mole fraction dry gas

$$Md = (100 - 15.98) / 100$$

5. Percent nitrogen in dry stack gas, lb/lb-mole

$$\%N2 = 100 - 9.90 - 5.50$$

6. Molecular weight of dry stack gas, lb/lb-mole

$$MWd = (9.90 * 0.44) + (5.50 * 0.32) + (84.60 * 0.28)$$

7. Molecular weight of wet stack gas, lb/lb-mole

$$MW = (29.80 * 0.840) + [18 * (1 - 0.84)]$$

8. Stack gas static pressure, in. Hg abs.

$$Psa = (-1.30 * 13.6) + 30.11 - (0.001 * 0.00)$$

9. Stack gas velocity at standard conditions, fps

$$Vs = 85.49 * 0.84 * (0.996) * \left[\frac{(372.1 + 460)}{(30.01 * 27.92)} \right]^{1/2}$$

10. Stack gas volumetric flow rate at standard conditions, DSCFM

$$Qs = \frac{(1058.82 * 71.28 * 359.70 * 0.840 * 30.01)}{(372.1 + 460)}$$

11. Stack gas volumetric flow rate at stack conditions, ACFM

$$Qa = 0.0567 * 822677.3 * (372.1 + 460) / (30.01 * 0.840)$$

12. Percent isokinetic

$$\%\ I = \frac{17.326 * 47.227 * (372.1 + 460)}{71.28 * 60 * 30.01 * 0.840 * (0.25)^2}$$

13. Combustion gas production rate, SCF/MMBTU

F = 8710 *(60.0 / 100) + 9190 *[1-(60.0 / 100)]

14. Particulate emission rate, grains/SCF

Eg = 0.01543 *(269.7 / 47.227)

15. Particulate emission rate, lbs/MMBTU

Eb = 8902 *(0.0881 / 7000)*[20.9 / (20.9 - 5.50)]

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

DRAFT

PERMITTEE:
Fla. Power & Light Co.
P. O. Box 078768
West Palm Beach, FL 33407-0768

Permit Number: AC 64-180842
PSD-FL-150
Expiration Date: June 30, 1992
County: Volusia
Latitude/Longitude: 28°50'31"N
81°19'32"W
Project: Orimulsion Fuel
Test Burn

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

For the construction of test equipment and modification of existing equipment at Sanford Power Plant's Unit 4 in order to burn Orimulsion fuel up to 120 full-capacity equivalent burn days during an 18-month period for the purpose of research and testing. The 1 MWe slipstream pilot test equipment consists of a spray dryer absorber, a reagent preparation system, a pulse jet fabric filter baghouse and a high volume, low pressure pulse jet fabric filter baghouse. The spray dryer is rated for 4500 ACFM and uses slaked lime. The 2.5-5 MWe slipstream pilot test equipment consists of a reverse air/sonic fabric filter baghouse, rated for 14,400 ACFM, a vertical-packed alkalai scrubber rated for 10,800 ACFM, a "SOXAL" reagent regenerator, a regenerated sorbent tank, a spent sorbent tank, and a steam stripper. The boiler is equipped with two air preheaters and two dust collectors. Pilot test streams will exhaust through main stack which will be equipped with continuous opacity, carbon monoxide, nitrogen oxide, and sulfur dioxide monitors. Pilot streams will be equipped with SO_2 monitors and will also be sampled for particulate matter.

The UTM coordinates are 17-468.3 km East and 3190.3 km North. The unit is located at Lake Monroe off U.S. Highway 17-92.

The source shall be constructed in accordance with the permit application, plans, documents, amendments and drawings, except as otherwise noted in the General and Specific Conditions.

Attachments are listed below:

1. FP&L's petition received April 2, 1990.
2. EPA's letter dated May 22, 1990.

GENERAL CONDITIONS:

Attachments Continued:

3. FP&L's application received May 22, 1990.
4. William Green's letter dated June 13, 1990.
5. DER's letter dated June 20, 1990.
6. DER's letter dated June 21, 1990.
7. FP&L's additional information received June 25, 1990.
8. EPA's letter dated June 26, 1990.
9. DER's letter dated June 28, 1990.
10. EPA's letter dated July 2, 1990.
11. FP&L's additional information received July 11, 1990.
12. FP&L's additional information received July 16, 1990.
13. FP&L's additional information received July 20, 1990.
14. FP&L's additional information received August 1, 1990.

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.

GENERAL CONDITIONS:

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant 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.

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or 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 proscribed 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 Rules 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. 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.

GENERAL CONDITIONS:

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.

14. 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.

15. This permit also constitutes Determination of Prevention of Significant Deterioration (PSD).

SPECIFIC CONDITIONS:

1. Heat Input Rate:

The permitted heat input rate for this source is 4,050 MMBtu/hr.

2. Permitted Fuels:

Unit 4 shall be fired with Orimulsion Fuel, No. 6 Residual Oil, No. 2 Fuel Oil, or Natural Gas only. Units 3 and 5 shall be fired with Natural Gas or Fuel Oil with one percent sulfur content (by weight) or less only. This condition amends previously existing conditions in operating permits AO 64-131230 and AO 64-132060.

3. Source Emission Limiting Standards:

a) Particulate Matter: Steady-state - 0.3 lb/MMBtu; Excess emissions for soot-blowing and load changes not to exceed 3 hours per 24-hours period - 0.6 lb/MMBtu.

b) Paritculate Matter with diameter $\leq$ 10 um (PM_{10}): Steady-state - 0.3 lb/MMBtu; Excess emissions for soot-blowing and load changes not to exceed 3 hours per 24-hour period - 0.6 lb/MMBtu.

c) Sulfur Dioxide: 4.3 lb/MMBtu

d) Visible Emissions: Steady-state - 60% opacity; Excess emissions for soot-blowing or load changes not to exceed 3 hours per 24-hour period - 100% opacity.

4. Source Emission Monitoring:

Continuous emission monitors for emissions of carbon monoxide (CO), nitrogen oxides (NOx), sulfur dioxide (SO_2) and opacity shall be operating at the start-up of burning Orimulsion fuel and shall remain in operation throughout the duration of the test project period regardless of what type of fuel is being burned.

5. Compliance Stack Test Requirements:

a) Particulate Matter: EPA Test Method 5 or 17 (40 CFR 60 Appendix A) shall be used to conduct eight 3-run steady-state tests and two 3-run soot-blowing tests. The first steady-state test shall be conducted within one week of start-up of burning Orimulsion Fuel.

b) Sulfur Dioxide: EPA Test Method 6C (40 CFR 60, Appendix A) shall be used to conduct eight 3-run steady-state tests and two 3-run soot-blowing tests.

c) Visible Emissions: Opacity CEM

6. Research Testing Requirements:

a) Sulfuric Acid Mist: EPA Test Method 8 (40 CFR 60, Appendix A) shall be used to conduct one 3-run steady-state test.

b) Nitrogen Oxides (NOx): EPA Test Method 7E (40 CFR 60, Appendix A) shall be used to conduct eight 3-run steady state tests and two 3-run soot-blowing tests.

c) Volatile Organic Compounds (VOC): EPA Test Method 25A (40 CFR 60, Appendix A) shall be used to conduct eight 3-run steady-state tests and two 3-run soot-blowing tests.

d) Trace elements and metals which shall include at least the following: mercury, vanadium pentoxide fumes, chromium, cadmium, arsenic, nickel, maganese, beryllium, copper, zinc, lead, selenium, phosphorous, thallium, silver, antimony, and barium. For mercury, EPA Test Method 101 (40 CFR 61, Appendix B) shall be used to conduct one 3-run steady-state test. For vanadium pentoxide fumes the method from the NIOSH Manual of Analytical Methods, or equivalent method, shall be used. For the remaining elements and metals, the EMTIC Interim Test Method shall be used to conduct one 3-run steady-state test.

7. Testing Related Requirements:

a) Notification of scheduled test dates shall be given to the Department at least 15 days prior to testing unless otherwise agreed to by the Department (17-2.700(2)(a)9., F.A.C.

b) Testing of trace elements & metals, and sulfuric acid mist shall be conducted with the source operating within 10% of its full capacity.

c) At least one 3-run test for particulate matter, sulfur dioxide, nitrogen oxides, and volatile organic compounds shall be conducted with the source operating within 10% of its full capacity.

d) The stack sampling facility must comply with Rule 17-2.700(4), F.A.C.

e) Results obtained from the test burn shall be reported monthly to the Department. The monthly reports shall include but not be limited to:

i. Orimulsion and any other fuel usage (recorded in barrels, MMBtu, and number of days burned),

ii. Number of full power test days during the month,

iii. Characteristics of Orimulsion and any other fuel used during the month (percent sulfur, heating value, and percent ash). This includes fuel used for Units 3 and 5,

iv. Copies of emission test results for stack and pilot test streams,

v. Opacity records, and

vi. Frequency of excess emission.

Monthly reports shall be submitted to the Bureau of Air Regulation and the Central Florida District office within 21 days following the end of the month. Stack emission test results shall be submitted no later than 45 days after the last run when a 3-run test is completed.

8. Local Requirements:

This permit does not preclude compliance with any applicable local permitting requirements and regulations.

9. Test Length:

The testing of Orimulsion fuel shall be allowed for 90 full-capacity equivalent burn days. With permission from the Department, an additional 30 full-capacity equivalent burn days may be allowed to complete testing if necessary.

10. Permit Renewal:

While effective, this permit supercedes existing permit No. AO 64-132055. This permit shall not be renewed or extended. When it expires only permit AO 64-132055 shall be effective.

Issued this _____ day
of _____, 1990

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

_____
Dale Twachtmann, Secretary