Florida Power
CORPORATION

August 27, 1999

Mr. Scott M. Sheplak, P.E.
Bureau of Air Regulation
Florida Department of Environmental Protection
2600 Blair Stone Rd.
Tallahassee, Florida 32399-2400

Dear Mr. Sheplak:

Re: Florida Power Corporation Hines Energy Complex, Polk County
Initial Title V Permit; DEP File No. 1050234-AV

Florida Power Corporation (FPC) is in receipt of a letter from the Department, dated March 9, 1999, acknowledging receipt of the above-referenced application. The Department's letter requests additional information in order to continue with the processing of a Title V permit for FPC's Hines facility. FPC had previously requested additional time to respond due to the reasons stated below. This letter serves to provide the requested information.

The initial compliance testing was not yet complete at the time that the application for a Title V permit was submitted. FPC has attached a summary of emission test results for the two combustion turbines (on both fuel oil and natural gas) and the auxiliary boiler. These summaries are included as Attachment HEC-EU1-L5. The complete test reports were transmitted to the Department's Tallahassee office on May 14, 1999. In addition, information is attached regarding Title VI applicability (Attachment HEC-FE-8) and a description of storage tanks onsite (Attachment HEC-EU5-B6).

In addition, recall that on May 27, 1999, the Department issued a revision to the original construction permit. This revision allowed for a higher heat input limit and a longer period of allowable time for excess emissions due to start-ups. A copy of the permit revision is attached (Attachment HEC-FE-11- Additional Applicable Requirements), as well as revised permit application sheets to reflect these changes.

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P.O. Box 14042 • St. Petersburg, Florida 33733-4042 • (727) 820-5151
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The Department has indicated that FPC should evaluate the applicability of the CAM rule (40 CFR Part 64) to these particular units. Based on a review of the rule's applicability criteria, FPC believes that these units are exempt from the CAM rule. Specifically, the pollutant for which the control device was intended is continuously monitored. Therefore, the monitoring of surrogate parameters for compliance determination isn't necessary.

Due to the nature of the information requested by the Department, this transmittal has been certified by FPC's Responsible Official, Mr W. Jeffrey Pardue. In addition, a P.E. certification statement has been prepared by Ms. Jennifer Tillman, and accompanies this transmittal.

If you should have any questions, please do not hesitate to contact me at (727) 826-4258.

Sincerely,

Scott H. Osbourn
Senior Environmental Engineer

Attachments

cc: Mike Halpin, DEP Tallahassee
Jerry Kissel, DEP SW District
Robert Manning, HGS&S

Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official:

   W. Jeffrey Pardue, C.E.P.
   Director, Environmental Services

2. Owner/Authorized Representative or Responsible Official Mailing Address:

   Organization/Firm: Florida Power Corporation
   Street Address: P.O. Box 14042, MAC BB1A
   City: St. Petersburg State: FL Zip Code: 33733

3. Owner/Authorized Representative or Responsible Official Telephone Numbers:
   Telephone: (727) 826 - 4301 Fax: (727) 826 - 4216

4. Owner/Authorized Representative or Responsible Official Statement:

   I, the undersigned, am the owner or authorized representative of the non-Title V source addressed in this Application for Air Permit or the responsible official, as defined in Rule 62-210.200, F.A.C., of the Title V source addressed in this application, whichever is applicable. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions unit.*

Signature 8/27/99
Date

* Attach letter of authorization if not currently on file.

Florida
Power
CORPORATION

Kenneth E. Armstrong
Vice President and General Counsel

March 31, 1998

TO WHOM IT MAY CONCERN:

Subject: Letter of Authorization

Please be advised that W. Jeffrey Pardue, Director, Environmental Services Department; Sharon K. Momberg, Manager of Waste Management Programs; Kent D. Hedrick, Manager of Water Programs; and J. Michael Kennedy, Manager of Air Programs, are authorized to represent Florida Power Corporation in matters relating to necessary permits and reporting documentation required from regulatory authorities in the areas of air, water, power plant site certifications and transmission line certifications, or hazardous and solid materials issues.

Very truly yours,

Kenneth E. Armstrong

Kenneth E. Armstrong

K:\KEA\MISC\pardue.esd

3201 34th Street South (33711) · P.O. Box 14042 (33733) · St. Petersburg, Florida · (813) 866-5153 · FAX (813) 866-4881
A Florida Progress Company

4. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this Application for Air Permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

If the purpose of this application is to obtain a Title V source air operation permit (check here [✓] if so), I further certify that each emissions unit described in this Application for Air Permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance schedule is submitted with this application.

If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [ ] if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

If the purpose of this application is to obtain an initial air operation permit or operation permit revision for one or more newly constructed or modified emissions units (check here [ ] if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

Jennifer A. Gillman 8/27/99

Signature Date

(seal)

Attach any exception to certification statement.

C. EMISSIONS UNIT DETAIL INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Details

1. Initial Startup Date:	
2. Long-term Reserve Shutdown Date:	
3. Package Unit: Manufacturer: Westinghouse	Model Number: 501F
4. Generator Nameplate Rating: 170 MW	
5. Incinerator Information: Dwell Temperature:	°F
Dwell Time:	seconds
Incinerator Afterburner Temperature:	°F

Emissions Unit Operating Capacity

1. Maximum Heat Input Rate:		1,866	mmBtu/hr
2. Maximum Incineration Rate:	lbs/hr		tons/day
3. Maximum Process or Throughput Rate:			
4. Maximum Production Rate:			

5. Operating Capacity Comment (limit to 200 characters):

Heat input is HHV; heat input at 59 degree F turbine inlet temperature; MW nominal rating. Heat input for oil is 1,999 MMBtu/hr at 59 degrees F (HHV).

Emissions Unit Operating Schedule

1. Requested Maximum Operating Schedule:

	hours/day		days/week
	weeks/yr	8,760	hours/yr

F. SEGMENT (PROCESS/FUEL) INFORMATION
(Regulated and Unregulated Emissions Units)

Segment Description and Rate: Segment 1 of 2

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters):

Natural Gas

2. Source Classification Code (SCC):

2-01-002-01

3. SCC Units:

Million Cubic Feet

4. Maximum Hourly Rate:	5. Maximum Annual Rate:
1.78	15,568

6. Estimated Annual Activity Factor:

7. Maximum Percent Sulfur:	8. Maximum Percent Ash:

9. Million Btu per SCC Unit:

1,050

10. Segment Comment (limit to 200 characters):

Based on 1,050 BTU/CF (HHV); maximum hourly and annual at 59 degrees F; turbine inlet temperatures.

Segment Description and Rate: Segment 2 of 2

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): Distillate Fuel Oil	
2. Source Classification Code (SCC): 2-01-001-01	
3. SCC Units: 1,000 Gallons Used	
4. Maximum Hourly Rate: 15.5	5. Maximum Annual Rate: 6,881
6. Estimated Annual Activity Factor:	
7. Maximum Percent Sulfur: 0.05	8. Maximum Percent Ash:
9. Million Btu per SCC Unit: 129	
10. Segment Comment (limit to 200 characters): BTU based on HHV of 129 MMBtu/1,000 gallons. Aggregate fuel usage of 13,762,806 gallons per year authorized for Power Block 1	

C. EMISSIONS UNIT DETAIL INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Details

1. Initial Startup Date:	
2. Long-term Reserve Shutdown Date:	
3. Package Unit: Manufacturer: Westinghouse	Model Number: 501F
4. Generator Nameplate Rating: 170 MW	
5. Incinerator Information:	
Dwell Temperature:	°F
Dwell Time:	seconds
Incinerator Afterburner Temperature:	°F

Emissions Unit Operating Capacity

1. Maximum Heat Input Rate:	1,866	mmBtu/hr
2. Maximum Incineration Rate:	lbs/hr	tons/day
3. Maximum Process or Throughput Rate:		
4. Maximum Production Rate:		
5. Operating Capacity Comment (limit to 200 characters):		

Heat input is HHV; heat input at 59 degree F turbine inlet temperature; MW nominal rating. Heat input for oil is 1,999 MMBtu/hr at 59 degrees F (HHV).

Emissions Unit Operating Schedule

1. Requested Maximum Operating Schedule:

	hours/day		days/week
	weeks/yr	8,760	hours/yr

F. SEGMENT (PROCESS/FUEL) INFORMATION
(Regulated and Unregulated Emissions Units)

Segment Description and Rate: Segment 1 of 2

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters):

   Natural Gas

2. Source Classification Code (SCC): 2-01-002-01

3. SCC Units: Million Cubic Feet

4. Maximum Hourly Rate:	5. Maximum Annual Rate:
1.78	15,568

6. Estimated Annual Activity Factor:

7. Maximum Percent Sulfur:	8. Maximum Percent Ash:

9. Million Btu per SCC Unit: 1,050

10. Segment Comment (limit to 200 characters):

    Based on 1,050 BTU/CF (HHV); maximum hourly and annual at 59 degrees F; turbine inlet temperatures.

Segment Description and Rate: Segment 2 of 2

1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **Distillate Fuel Oil**	
2. Source Classification Code (SCC): **2-01-001-01**	
3. SCC Units: **1,000 Gallons Used**	
4. Maximum Hourly Rate: **15.5**	5. Maximum Annual Rate: **6,881**
6. Estimated Annual Activity Factor:	
7. Maximum Percent Sulfur: **0.05**	8. Maximum Percent Ash:
9. Million Btu per SCC Unit: **129**	
10. Segment Comment (limit to 200 characters): **BTU based on HHV of 129 MMBtu/1,000 gallons. Aggregate fuel usage of 13,762,806 gallons per year authorized for Power Block 1**	

ATTACHMENT HEC-FE-11

ADDITIONAL APPLICABLE REQUIREMENTS

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF FINAL PERMIT

In the Matter of an
Application for Permit by:

Florida Power Corporation
One Power Plaza
263 13th Avenue South
St. Petersburg, Florida 33701

DEP File No.1050234-002-AC, PSD-FL-195A
Hines Energy Complex Power Block 1
Polk County

Enclosed is Final Permit Number 1050234-002-AC. This permit authorizes Florida Power Corporation to operate the Hines Energy Complex with increased heat inputs, megawatt ratings and startup times. This permit is issued pursuant to Chapter 403, Florida Statutes.

Any party to this order has the right to seek judicial review of it under section 120.68 of the Florida Statutes, by filing a notice of appeal under rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department of Environmental Protection in the Office of General Counsel, Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The notice must be filed within thirty days after this order is filed with the clerk of the Department.

Executed in Tallahassee, Florida.

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

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this Notice of Final Permit (including the Final permit) was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 5-27-99 to the person(s) listed:

Mr. Jeffrey Pardue, Florida Power Corporation *
Ms. Jennifer Tillman, P.E., Florida Power Corporation *
Bill Thomas, P.E., DEP-SWD
Mr. Gregg Worley, EPA
Mr. John Bunyak, NPS

Clerk Stamp

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

(Clerk) 5-27-99 (Date)

FINAL DETERMINATION

Florida Power Corporation
Hines Energy Complex
DEP File No. 1050234-002-AC, PSD-FL-195A

The Department distributed a public notice package on May 10, 1999 to allow the applicant to modify its permit at the Hines Energy Complex located in Polk County. The Public Notice of Intent to Issue was published in the Lakeland Ledger on May 12, 1999.

COMMENTS/CHANGES

No comments were received by the Department from the public.

No comments were received from the EPA.

Comments were received from the applicant by electronic correspondence dated May 25, 1999.

A meeting was held on May 26, 1999 between the Department, the applicant's representatives to discuss the comments. These comments were minor in nature, representing only a clarification of the applicant's request.

The Department determined that minor corrections or changes must be made to the draft permit text to clarify the original requirements. The corrections or changes are summarized below.

Specific Condition B.3.: A description was provided for a warm start along with the corresponding startup requirements.

CONCLUSION

The final action of the Department is to issue the permit with the changes described above.

Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

May 27, 1999

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. W. Jeffrey Pardue
Director, Environmental Services
FPC -Hines Energy Complex
One Power Plaza
263 13th Avenue South
St. Petersburg, Florida 33701

Re: DEP File No. PSD-FL-195A; Modification of Permit No. PSD-FL-195A
Hines Energy Complex / Polk County

The applicant, Florida Power Corporation, applied on May 4, 1999, to the Department for a modification to air construction permit number PSD-FL-195A for its Hines Energy Complex located in Polk, County. The modification is to allow the facility to utilize the fully installed capacity of the combined cycle units by modifying the maximum heat input ratings and maximum megawatt ratings. Additionally, testing has shown that the allotted startup time of 2 hours is inadequate for warm and cold starts and increased times are requested. The Department has reviewed the modification request. The referenced permit is hereby modified as follows:

Permit Cover Letter: Multiple changes. A revised cover letter is included for clarity following the Specific Condition changes below.

Specific Condition Introductory text changes as follow:

From: The construction and operation of the Hines Energy Complex (Project) shall be in accordance with all applicable provisions of Chapters 62-210 to 297, F.A.C. and NSPS Subparts GG, Dc, and Kb. The following emission limitations and conditions reflect BACT determinations for the Power Block 1- 485 MW (two combined cycle combustion turbines and auxiliary equipment) of generating capacity for which the need has been determined. BACT determinations for the remaining phases will be made upon review of supplemental applications. In addition to the foregoing, the Project shall comply with the following conditions of certification as indicated.

To: The construction and operation of the Hines Energy Complex (Project) shall be in accordance with all applicable provisions of Chapters 62-210 to 297, F.A.C. and NSPS Subparts GG, Dc, and Kb. The following emission limitations and conditions reflect BACT determinations for the Power Block 1- 500 MW (two combined cycle combustion turbines and auxiliary equipment) of generating capacity for which the need has been determined. BACT determinations for the remaining phases will be made upon review of supplemental applications. In addition to the foregoing, the Project shall comply with the following conditions of certification as indicated.

Specific Condition A.1.

From: The maximum heat input (HHV) to each combustion turbine (CT) at an ambient temperature of 59° F shall neither exceed 1,757 MMBtu/hr while firing natural gas, nor 1,846 MMBtu/hr while firing fuel oil. Heat input may vary depending on ambient conditions and the CT characteristics. Manufacturer's curves or equations for correction to other temperatures shall be provided to DEP for review 90 days after selection of the CT. Subject to approval by the Department for technical validity applying sound engineering principles, the manufacturer's curves shall be used to establish heat input rates over a range of temperatures for the purpose of compliance determination.

To: The maximum heat input (HHV) to each combustion turbine (CT) at an ambient temperature of 59° F shall neither exceed 1,866 MMBtu/hr while firing natural gas, nor 1,999 MMBtu/hr while firing fuel oil. Heat input may vary depending on ambient conditions and the CT characteristics. Manufacturer's curves or equations for correction to other temperatures shall be provided to DEP for review 90 days after selection of the CT. Subject to approval by the Department for technical validity applying sound engineering principles, the manufacturer's curves shall be used to establish heat input rates over a range of temperatures for the purpose of compliance determination.

Specific Condition A.8.

From: If site construction does not commence on Power Block 1 (485 MW)within 18 months of issuance of this permit, then FPC may request an extension of the 18-month period, provided that such request is received by the Department's Bureau of Air Regulation at least 90 days prior to the expiration date. Such a request shall identify the progress made toward commencement of the construction of the site and the expected time required to start and complete construction of the initial phase. The Department may grant the extension upon a satisfactory showing that the extension is justified.

To: If site construction does not commence on Power Block 1 (500 MW) within 18 months of issuance of this permit, then FPC may request an extension of the 18-month period, provided that such request is received by the Department's Bureau of Air Regulation at least 90 days prior to the expiration date. Such a request shall identify the progress made toward commencement of the construction of the site and the expected time required to start and complete construction of the initial phase. The Department may grant the extension upon a satisfactory showing that the extension is justified.

Specific Condition B.3.

From: Excess emissions from a turbine resulting from start up, shutdown, malfunction, or load change shall be acceptable providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized but in no case exceed two hours in any 24 hour period unless specifically authorized by the Department for a longer duration. The permittee shall provide a general description of the procedures to be followed during periods of start up, shutdown, malfunction, or load change to ensure that the best operational practices to minimize emissions will be adhered to and the duration of any excess emissions will be minimized. The description should be submitted to the Department along with the initial compliance test data. The description may be updated as needed by submitting such update to the Department within thirty (30) days of implementation.

To: Excess emissions resulting from startup, shutdown, or malfunction shall be permitted provided that best operational practices are adhered to and the duration of excess emissions shall be minimized. Excess emissions occurrences shall in no case exceed two hours in any 24-hour period except in the event that the steam turbine has been shut down for 8 hours or more. During a cold start-up to combined cycle operation, up to four hours of excess emissions are allowed in a 24-hour period. Cold start-up is defined as a startup to combined cycle operation following a steam turbine shutdown lasting at least 48 hours. During a warm start-up to combined cycle operation, up to three hours of excess emissions are allowed in a 24-hour period. Warm start-up is defined as a startup to combined cycle operation following a steam turbine shutdown lasting at least 8 hours. [Applicant Request, Vendor Combined Cycle Startup Curves Data and Rule 62-210.700, F.A.C.].

A copy of this letter shall be filed with the referenced permit and shall become part of the permit. This permit modification is issued pursuant to Chapter 403, Florida Statutes.

Any party to this order (permit modification) has the right to seek judicial review of it under Section 120.68, F.S., by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department of Environmental Protection in the Office of General Counsel, Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The notice must be filed within thirty days after this order is filed with the clerk of the Department.

Executed in Tallahassee, Florida.

Howard L. Rhodes, Director
Division of Air Resources
Management

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this permit modification was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 5-27-99 to the person(s) listed:

W. Jeffrey Pardue, Florida Power Corporation *
Jennifer Tillman, P.E., Florida Power Corporation *
Doug Neely, EPA
John Bunyak, NPS
Bill Thomas, P.E., DEP-SWD
Mr. Gregg Worley, EPA

Clerk Stamp

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

Kuyi Jaber (Clerk) 5-27-99 (Date)

PERMITTEE:
Florida Power Corporation
3201 34th Street South
St. Petersburg, FL 33733

Permit Number:	**PSD-FL-195A/PA-92-33**
Issued:	**3/1/94 Revised: 5/11/99**
Expiration Date:	**November 1, 2000**
County:	**Polk**
Latitude/Longitude:	**27°47'19"N/81°52'10"W**
Project:	**500 MW Combined Cycle**

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 62-212 and 62-4. 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 specifically described as follows:

For two combined cycle combustion turbines (CTs) with maximum allowable heat input based on the higher heating value (HHV) at 59°F of 1,866 MMBtu/hr/unit (natural gas) and 1,999 MMBtu/hr/unit (oil) to be located at the Hines Energy Complex near Fort Meade, Florida. Power Block 1 consists of two combined cycle combustion turbines for a total of 500 MW, a 99 MMBtu/hr auxiliary boiler (Subpart Dc), a 1,300 kW diesel generator and a 97,570 barrel fuel oil storage tank (Subpart Kb). The combustion turbines are Westinghouse Model 501FC or equivalent and rated at approximately 165 MW in simple cycle and equipped with dry low NO_X combustors and/or Selective Catalytic Reduction (SCR) for natural gas firing and wet injection for fuel oil firing. Each combustion turbine will incorporate an unfired heat recovery steam generator.

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.

Howard L. Rhodes, Director
Division of Air Resources
Management

Relevant documents are listed below:

1. FPC application received August 4, 1992 and revision received May 4, 1999.
2. The Department's letters dated August 31 and November 13, 1992.
3. FPC's letters dated October 13 and November 30, 1992; June 27 and September 9, 1996; February 18 and June 30, 1998; and the SCR Technical Specification received August 3, 1998.
4. Westinghouse 501FC tables or curves showing Heat Input vs. Compressor Inlet Temperature and Nitrogen Oxide Emissions vs. Compressor Inlet Temperature shall be attachments to and are part of this permit.

(The Hines/AIR/Permit

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF FINAL PERMIT MODIFICATION

In the Matter of an
Application for Permit Modification

Mr. W. Jeffrey Pardue
Director of Environmental Services Dept.
Florida Power Corporation
3201 34th Street South
St. Petersburg, Florida 33733

Permit: PSD-FL-195A / PA-92-33

Enclosed is the Final Permit Modification which reflects the use of SCR and the technical specifications of the new Westinghouse combined cycle combustion turbines. This permit is issued pursuant to Chapter 403, Florida Statutes and 62-4 through 297 F.A.C and 40 CFR 52.21-Prevention of Significant Deterioration (PSD).

Any party to this order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, F.S., by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Legal Office; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 (thirty) days from the date this Notice is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

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

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF FINAL PERMIT (including the FINAL permit) was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 9-29-98 to the person(s) listed:

Mr. W Jeffrey Pardue *
Mr. Doug Neeley, EPA
Mr. John Bunyak, NPS
Mr. Bill Thomas, SWD
Mr. Hamilton Oven, OSC

Clerk Stamp

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

(Clerk) 9-29-98 (Date)

FINAL DETERMINATION

Florida Power Corporation

Permit Modification for Westinghouse CTs with SCR and Other Changes
Hines Energy Complex
Combined Cycle Project
Power Block 1

Polk County

Construction Permit No. PSD-FL-195A / PA-92-33

Florida Power Corporation submitted an application to modify permit No. PSD-FL-195 to install a Selective Catalytic Reduction (SCR) system and to reflect the technical specifications of the combustion turbines installed at its Combined Cycle Facility located near Fort Meade, Polk County.

No comments were received during the public notice period. With this action the Department modifies the construction permit in accordance with the Intent To Issue PSD Permit Modification with the following minor changes:

1. The custom fuel monitoring schedule has been revised to reflect recent guidance from EPA.
2. Minor clarifications were made to certain Specific Conditions regarding testing.

Department of Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

PERMITTEE:
Florida Power Corporation
3201 34th Street South
St. Petersburg, FL 33733

Permit Number: PSD-FL-195A/PA-92-33
Issued: 3/1/94 **Revised:** 9/28/98
Expiration Date: November 1, 2000
County: Polk
Latitude/Longitude: 27°47'19"N/81°52'10"W
Project: 485 MW Combined Cycle

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 62-212 and 62-4. 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 specifically described as follows:

For two combined cycle combustion turbines (CTs) with maximum allowable heat input based on the higher heating value (HHV) at 59°F of 1,757 MMBtu/hr/unit (natural gas) and 1,846 MMBtu/hr/unit (oil) to be located at the Hines Energy Complex near Fort Meade, Florida. Power Block 1 consists of two combined cycle combustion turbines for a total of 485 MW, a 99 MMBtu/hr auxiliary boiler(Subpart Dc), a 1,300 KW diesel generator and a 97,570 barrel fuel oil storage tank(Subpart Kb). The combustion turbines are Westinghouse Model 501FC or equivalent and rated at approximately 165 MW in simple cycle and equipped with dry low NO_X combustors and/or Selective Catalytic Reduction (SCR) for natural gas firing and wet injection for fuel oil firing. Each combustion turbine will incorporate an unfired heat recovery steam generator.

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.

Howard L. Rhodes, Director
Division of Air Resources Management

Relevant documents are listed below:

1. Florida Power Corporation (FPC) application received August 4, 1992.
2. The Department's letters dated August 31 and November 13, 1992.
3. FPC's letters dated October 13 and November 30, 1992; June 27 and September 9, 1996; February 18 and June 30, 1998; and the SCR Technical Specification received August 3, 1998.

4. Westinghouse 501FC tables or curves showing Heat Input vs. Compressor Inlet Temperature and Nitrogen Oxide Emissions vs Compressor Inlet Temperature shall be attachments to and are part of this permit.

GENERAL CONDITIONS:

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

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

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

   The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

10. The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 62-4.120 and 62-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

12. This permit or a copy thereof shall be kept at the work site of the permitted activity.

13. This permit also constitutes:

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

14. The permittee shall comply with the following:
    a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.
    b. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.
    c. Records of monitoring information shall include:
       - the date, exact place, and time of sampling or measurements;
       - the person responsible for performing the sampling or measurements;

- the dates analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

15. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

16. Circumvention. No person shall circumvent any air pollution control device, or allow the emission of air pollutants without the applicable air pollution control device operating properly pursuant to Rule 62-210.650 F.A.C.

SPECIFIC CONDITIONS:

The construction and operation of the Hines Energy Complex (Project) shall be in accordance with all applicable provisions of Chapters 62-210 to 297, F.A.C. and NSPS Subparts GG, Dc, and Kb. The following emission limitations and conditions reflect BACT determinations for the Power Block 1- 485 MW (two combined cycle combustion turbines and auxiliary equipment) of generating capacity for which the need has been determined. BACT determinations for the remaining phases will be made upon review of supplemental applications. In addition to the foregoing, the Project shall comply with the following conditions of certification as indicated.

A. General Requirements

1. The maximum heat input (HHV) to each combustion turbine (CT) at an ambient temperature of 59° F shall neither exceed 1,757 MMBtu/hr while firing natural gas, nor 1,846 MMBtu/hr while firing fuel oil. Heat input may vary depending on ambient conditions and the CT characteristics. Manufacturer's curves or equations for correction to other temperatures shall be provided to DEP for review 90 days after selection of the CT. Subject to approval by the Department for technical validity applying sound engineering principles, the manufacturer's curves shall be used to establish heat input rates over a range of temperatures for the purpose of compliance determination.

2. Each of the two CTs in Power Block 1 may operate continuously, i.e., 8,760 hrs/year.

3. Only natural gas (NG) or low sulfur fuel oil shall be fired in each combustion turbine. Only low sulfur fuel oil shall be fired in the diesel generator. The maximum sulfur content of the low sulfur fuel oil shall not exceed 0.05 percent, by weight. Only natural gas shall be fired in the auxiliary boiler.

4. The maximum heat input to the auxiliary boiler shall not exceed 99 MMBtu/hr. Fuel consumption shall be measured and recorded for the auxiliary boiler.

5. The maximum allowable fuel oil consumption for the two turbines is 13,762,806 gallons per year, which is equivalent to an aggregate of 1,000 hours per year of operation at full load.

6. The permittee shall have the option of installing duct module(s) suitable for possible future installation of an oxidation catalyst and/or SCR equipment on each combined cycle generating unit. In the event that the module(s) are not installed in the Heat Recovery Steam Generator (HRSG), the retrofit costs

associated with not making provisions for such technology (initially) shall not be considered in any future economic evaluation to justify not installing SCR or an oxidation catalyst.

7. Fugitive dust emissions during the construction period shall be minimized by covering or watering dust generation areas.

8. If site construction does not commence on Power Block 1 (485 MW)within 18 months of issuance of this permit, then FPC may request an extension of the 18-month period, provided that such request is received by the Department's Bureau of Air Regulation at least 90 days prior to the expiration date. Such a request shall identify the progress made toward commencement of the construction of the site and the expected time required to start and complete construction of the initial phase. The Department may grant the extension upon a satisfactory showing that the extension is justified. Units to be constructed or modified in later phases of the project will be reviewed under the supplementary review process of the Power Plant Siting Act. If site construction has not commenced within 18 months of issuance of this certification, then FPC shall obtain from DEP a review and, if necessary, a modification of the BACT determination and allowable emissions for the unit(s) on which construction has not commenced [40 CFR 52.21(r)(2)].

B. Emission Limits

1. The maximum allowable emissions from each of the two CTs, when firing natural gas or low sulfur fuel oil, in accordance with the BACT determination and subsequent data from Westinghouse, shall not exceed the following(at 59° F reference temperature for NOx emissions) (except during periods of start up, shutdown, malfunction):

EMISSIONS LIMITATIONS

POLLUTANT	FUEL	BASIS(g)	LB/HR/CT	TPY(b)
NO_X(a)	Gas	12 ppmvd (h)	73(i)	639
	Oil	42 ppmvd (c) (h)	305	153
VOC (d)	Gas	7 ppmvw	10.4	91
	Oil	10 ppmvw	19.0	5.6
CO	Gas	25 ppmvd	77	675
	Oil	30 ppmvd	93	47
PM/PM_{10}	Gas		15.6	79
	Oil(e)		44.8	21
SO_2	Gas(f)		4.7	44
	Oil(f)		94	47
Visible Emissions	Gas	10 percent opacity		
	Oil	20 percent opacity		

a. Pollutant emission rates may vary depending on ambient conditions (compressor inlet temperatures)and the CT characteristics. Manufacturer's curves for the NO_X emission rate correction to other temperatures at different loads shall be provided to DEP for review 90 days

after selection of the CT. Subject to approval by the Department for technical validity applying sound engineering principles, the manufacturer's curves shall be used to establish pollutant emission rates over a range of temperatures for the purpose of compliance determination. Emission limitations in LB/HR/CT of NO_X are blocked 24-hour averages (midnight to midnight) and are calculated as follows:

NO_X emissions shall be determined continuously by a Continuous Emissions Monitoring System (CEMS). A CEMS operated and maintained in accordance with 40 CFR 75 shall be used. Compliance with the NO_X emissions standards in the above table shall be demonstrated with this CEMS system based on a 24-hour block average. Based on CEMS data at the end of each operating day, new 24-hour average emission rates, both actual and allowable (based on compressor inlet temperatures) are calculated from the arithmetic average of all valid hourly emission rates during the previous 24 operating hours. Valid hourly emission rates shall not include periods of startup (including fuel switching), shutdown, or malfunction as defined in Rule 62-210.200 where emissions exceed the NO_X standard. These excess emission periods shall be reported as required in Specific Condition E.2.f. A valid hourly emission rate shall be calculated for each hour in which two NO_X and carbon dioxide (or oxygen) concentrations are obtained at least 15 minutes apart. When monitoring data is not available, substitution for missing data shall be handled as required by Title IV (40 CFR 75) to calculate the 24-hour block average.

b. Annual emission limits (TPY) for natural gas are based on a total of two CTs operating at full load 8,760 hours per year (i.e., NO_X - 73 lbs/hr X 2 CTs X 8,760 hrs/yr X 1 ton/2,000 lbs = 639 TPY). Annual emission limits (TPY) for fuel oil are based on full load operation for a total of 1,000 hours per year for the two CTs (i.e., NO_X - 305 lbs/hr X 1,000 hrs/yr X 1 ton/2,000 lbs = 153 TPY).

c. Fuel oil NO_X emissions are based on full load operation and 15 percent oxygen. For fuel oil firing, NO_X levels of 42 ppmvd @ 15 percent O_2 are based on a fuel bound nitrogen content of 0.015 percent or less. The emission limit for NO_X is adjusted as follows for higher fuel nitrogen contents up to a maximum of 0.030 percent by weight:

FUEL BOUND NITROGEN (% BY WEIGHT)	NO_X LEVELS (PPMVD @ 15%O_2)	NO_X EMISSIONS LB/HR/CT	NO_X EMISSIONS TPY
0.015 or less	42	305	153
0.020	44	320	160
0.025	46	334	167
0.030	48	349	175

using the formula STD = 0.0042 + F where:

STD = allowable NO_X emissions (percent by volume at 15 percent O_2 and on a dry basis).

F = NO_X emission allowance for fuel-bound nitrogen defined by the following table:

FUEL-BOUND NITROGEN (% BY WEIGHT)	F (NO_X % BY VOLUME)
$0 < N < 0.015$	0
$0.015 < N < 0.03$	0.04(N-0.015)

where: N = the nitrogen content of the fuel (% by weight).

NO_X emissions limits are preliminary for the fuel oil specified in Specific Condition No. A.3. FPC shall maintain fuel bound nitrogen content data for the low sulfur fuel oil prior to commercial

operation. Adjustments of the NO_x standard (up and down) shall be calculated and recorded based upon a volume weighted average of the nitrogen content of each bulk fuel oil shipment and the nitrogen content of the existing fuel in the storage tank. The NO_x emission allowance (F) for fuel oil shall not be adjusted between fuel oil shipments. Records for these adjusted standards shall be kept on site for a minimum of 5 years.

d. Exclusive of background concentrations.

e. PM/PM_{10} emission limitations include sulfuric acid mist.

f. SO_2 emissions are based on a maximum of 1 grain of S/100cf of natural gas and 0.05 percent sulfur in the fuel oil.

g. The values are the computational basis for the lb/hr numbers, which are the actual emission limitations. Once a combustion turbine manufacturer has been selected, it may be necessary to modify this basis. If this basis is to be modified, a professional engineer-certified equivalency analysis by the manufacturer must be submitted to the Department. The equivalency analysis will recommend an emissions normalizing basis (i.e., lb/hr, lb/MMBtu, lb/MWh, or ppmvd) and associated emissions appropriate for the specific manufacturer's equipment. If the equivalency analysis demonstrates an impact equal to or less than the current lb/hr limit, the Department shall amend the conditions to reflect the alternate basis. The characteristics and parameters of the CT selected will be reflected in other permit conditions, where appropriate.

h. At 15 percent O_2, not ISO corrected.

i. Control of nitrogen oxides from each CT while firing natural gas shall be accomplished using dry low NO_x burners (DLN) and SCR. Ammonia slip shall not exceed 10 ppm. If the Westinghouse Piloted Ring Combustor(PRC) or a more advanced DLN burner is developed which is able to comply with the emission limits (listed in the above table) and is installed by November 1, 2000 the SCR system may be removed and replaced with these new burners upon 30 days prior notice to DEP. This action would implement the original BACT for NO_x and would not be subject to PSD review. This notice shall include information on the new burners which provides reasonable assurance and PE certification that these DLN burners can consistently meet the BACT emission limits. In this case the new dry low NO_x burners shall be tested in accordance with the initial performance test as described in Section C.1 within 180 days of startup with the new burners.

The following CT emissions, determined by BACT, are tabulated for PSD purposes:

ESTIMATED EMISSIONS

POLLUTANT	METHOD OF CONTROL	Basis(b)
Benzene	Natural Gas	BACT
Inorganic Arsenic	No. 2 Fuel Oil(a)	BACT
Beryllium	No. 2 Fuel Oil (a)	BACT
Mercury	No. 2 Fuel Oil(a)	(c)
Pb	No. 2 Fuel Oil (a)	(c)

a. The No. 2 fuel oil shall have a maximum sulfur content of 0.05 percent.

b. Since these pollutants are inherent constituents in the fuel, the basis for control will be by specifying that only natural gas and No. 2 fuel oil can be fired at the facility.

c. Below PSD significant emission levels.

3. Excess emissions from a turbine resulting from start up, shutdown, malfunction, or load change shall be acceptable providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized but in no case exceed two hours in any 24 hour period unless specifically authorized by the Department for a longer duration. The permittee shall provide a general description of the procedures to be followed during periods of start up, shutdown, malfunction, or load change to ensure that the best operational practices to minimize emissions will be adhered to and the duration of any excess emissions will be minimized. The description should be submitted to the Department along with the initial compliance test data. The description may be updated as needed by submitting such update to the Department within thirty (30) days of implementation.

4. Operation of the auxiliary steam boiler shall be limited to a maximum of 1000 hours per year and only during periods of cold CT startup or quick startup out of a short-term shutdown mode, when no other source of steam is available or during periodic testing. The following emission limitations shall apply:

   a. NO_x emissions shall not exceed 0.1 lb/MMBtu for natural gas firing based on vendor-certified stack test data for the model of auxiliary boiler purchased.
   b. Sulfur dioxide emissions shall be limited by firing natural gas.
   c. Visible emissions shall not exceed 10 percent opacity while burning natural gas.

5. Operation of the emergency diesel generator shall be limited to a maximum of 100 hours per year and only during periods of on site emergency power needs (when no other power source is available) or during periodic testing. The following emission limitations shall apply:
   a. The manufacturers design NO_x emission rate shall not exceed 9.82 grams/hp-hr based on vendor-certified stack test data (or equivalent) on the model of generator purchased. This test data shall be provided to the Department with the initial combustion turbine performance test report.
   b. Sulfur dioxide emissions shall be limited by firing only low sulfur fuel oil with maximum sulfur content of 0.05 percent by weight.
   c. Visible emissions shall not exceed 20 percent opacity.

C. Performance Testing

1. An initial (I) performance test shall be performed on each CT for each fuel. Testing of emissions shall be conducted with the source operating at capacity (maximum heat input rate for the tested operating temperature). Capacity is defined as 90 - 100 percent of permitted capacity. If it is impracticable to test at capacity, then sources may be tested at less than capacity; in this case subsequent source operation is limited to 110 percent of the test load until a new test is conducted. Once the unit is so limited, then operation at higher capacities is allowed for no more than fifteen consecutive days for purposes of additional compliance testing to regain the rated capacity in the permit, with prior notification to the Department. Annual (A) compliance tests shall be performed on each CT with the fuel(s) indicated below. Tests shall be conducted using EPA reference methods in accordance with 40 CFR 60, Appendix A, as adopted by reference in Rule 62-297, F.A.C.:
   a. Reference Method 5 or 17 for PM (I; A- only for oil and only if fuel oil is fired more than 400 hours for the CT in the previous federal fiscal year).
   b. Reference Method 9 for VE (I, A- only for oil and only if fuel oil is fired more than 400 hours for the CT in the previous federal fiscal year).

c. Reference Method 10 for CO (I, A- for gas and annually for oil if fuel oil is fired more than 400 hours for the CT in the previous federal fiscal year).

d. Reference Method 20 for NO_X (I- only for compliance with 40 CFR 60.332 and 40 CFR 60.335).

e. Reference Method 18 or Method 25A for VOC (I).

f. ASTM D4294 (or equivalent) for sulfur content of distillate oil (I,A), which can be used for determining SO_2 emissions annually.

g. ASTM D1072-80, D3031-81, D4084-82, or D3246-81 (or equivalent) for sulfur content of natural gas (I).

h. Ammonia (I) by EPA Conditional Test Method CTM-027 or a test method approved by DEP prior to the initial performance test.

i. Other DEP approved methods may be used for compliance testing after prior Departmental approval.

2. The maximum sulfur content of the low sulfur fuel oil shall not exceed 0.05 percent by weight. Compliance shall be demonstrated in accordance with the requirements of 40 CFR 60.334 testing for sulfur content of the fuel oil in the storage tanks on each occasion that fuel is transferred to the storage tanks from any other source. Testing for fuel bound nitrogen content by ASTM D3431 or D4629 or other equivalent ASTM method, and for fuel oil higher heating value, shall also be conducted on the same schedule.

D. Monitoring Requirements

For each combined cycle unit, the permittee shall install, operate, and maintain a continuous emission monitoring system (CEMS) (in accordance with 40 CFR 60, Appendix F or 40 CFR 75) or use other DEP approved alternate methods to monitor nitrogen oxides and, if necessary, a diluent gas (CO_2 or O_2). The Federal Acid Rain Program requirements of 40 CFR 75 shall apply when those requirements become effective for the CTs.

1. Each CEMS shall meet performance specifications of 40 CFR 60, Appendix B or 40 CFR 75.

2. CEMS data shall be recorded and reported in accordance with Chapter 40 CFR 60 Appendix A and Subpart GG and 40 CFR 75. The record shall include periods of start up, shutdown, and malfunction. Compliance with condition B.1. for NO_X shall be determined by CEMS on a mass emission rate basis (LB/HR) using EPA Method 19 and hourly averaged heat inputs (MMBtu/hr).

3. A malfunction means any sudden and unavoidable failure of air pollution control equipment or process equipment to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions.

4. The procedures under 40 CFR 60.13 and 40 CFR 75 shall be followed for installation, evaluation, and operation of all CEMS.

5. For purposes of the reports required under this permit, excess emissions are defined as any calculated average emission rate, as determined pursuant to Condition B.3 herein, which exceeds the applicable emission limits in Condition B.1.

E. Notification, Reporting and Recordkeeping

1. To determine compliance with the natural gas and fuel oil firing heat input limitation, the permittee shall maintain daily records of natural gas and fuel oil consumption for each turbine and the heating value for each fuel. All records shall be maintained for a minimum of two years after the date of each record and shall be made available to representatives of the Department upon request.
2. The project shall comply with all the applicable requirements of Chapter 62, F.A.C., and 40 CFR 60 Subparts A, GG, Dc, and Kb. The requirements shall include:

   a. CFR 60.7(a)(1) - By postmarking or delivering notification of the start of construction no more than 30 days after such date.

   b. CFR 60.7(a)(2) - By postmarking or delivering notification of the anticipated date of the initial startup of each CT and the auxiliary steam boiler not less than 30 days prior to such date.

   c. CFR 60.7(a)(3) - By postmarking or delivering notification of the actual start up of each turbine and the auxiliary steam boiler within 15 days after such date.

   d. CFR 60.7(a)(5) - By postmarking or delivering notification of the date for demonstrating the CEMS performance, no less than 30 days prior to such date.

   e. CFR 60.7(a)(6) - By postmarking or delivering notification of the anticipated date for conducting the opacity observations no less than 30 days prior to such date.

   f. CFR 60.7(b) - By initiating a recordkeeping system to record the occurrence and duration of any start up, shutdown or malfunction of a turbine and the auxiliary steam boiler, of any malfunction of the air pollution control equipment, and the periods when the CEMS is inoperable.

   g. CFR 60.7(c) - By postmarking or delivering a quarterly excess emissions and monitoring system performance report within 30 days after the end of each calendar quarter. This report shall contain the information specified in 40 CFR 60.7(c) and (d). When firing natural gas or fuel oil in the combustion turbines, the NO_X CEMS shall be used in lieu of the water/fuel monitoring system and fuel bound nitrogen (FBN) monitoring required for reporting excess emissions in 40 CFR 60.334(c)(1) (1997 version). The calibration of the water/fuel monitoring device required in 40 CFR 60.335 (c)(2) (1997 version) will be replaced by the 40 CFR 75 certification tests of the NO_X CEMS. Upon request from DEP, the CEMS emission rates for NO_X shall be corrected to ISO conditions to demonstrate compliance with the NO_X standard established in 40 CFR 60.332.

   h. A custom fuel monitoring schedule pursuant to 40 CFR 75 Appendix D for natural gas may be used in lieu of the daily sampling requirements of 40 CFR 60.334 (b)(2) provided the following requirements are met:

      1. The permittee shall apply for an Acid Rain permit within the deadlines specified in 40 CFR 72.30.
      2. The permittee shall submit a monitoring plan, certified by signature of the Designated Representative (DR), that commits to using a primary fuel of pipeline supplied natural gas (sulfur content less than or equal to 20 gr/100 scf pursuant to 40 CFR 75.11(d)(2)).
      3. Each unit shall be monitored for SO_2 emissions using methods consistent with the requirements of 40 CFR 75 and certified by the USEPA.

      This custom fuel monitoring schedule will only be valid when pipeline natural gas is used as a primary fuel. If the primary fuel for these units is changed to a higher sulfur fuel, SO_2 emissions must be accounted for as required pursuant to 40 CFR 75.11(d).

   i. CFR 60.8(a) - By conducting all performance tests within 60 days after achieving the maximum turbine and boiler firing rates, but not more than 180 days after the initial start up of each CT and the auxiliary boiler.

j. CFR 60.8(d) - By postmarking or delivering notification of the date of each performance test required by this permit at least 30 days prior to the test date; and,

k. Rule 62-297.345, F.A.C. - By providing stack sampling facilities where necessary .

All notifications and reports required by this specific condition shall be submitted to the Department's Air Program, within the Southwest District office. Performance test results shall be submitted within 45 days of completion of such test.

3. The following information shall be submitted to the Department's Bureau of Air Regulation within 90 days after selection of each, respectively:

   a. Description of the final selection of the turbines, the auxiliary steam boiler and diesel generator for installation at the facility. Descriptions shall include the specific make and model numbers, any changes in the proposed method of operation, fuels, emissions or equipment.

   b. Description of the CEMS selected. Description shall include the type of sensors, the manufacturer and model number of the equipment.

4. The following protocols shall be submitted to the Department's Air Program, within the Southwest District office for approval;

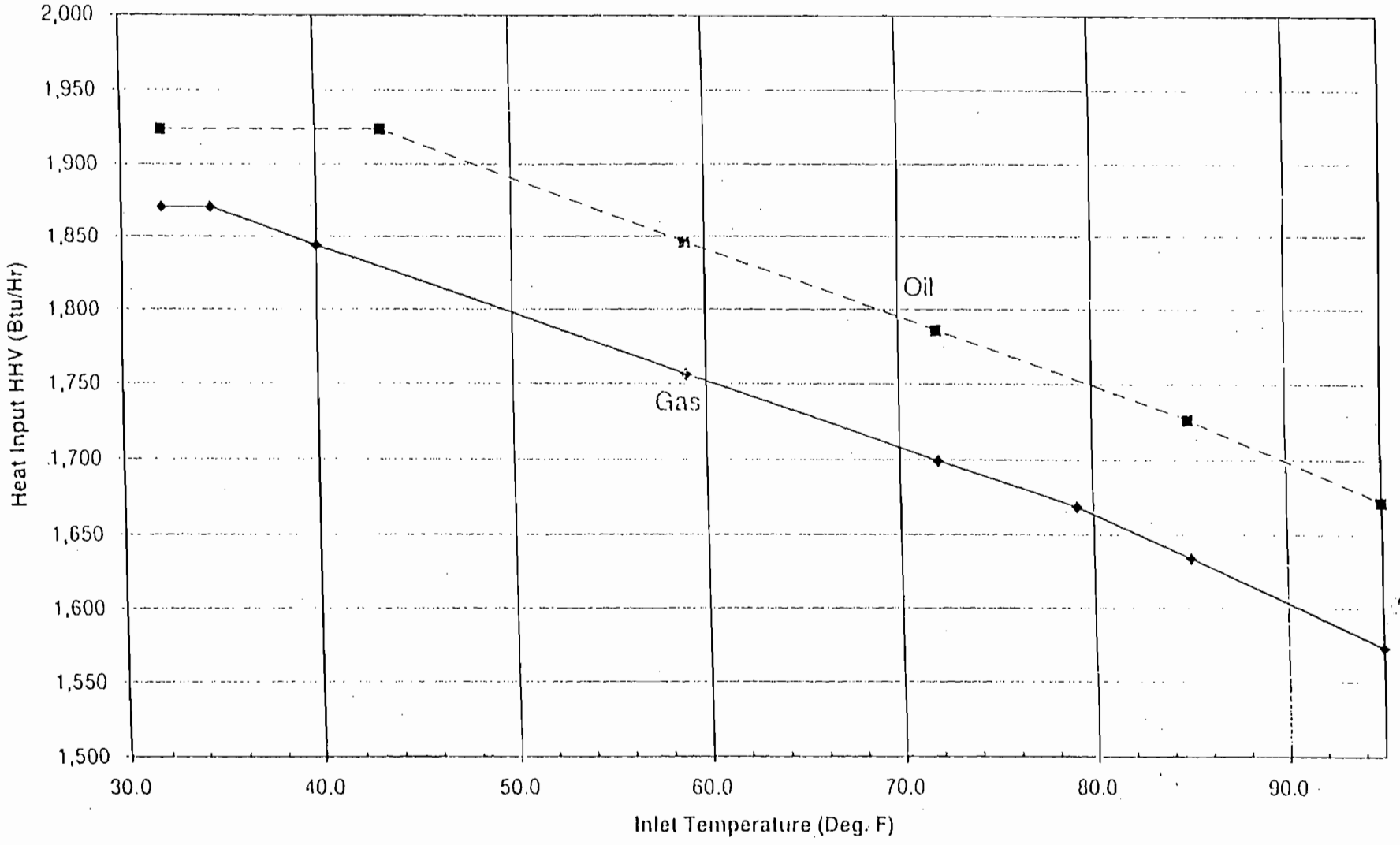
   a. CEMS Protocol - Within 60 days after selection of the CEMS, but prior to the initial startup, a CEMS protocol describing the system, its installation, operating and maintenance characteristics and requirements. The protocol shall meet the requirements of 40 CFR 60.13, 40 CFR 60 Appendix B and Appendix F or 40 CFR 75. The Federal Acid Rain Program requirements of 40 CFR 75 shall apply when those requirements become effective within the state.

   b. Performance Test Protocol - At least 30 days prior to conducting the initial performance tests required by this permit, the permittee shall submit to the Department's Air Program, within the Southwest District office, a protocol outlining the procedures to be followed, the test methods and any differences between the reference methods and the test methods proposed to be used to verify compliance with the conditions of this permit. The Department shall approve the testing protocol provided that it meets the requirements of this permit.

F. Modifications

The permittee shall give written notification to the Department when there is any modification to this facility. This notice shall be submitted sufficiently in advance of any critical date involved to allow sufficient time for review, discussion, and revision of plans, if necessary. Such notice shall include, but not be limited to, information describing the precise nature of the change; modifications to any emission control system; production capacity of the facility before and after the change; and the anticipated completion date of the change.

Heat Input (HHV) vs. Inlet Temperature



Florida Power Corporation - Hines Energy Project
NOx Emission Rates

Gas Fuel		Oil Fuel	
Temp, °F	NOx, lb/hr	Temp, °F	NOx, lb/hr
20	78.00	20	316.00
21	78.00	21	316.08
22	78.00	22	316.17
23	78.00	23	316.25
24	78.00	24	316.33
25	78.00	25	316.42
26	78.00	26	316.50
27	78.00	27	316.58
28	78.00	28	316.67
29	78.00	29	316.75
30	78.00	30	316.83
31	78.00	31	316.92
32	78.00	32	317.00
33	78.00	33	317.00
34	78.00	34	317.00
35	78.00	35	317.00
36	77.80	36	317.00
37	77.60	37	317.00
38	77.40	38	317.00
39	77.20	39	317.00
40	77.00	40	317.00
41	76.79	41	317.00
42	76.58	42	317.00
43	76.37	43	317.00
44	76.16	44	316.25
45	75.95	45	315.50
46	75.74	46	314.75
47	75.53	47	314.00
48	75.32	48	313.25
49	75.11	49	312.50
50	74.89	50	311.75
51	74.68	51	311.00
52	74.47	52	310.25
53	74.26	53	309.50
54	74.05	54	308.75
55	73.84	55	308.00
56	73.63	56	307.25
57	73.42	57	306.50
58	73.21	58	305.75
59	73.00	59	305.00
60	72.85	60	304.46
61	72.69	61	303.92
62	72.54	62	303.38
63	72.38	63	302.85
64	72.23	64	302.31
65	72.08	65	301.77
66	71.92	66	301.23
67	71.77	67	300.69

68	71.62	68	300.15
69	71.46	69	299.62
70	71.31	70	299.08
71	71.15	71	298.54
72	71.00	72	298.00
73	70.86	73	297.23
74	70.71	74	296.46
75	70.57	75	295.69
76	70.43	76	294.92
77	70.29	77	294.15
78	70.14	78	293.38
79	70.00	79	292.62
80	69.83	80	291.85
81	69.67	81	291.08
82	69.50	82	290.31
83	69.33	83	289.54
84	69.17	84	288.77
85	69.00	85	288.00
86	68.80	86	287.30
87	68.60	87	286.60
88	68.40	88	285.90
89	68.20	89	285.20
90	68.00	90	284.50
91	67.80	91	283.80
92	67.60	92	283.10
93	67.40	93	282.40
94	67.20	94	281.70
95	67.00	95	281.00

ATTACHMENT HEC-EU1-L5

COMPLIANCE TEST REPORT

Florida Power
CORPORATION

bcc: D. W. Sorrick
D. G. Dingle
J. W. Agee
J. M. Kennedy
R. J. McClintock
B. R. Melton

File: Hines/Air/Corresp.
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927-RPP902-007

May 14, 1999

Mr. William Proses
Florida Department of Environmental Protection
Southwest District
3804 Coconut Palm Dr.
Tampa, Florida 33619-8318

Dear Mr. Proses:

Re: Initial Compliance Testing
Hines Energy Complex

Florida Power Corporation (FPC) has completed compliance testing at the above-referenced facility. Testing was conducted on combustion turbine units 1A and 1B, while firing fuel oil, during the periods of April 1 through 2 and April 11 through 12, 1999. In addition, testing was completed on the auxiliary boiler on March 29, 1999. Test results indicate that compliance was achieved for all applicable requirements. This letter serves to transmit two copies of each test report.

If you should have any questions concerning the enclosed test reports, please do not hesitate to contact me at (727) 826-4258.

Sincerely,

Scott H. Osbourn
Senior Environmental Engineer

cc: Martin Costello, DEP
Leonard Brenner, Cubix Corporation

ONE POWER PLAZA, 263 - 13th Avenue South, BB1A, St. Petersburg, FL 33701-5511 •
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A Florida Progress Company

INITIAL COMPLIANCE TEST REPORT
for
NATURAL GAS FUELED STACK EMISSIONS

on
POWER BLOCK 1

consisting of
UNITS 1A AND 1B, TWO WESTINGHOUSE 501F COMBINED CYCLE COMBUSTION TURBINES

at the
HINES ENERGY COMPLEX

in
POLK COUNTY, FLORIDA

Prepared for

FLORIDA POWER CORPORATION

February 1999

Cubix Job No. 4911

Prepared by

Cubix Corporation
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INTRODUCTION

Emission testing was conducted on Power Block 1, which consists of two combined cycle combustion turbines manufactured by Siemens Westinghouse Power Corporation. These units, used to generate power, were recently installed at the Hines Energy Complex located near Fort Meade in Polk County, Florida. Florida Power Corporation (FPC) owns and operates this facility. This report documents the testing of each combustion turbine while fueled with natural gas. A separate report will be provided for the testing of the units while fueled with No. 2 fuel oil. The testing was conducted by Cubix Corporation, Southeast Regional Office on December 29 and 31, 1998, and on January 1 to 2, 1999.

The purpose of this testing was to determine the status of initial compliance for combustion turbine emissions with the permit limits set forth by the Florida Department of Environmental Protection (FDEP), Permit Numbers PSD-FL-195A and PA-92-33. Additionally, the emissions were measured to determine compliance with the Environmental Protection Agency (EPA) Code of Federal Regulations, Title 40, Part 60, (40 CFR 60) Subpart GG "Standards of Performance for Stationary Gas Turbines". The tests followed the procedures set forth in 40 CFR 60, Appendix A, Methods 1, 2, 3a, 4, 5, 9, 10, 19, 20, 25a, and 26a (modified).

Each turbine's exhaust was analyzed for oxides of nitrogen (NO_X), carbon monoxide (CO), total hydrocarbon compounds (THC), oxygen (O_2), and carbon dioxide (CO_2) using continuous instrumental monitors. Particulate matter (PM) and ammonia (NH_3) samples were collected iso-kinetically using a combined hot/cold manual sampling train. Ammonia samples were analyzed on-site using the Nessler procedure and also by Triangle Laboratories, Inc. of Durham, North Carolina using ion chromatographic procedures. Visible emissions (VE) were determined by a certified observer. Analysis of the natural gas fuel was provided by Florida Gas Transmission Company's laboratory in Perry, Florida. Table 1 provides background data pertinent to these tests.

This test report has been reviewed and approved for submittal to the FDEP by the following representatives:

Leonard

Cubix Corporation

Florida Power Corporation

SUMMARY OF RESULTS

Florida Power Corporation (FPC) owns and operates the Hines Energy Complex in Polk County, Florida. At this facility two Westinghouse combined cycle combustion turbines, each equipped with an unfired heat recovery steam generator (HRSG), are used to generate electrical power. The combustion turbines are designated as Unit 1A and Unit 1B by FPC. Stack emissions from these units, while fueled with natural gas, are the subject of this report. Emissions from these units, while fueled with fuel oil, will be reported separately.

The first step in the test matrix for each unit consisted of conducting an initial sampling traverse of the combustion turbine/heat recovery steam generator (CT/HRSG) exhaust stack. The purpose of this sampling traverse was to check for changes in O_2 concentration (stratification) within the exhaust stack. Each turbine was set to the lowest load representative of normal operation, approximately 90 megawatts (MW), while operating under dry, low NO_x combustion and with Selective Catalytic Reduction (SCR) operating. O_2 concentrations were measured at 48 traverse points within the CT/HRSG stack to determine the eight points of lowest O_2 concentration. This initial traverse was conducted on each CT/HRSG stack. No significant stratification was found in either exhaust stack; therefore, all subsequent tests were conducted at the eight most convenient traverse points on each unit.

Following the O_2-traverse, Cubix conducted three test runs at each of four load conditions across the operational range of the combustion turbine (~90 MW, ~110 MW, ~135 MW, and full load at ~165 MW). Each reduced load test run was 18 minutes and 40 seconds in duration (8 sample points, 140 seconds per point). The first reduced load test was conducted concurrently with the initial O_2-traverse. Full load is defined as 90 to 100% of the maximum permitted capacity, expressed as heat input, determined from the Westinghouse performance curve of heat input versus turbine inlet temperature for the unit. NO_x, O_2, and CO_2 were continuously monitored at all load conditions. Additional full load measurements included CO and THC using continuous instrumental monitors and iso-kinetic sampling for collection of PM and NH_3 samples. The full load test runs were 1 hour in duration for all constituents except PM and NH_3 which were performed for 2 to 3 hours to collect an appreciable amount of sample. A one-hour VE test was conducted simultaneously with one of the full load test runs. This test matrix was performed on both CT units.

Table 2, the executive summary, signifies the performance for each unit during the full load testing. These performance results are an average of the three full load test runs for each unit. These emissions are compared to the permit limits set forth in FDEP Permit Nos. PSD-FL-195A and PA-92-33.

TABLE 2
Executive Summary

Parameter	Unit 1A Westinghouse 501F Turbine	Unit 1B Westinghouse 501F Turbine	NSPS/FDEP Permit Limits
Percent Load (of capacity as heat input)	100.0%	99.8%	90 to 100%
NO_x (lbs/hr at 67°F inlet temperature)	63.5	-	71.77
NO_x (lbs/hr at 61°F inlet temperature)	-	67.8	72.69
VOC (lbs/hr, from THC measurements)	0.33	0.73	10.4
CO (lbs/hr)	2.11	2.56	77
PM/PM_{10} (lbs/hr)	2.54	2.97	15.6
SO_2 (lbs/hr)	1.63	1.65	4.7
Visible Emissions (% opacity)	0%	0%	10%
NH_3 (ppmv, dry basis by Nessler analysis)	3.84	6.15	10
NH_3 (ppmv, dry basis by Ion Chromatography)	3.57	4.19	10

Tables 3 and 4 represent the Unit 1A test results for full load and reduced load testing, respectively. These tabular summaries contain all pertinent operational parameters, ambient conditions, measured emissions, corrected concentrations, and calculated emission rates. NO_X emissions are reported in units of parts per million by volume (ppmv) on a dry basis, ppmv corrected to 15% excess O_2, and ppmv corrected to 15% excess O_2 and ISO conditions. The EPA defines ISO conditions as ambient atmospheric conditions of 59 degrees Fahrenheit (°F) temperature, 101.3 kilopascals (kPa) pressure, and 60% relative humidity. CO and NH_3 concentrations were determined on ppmv, dry basis. Volatile organic compound (VOC) concentrations were determined from THC measurements and were determined on a ppmv, wet basis as methane. Concentrations of PM were determined in units of grams per dry standard cubic feet (grams PM/DSCF). Mass emission rates for NO_X, CO, VOC, PM, NH_3, and SO_2 are reported in terms of pounds per hour (lbs/hr). As stated in the test matrix above, only NO_X concentrations and emissions were applicable for the reduced load tests.

Tables 5 and 6 represent the Unit 1B test results for full load and reduced load testing, respectively. These tabular summaries contain all pertinent operational parameters, ambient conditions, measured emissions, corrected

concentrations, and calculated emission rates. NO_X emissions are reported in units of ppmv on a dry basis, ppmv at 15% excess O_2, and ppmv at 15% excess O_2 and ISO conditions. CO and NH_3 concentrations were determined on ppmv, dry basis. VOC concentrations were determined from THC measurements and were determined on a ppmv, wet basis as methane. Concentrations of PM were determined in units of grams PM/DSCF. Mass emission rates for NO_X, CO, VOC, PM, NH_3, and SO_2 are reported in terms of lbs/hr.

Volumetric flow and mass emission rates were determined by stoichiometric calculation (EPA Method 19) based on measurements of diluent gas (O_2 or CO_2) concentrations, "F-factors" determined from fuel composition, and unit fuel flow rates. Examples of iso-kinetic calculations, emission rate calculations, and other calculations necessary for the presentation of the results of this section are contained in Appendix B.

The fuel sulfur content analyses, concentration in ppmv, is contained in Appendix C of this report. The fuel was analyzed on-line for total fuel sulfur content by Florida Gas Transmission's Perry Laboratory. The SO_2 emission rates, reported in lbs/hr, were calculated from the results of these analyses and the measured fuel flow rates recorded during the tests.

Visible emission observations of each CT/HRSG exhaust stack per EPA Method 9 were performed by an observer certified by Eastern Technical Associates of Raleigh, North Carolina. A one-hour visible emissions test run was conducted on each unit. VE were an average of 0% opacity in the highest six-minute average for each test and no VE greater than 0% opacity was observed during the tests.

Appendix A contains all field data sheets used during these tests as well as the particulate matter analysis worksheets and the Nessler procedure ammonia analysis worksheets. Appendix B contains examples of all calculations necessary for the reduction of the data presented in this report. Appendix C contains the fuel analysis and Cubix's fuel calculation worksheet. Quality Assurance Activities are documented in Appendix D. Certificates of calibrations are contained in Appendix E of this report. Copies of the reference method strip chart records obtained during these tests are available in Appendix F of this report. Appendix G contains the "Visible Emissions Observation Forms" and the observer certifications. Appendix H contains the operational data provided by FPC during the test runs. Ion chromatography results from the ammonia analysis are presented in Appendix I. The FDEP facility permits and FDEP correspondence records are presented in Appendix J for reference purposes.

TABLE 3: Summary of Results
Full Load Testing
Unit 1A

Company: Florida Power Corporation
Plant: Hines Energy Complex
Location: near Ft. Meade in Polk County, Florida
Technicians: LJB, RPO, JAR, JFR
Source: Unit 1A, a Westinghouse 501F Power Turbine

Test Number	Gas-AC-2	Gas-AC-3	Gas-AC-4		
Date	1/1/99	1/1/99	1/1/99		
Start Time	9:05	13:21	14:58		FDEP
Stop Time	10:05	14:21	15:59		Permit
Turbine/Compressor Operation				*Averages*	Limits
Generator Output (MW, CT generated power only)	171.4	164.0	163.7	*166.4*	
Heat Input (MMBtu/hr, higher heating value, HHV)	1,744	1,720	1,706	*1,723*	
Turbine Capacity (Mfg.'s Curve, heat input vs. inlet temp)	1,760	1,704	1,704	*1,723*	
Percent Load (% of maximum heat input at inlet temp)	99.1%	100.9%	100.1%	*100.0%*	
Engine Compressor Discharge Pressure (psia)	218.6	211.9	211.9	*214.1*	
Turbine Air Inlet Temperature (°F)	58.4	71.0	71.0	*66.8*	
Compressor Discharge Temperature Sel. (°F)	219	766	766	*584*	
Mean Turbine Exhaust Temperature (°F)	1130	1144	1147	*1140*	
SCR Ammonia Injection Rate (lbs/hr)	193.2	197.5	193.6	*194.8*	
Pre-SCR Temperature (SCR inlet temperature, °F)	613	613	613	*613*	
Post-SCR Temperature (SCR outlet temperature, °F)	646	646	646	*646*	
Turbine Fuel Data (Natural Gas, FGT)					
Fuel Heating Value (Btu/lb, HHV)	23122	23122	23122	*23122*	
Fuel Specific Gravity	0.5982	0.5982	0.5982	*0.5982*	
Sulfur in Fuel (grains/100 SCF of fuel gas)	0.375	0.375	0.375	*0.375*	1
O_2 "F-factor" (DSCFex/MMBtu @ 0% excess air)	8646	8646	8646	*8646*	
CO_2 "F-factor" (DSCFex/MMBtu @ 0% excess air)	1034	1034	1034	*1034*	
Fuel Flow (KPPH, natural gas)	75.43	74.38	73.80	*74.54*	
Heat Input (MMBtu/hr, Higher Heat Value)	1744.1	1719.8	1706.4	*1723.4*	
Heat Input (MMBtu/hr, Lower Heat Value)	1569.7	1547.8	1535.8	*1551.1*	
Ambient Conditions					
Atmospheric Pressure ("Hg)	29.83	29.76	29.73	*29.77*	
Temperature (°F): Dry bulb	70.0	74.0	71.8	*71.9*	
(°F): Wet bulb	63.0	63.0	61.9	*62.6*	
Humidity (lbs moisture/lb of air)	0.0105	0.0096	0.0094	*0.0098*	
Measured Emissions					
NO_X (ppmv, dry basis)	11.99	12.14	12.14	*12.09*	
NO_X (ppmv, dry @ 15% O_2)	9.9	10.0	10.3	*10.1*	
NO_X (ppmv @ 15% O_2, ISO Day)	10.8	10.3	10.6	*10.6*	
CO (ppmv, dry basis)	0.62	0.63	0.73	*0.66*	
THC (ppmv, wet basis)	0.38	0.02	0.10	*0.17*	
PM (grams PM/DSCF exhaust gas)	2.80E-05	3.53E-05	1.53E-05	*2.62E-05*	
NH_3 (ppmv, dry basis from ion chromatography per FDEP)	2.42	2.93	5.37	*3.57*	10
NH_3 (ppmv, dry basis from on-site Nessler analysis)	2.60	3.09	5.82	*3.84*	10
Visible Emissions (% opacity)	0			0	10
H_2O (% volume, from Method 5 sample train)	8.48	8.24	8.35	8.36	
O_2 (% volume, dry basis)	13.76	13.77	13.94	*13.82*	
CO_2 (% volume, dry basis)	4.16	4.21	4.08	*4.15*	
F_o (fuel factor, range = 1.600-1.836 for NG)	1.72	1.69	1.71	*1.71*	
Stack Volumetric Flow Rates					
via O_2 "F_d-factor" (SCFH, dry basis)	4.41E+07	4.36E+07	4.43E+07	*4.40E+07*	
via CO_2 "F_c-factor" (SCFH, dry basis)	4.34E+07	4.22E+07	4.32E+07	*4.29E+07*	
Calculated Emission Rates (via M-19 O_2 "F-factor")					
NO_X (lbs/hr)	**63.2**	**63.2**	**64.2**	*63.5*	71.77†
CO (lbs/hr)	**1.99**	**2.00**	**2.35**	*2.11*	77
THC (lbs/hr)	**0.76**	**0.04**	**0.20**	*0.33*	10.4
PM (lbs/hr)	**2.73**	**3.39**	**1.49**	*2.54*	15.6
SO_2 (lbs/hr, based on fuel flow and fuel sulfur)	**1.64**	**1.62**	**1.61**	*1.63*	4.7

† Permit Limit based upon actual average turbine air inlet temperature during testing

Testing by Cubix Corporation - Austin, Texas - Gainesville, Florida

Company: Florida Power Corporation
Plant: Hines Energy Complex
Location: near Ft. Meade in Polk County, Florida
Technicians: LJB, JFR, RPO, JAR
Source: Unit 1A, a Westinghouse 501F Power Turbine

TABLE 4: Summary of Results
Reduced Load Testing
Unit 1A

Test Number	Gas-AC-1	Gas-AC-11	Gas-AC-12	Gas-AC-8	Gas-AC-9	Gas-AC-10	Gas-AC-5	Gas-AC-6	Gas-AC-7
Date	12/31/98	1/2/99	1/2/99	1/1/99	1/2/99	1/2/99	1/1/99	1/1/99	1/1/99
Start Time	18:25	13:57	14:50	20:31	12:43	13:13	18:11	18:41	19:17
Stop Time	21:07	14:17	15:09	20:50	13:02	13:32	18:30	19:01	19:37
Turbine/Compressor Operation	**Low Load, ~86 MW**			**Mid Load-1, ~108 MW**			**Mid Load-2, ~135 MW**		
Generator Output	85.0	80.8	90.9	110.9	107.3	106.9	135.4	135.0	135.1
Heat Input (higher heating value, HHV)	1033.6	1035.9	1123.3	1216.9	1242.8	1242.8	1416.7	1404.9	1404.9
Turbine Capacity (Mfg.'s Curve, heat input vs. inlet temp)	1,742	1,676	1,666	1,745	1,690	1,690	1,729	1,736	1,745
Percent Load (% of maximum heat input at inlet temp)	59.3	61.8	67.4	69.7	73.5	73.5	81.9	80.9	80.5
Engine Compressor Discharge Pressure (psia)	148.0	143.5	148.3	164.9	161.1	161.1	190.0	189.0	189.0
Turbine Air Inlet Temperature (°F)	62.6	77.0	79.0	62.0	74.0	74.0	65.5	64.0	62.0
Compressor Discharge Temperature Sel. (°F)	652	673	679	681	694	694	718	718	713
Mean Turbine Exhaust Temperature (°F)	1037	1058	1096	1086	1101	1101	1073	1070	1070
SCR Ammonia Injection Rate (lbs/hr)	104.9	91.0	96.0	105.0	114.5	116.0	125.0	67.5	60.5
Pre-SCR Temperature (SCR inlet temperature, °F)	604	575	582	572	592	592	583	583	583
Post-SCR Temperature (SCR outlet temperature, °F)	622	605	612	610	617	617	618	615	615
Turbine Fuel Data (Residue Gas)									
Fuel Heating Value (Btu/lb, HHV)	23122	23122	23122	23122	23122	23122	23122	23122	23122
Fuel Specific Gravity	0.5982	0.5982	0.5982	0.5982	0.5982	0.5982	0.5982	0.5982	0.5982
Sulfur in Fuel (% weight, from ASTM D3246 analysis)	0.00060	0.00060	0.00060	0.00060	0.00060	0.00060	0.00060	0.00060	0.00060
O_2 "F-factor" (DSCFex/MMBtu @ 0% excess air)	8646	8646	8646	8646	8646	8646	8646	8646	8646
CO_2 "F-factor" (DSCFex/MMBtu @ 0% excess air)	1034	1034	1034	1034	1034	1034	1034	1034	1034
Fuel Flow (KPPH)	44.70	44.80	48.58	52.63	53.75	53.75	61.27	60.76	60.76
Heat Input (MMBtu/hr, Higher Heat Value)	1033.6	1035.9	1123.3	1216.9	1242.8	1242.8	1416.7	1404.9	1404.9
Heat Input (MMBtu/hr, Lower Heat Value)	930.2	932.3	1010.9	1095.2	1118.5	1118.5	1275.0	1264.4	1264.4
Ambient Conditions									
Atmospheric Pressure ("Hg)	29.80	29.56	29.55	29.75	29.60	29.59	29.74	29.75	29.75
Temperature (°F): Dry bulb	62.0	80.5	81.2	64.0	78.0	79.8	68.6	65.2	64.9
(°F): Wet bulb	58.0	71.6	72.0	59.8	71.4	71.4	61.7	59.9	60.0
Humidity (lbs moisture/lb of air)	0.0092	0.0144	0.0146	0.0099	0.0148	0.0144	0.0100	0.0097	0.0098
Measured Emissions									
NO_x (ppmv, dry basis)	8.86	10.59	12.50	16.37	12.07	12.13	6.07	9.04	12.74
O_2 (% volume, dry basis)	15.11	15.01	14.62	14.40	14.43	14.39	14.47	14.43	14.39
CO_2 (% volume, dry basis)	3.35	3.32	3.48	3.71	3.75	3.75	3.71	3.66	3.64
F_o (fuel factor, range = 1.600-1.836 for NG)	1.73	1.77	1.80	1.75	1.73	1.74	1.73	1.77	1.79
Stack Volumetric Flow Rates									
via O_2 "F_d-factor" (SCFH, dry basis)	3.22E+07	3.18E+07	3.23E+07	3.38E+07	3.47E+07	3.45E+07	3.98E+07	3.92E+07	3.90E+07
via CO_2 "F_c-factor" (SCFH, dry basis)	3.19E+07	3.23E+07	3.34E+07	3.39E+07	3.43E+07	3.43E+07	3.95E+07	3.97E+07	3.99E+07
Calculated Emission Rates (via M-19 O_2 "F-factor")									
NO_x (ppmv, dry @ 15% O_2)	9.0	10.6	11.7	14.9	11.0	11.0	5.6	8.2	11.5
NO_x (ppmv @ 15% O_2, ISO Day)	9.5	11.8	13.0	15.8	12.4	12.3	5.9	8.7	12.3
NO_x (lbs/hr)	**34.1**	**40.8**	**49.8**	**66.3**	**50.0**	**50.0**	**28.9**	**42.9**	**60.7**

TABLE 5: Summary of Results
Full Load Testing
Unit 1B

Company: Florida Power Corporation
Plant: Hines Energy Complex
Location: near Ft. Meade in Polk County, Florida
Technicians: LJB, RPO, JAR, JFR
Source: Unit 1B: a Westinghouse 501F Power Turbine

Test Number	**Gas-BC-10**	**Gas-BC-11**	**Gas-BC-12**		
Date	12/29/98	12/31/98	12/31/98		
Start Time	18:00	7:28	14:05		FDEP
Stop Time	21:45	8:34	15:11		Permit
Turbine/Compressor Operation				*Averages*	Limits
Generator Output (MW, CT generated power only)	169.3	180.34	168.60	*172.8*	
Heat Input (higher heating value, HHV)	1,728	1,771	1,736	*1,745*	
Turbine Capacity (Mfg.'s Curve, heat input vs. inlet temp)	1,728	1,802	1,715	*1,748*	
Percent Load (% of maximum heat input at inlet temp)	100.0%	98.3%	101.2%	*99.8%*	
Engine Compressor Discharge Pressure (psia)	213.7	225.05	215.15	*218.0*	
Turbine Air Inlet Temperature (°F)	65.7	49.0	68.7	*61.1*	
Compressor Discharge Temperature Sel. (°F)	762	743	767	*758*	
Mean Turbine Exhaust Temperature (°F)	1141	1123	1138	*1134*	
SCR Ammonia Injection Rate (lbs/hr)	231.3	231.03	216.12	*226.16*	
Pre-SCR Temperature (SCR inlet temperature, °F)	634	615	617	*622*	
Post-SCR Temperature (SCR outlet temperature, °F)	658	646	646	*650*	
Turbine Fuel Data (Natural Gas, FGT)					
Fuel Heating Value (Btu/lb, HHV)	23122	23122	23122	*23122*	
Fuel Specific Gravity	0.5982	0.5982	0.5982	*0.5982*	
Sulfur in Fuel (grains/100 SCF of fuel gas)	0.375	0.375	0.375	*0.375*	1
O_2 "F-factor" (DSCFex/MMBtu @ 0% excess air)	8646	8646	8646	*8646*	
CO_2 "F-factor" (DSCFex/MMBtu @ 0% excess air)	1034	1034	1034	*1034*	
Fuel Flow (KPPH, natural gas)	74.72	76.60	75.08	*75.47*	
Heat Input (MMBtu/hr, Higher Heat Value)	1727.7	1771.1	1736.0	*1744.9*	
Heat Input (MMBtu/hr, Lower Heat Value)	1554.9	1594.0	1562.4	*1570.4*	
Ambient Conditions					
Atmospheric Pressure ("Hg)	29.50	29.85	29.81	*29.72*	
Temperature (°F): Dry bulb	67.0	57.0	72.5	*65.5*	
(°F): Wet bulb	66.8	52.0	62.0	*60.3*	
Humidity (lbs moisture/lb of air)	0.0140	0.0070	0.0093	*0.0101*	
Measured Emissions					
NO_X (ppmv, dry basis)	12.47	12.88	13.18	*12.84*	
NO_X (ppmv, dry @ 15% O_2)	9.9	10.7	10.8	*10.5*	
NO_X (ppmv @ 15% O_2, ISO Day)	11.3	11.1	11.1	*11.2*	
CO (ppmv, dry basis)	0.67	0.84	0.87	*0.79*	
THC (ppmv, wet basis)	0.22	0.30	0.57	*0.36*	
PM (grams PM/DSCF exhaust gas)	1.82E-05	5.14E-05	2.00E-05	*2.99E-05*	
NH_3 (ppmv, dry basis from ion chromatography per FDEP)	4.38	3.71	4.48	*4.19*	10
NH_3 (ppmv, dry basis from on-site Nessler analysis)	5.82	6.75	5.87	*6.15*	10
Visible Emissions (% opacity)			0	**0**	10
H_2O (% volume, from Method 5 sample train)	9.14	8.05	7.97	**8.38**	
O_2 (% volume, dry basis)	13.50	13.78	13.69	*13.66*	
CO_2 (% volume, dry basis)	4.32	3.93	4.10	*4.12*	
F_o (fuel factor, range = 1.600-1.836 for NG)	1.71	1.81	1.76	*1.76*	
Stack Volumetric Flow Rates					
via O_2 "F_d-factor" (SCFH, dry basis)	4.22E+07	4.50E+07	4.35E+07	*4.35E+07*	
via CO_2 "F_c-factor" (SCFH, dry basis)	4.14E+07	4.66E+07	4.38E+07	*4.39E+07*	
Calculated Emission Rates (via M-19 O_2 "F-factor")					
NO_X (lbs/hr)	**62.8**	**71.7**	**68.9**	*67.8*	72.69†
CO (lbs/hr)	**2.06**	**2.85**	**2.77**	*2.56*	77
THC (lbs/hr)	**0.43**	**0.63**	**1.13**	*0.73*	10.4
PM (lbs/hr)	**1.69**	**5.28**	**1.93**	*2.97*	15.6
SO_2 (lbs/hr, based on fuel flow and fuel sulfur)	**1.63**	**1.67**	**1.64**	*1.65*	4.7

† Permit Limit based upon actual average turbine air inlet temperature during testing

Testing by Cubix Corporation - Austin, Texas - Gainesville, Florida

Company: Florida Power Corporation
Plant: Hines Energy Complex
Location: near Ft. Meade in Polk County, Florida
Technicians: LJB, JFR, RPO, JAR
Source: Unit 1B, a Westinghouse 501F Power Turbine

TABLE 6: Summary of Results
Reduced Load Testing
Unit 1B

Test Number	Gas-BC-1	Gas-BC-2	Gas-BC-3	Gas-BC-4	Gas-BC-5	Gas-BC-6	Gas-BC-7	Gas-BC-8	Gas-BC-9
Date	12/29/98	12/29/98	12/29/98	12/29/98	12/29/98	12/29/98	12/29/98	12/29/98	12/29/98
Start Time	7:14	9:55	10:34	11:20	11:54	12:27	13:48	14:21	14:56
Stop Time	9:43	10:16	10:55	11:39	12:13	12:46	14:08	14:41	15:15
Turbine/Compressor Operation	Low Load, ~90 MW			Mid Load-1, ~110 MW			Mid Load-2, 130 MW		
Generator Output	89.99	89.96	90.14	110.11	109.94	109.94	130.02	130.14	129.87
Heat Input (higher heating value, HHV)	1067.8	1073.6	1073.6	1234.7	1245.1	1250.9	1408.4	1408.4	1408.4
Turbine Capacity (Mfg.'s Curve, heat input vs. inlet temp)	1,750	1,739	1,724	1,703	1,688	1,674	1,658	1,666	1,664
Percent Load (% of maximum heat input at inlet temp)	61.0	61.7	62.3	72.5	73.8	74.7	84.9	84.6	84.6
Engine Compressor Discharge Pressure (psia)	148.91	148.73	148.20	163.08	162.85	162.69	185.91	185.56	185.28
Turbine Air Inlet Temperature (°F)	60.91	63.31	66.70	71.40	74.53	77.37	80.44	79.00	79.25
Compressor Discharge Temperature Sel. (°F)	655	657	662	690	694	699	738	736	737
Mean Turbine Exhaust Temperature (°F)	1066	1070	1075	1089	1095	1101	1068	1069	1071
SCR Ammonia Injection Rate (lbs/hr)	83.79	86.26	105.28	88.73	125.46	114.16	74.27	62.56	77.62
Pre-SCR Temperature (SCR inlet temperature, °F)	573	578	579	584	565	574	599	600	600
Post-SCR Temperature (SCR outlet temperature, °F)	605	605	608	614	601	607	622	624	625
Turbine Fuel Data (Residue Gas)									
Fuel Heating Value (Btu/lb, HHV)	23122	23122	23122	23122	23122	23122	23122	23122	23122
Fuel Specific Gravity	0.5982	0.5982	0.5982	0.5982	0.5982	0.5982	0.5982	0.5982	0.5982
Sulfur in Fuel (% weight, from ASTM D3246 analysis)	0.00060	0.00060	0.00060	0.00060	0.00060	0.00060	0.00060	0.00060	0.00060
O_2 "F-factor" (DSCFex/MMBtu @ 0% excess air)	8646	8646	8646	8646	8646	8646	8646	8646	8646
CO_2 "F-factor" (DSCFex/MMBtu @ 0% excess air)	1034	1034	1034	1034	1034	1034	1034	1034	1034
Fuel Flow (KPPH)	46.18	46.43	46.43	53.40	53.85	54.10	60.91	60.91	60.91
Heat Input (MMBtu/hr, Higher Heat Value)	1067.8	1073.6	1073.6	1234.7	1245.1	1250.9	1408.4	1408.4	1408.4
Heat Input (MMBtu/hr, Lower Heat Value)	961.0	966.2	966.2	1111.2	1120.6	1125.8	1267.5	1267.5	1267.5
Ambient Conditions									
Atmospheric Pressure ("Hg)	29.60	29.60	29.59	29.58	29.56	29.53	29.51	29.50	29.48
Temperature (°F): Dry bulb	63.6	68.0	69.0	72.2	75.1	80.0	79.8	79.2	77.3
(°F): Wet bulb	63.6	67.0	68.0	69.2	70.8	73.3	75.5	76.1	76.4
Humidity (lbs moisture/lb of air)	0.0125	0.0138	0.0143	0.0145	0.0151	0.0159	0.0178	0.0185	0.0192
Measured Emissions									
NO_x (ppmv, dry basis)	14.19	15.73	10.67	15.58	16.82	13.60	7.67	11.17	10.63
O_2 (% volume, dry basis)	14.85	14.80	14.79	14.43	14.31	14.34	14.45	14.38	14.39
CO_2 (% volume, dry basis)	3.46	3.50	3.58	3.71	3.75	3.73	3.71	3.75	3.83
F_o (fuel factor, range = 1.600-1.836 for NG)	1.75	1.74	1.71	1.74	1.76	1.76	1.74	1.74	1.70
Stack Volumetric Flow Rates									
via O_2 "F_o-factor" (SCFH, dry basis)	3.19E+07	3.18E+07	3.18E+07	3.45E+07	3.41E+07	3.45E+07	3.95E+07	3.90E+07	3.91E+07
via CO_2 "F_c-factor" (SCFH, dry basis)	3.19E+07	3.17E+07	3.10E+07	3.44E+07	3.43E+07	3.47E+07	3.93E+07	3.88E+07	3.80E+07
Calculated Emission Rates (via M-19 O_2 "F-factor")									
NO_x (ppmv, dry @ 15% O_2)	13.8	15.2	10.3	14.2	15.1	12.2	7.0	10.1	9.6
NO_x (ppmv @ 15% O_2, ISO Day)	15.5	17.4	11.8	16.1	17.1	14.0	8.3	12.1	11.7
NO_x (lbs/hr)	**54.1**	**59.8**	**40.5**	**64.2**	**69.0**	**56.3**	**36.2**	**52.1**	**49.6**

STACK EMISSIONS
INITIAL COMPLIANCE TEST REPORT

on a

99 MMBTU/HR AUXILIARY BOILER

at the

HINES ENERGY COMPLEX

in

POLK COUNTY, FLORIDA

Prepared for

FLORIDA POWER CORPORATION

May 1999

Cubix Job No. 4911

Prepared by

Cubix Corporation
http://www.cubixcorp.com

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INTRODUCTION

Stack emission testing was conducted on a 99 MMBtu/hr natural gas fired Auxiliary Boiler located at the Hines Energy Complex near Fort Meade in Polk County, Florida. Florida Power Corporation (FPC) owns and operates this facility. This report documents the testing of the auxiliary boiler while fired on natural gas. Oxides of nitrogen (NO_x), oxygen (O_2), carbon dioxide (CO_2), and visible emissions (VE) were measured in the exhaust of the auxiliary boiler. The tests were conducted by Cubix Corporation, Southeast Regional Office, on March 29, 1999.

The purpose of this testing was to determine the status of initial compliance for the auxiliary boiler's emissions with the permit limits set forth by the Florida Department of Environmental Protection (FDEP), Permit Numbers PSD-FL-195A and PA-92-33. Additionally, the emissions were measured to determine compliance with the Environmental Protection Agency (EPA) Code of Federal Regulations, Title 40, Part 60, (40 CFR 60) Subpart Dc "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units". The tests followed the procedures set forth in 40 CFR 60, Appendix A, Methods 3a, 7e, 9, and 19. Three one-hour test runs were conducted on the unit documenting operational data, emission concentrations, and mass emission rates.

This report has been reviewed and is approved for submittal by the following representatives:

Cubix Corporation

Florida Power Corporation

SUMMARY OF RESULTS

Florida Power Corporation owns and operates the Hines Energy Complex located in Polk County, Florida. At this facility a natural gas fired auxiliary boiler is used to provide supplemental steam to a heat recovery steam generation system used in power generation. Stack emissions from this unit are the subject of this report.

The test matrix consisted of three one-hour (or greater) test runs on the auxiliary boiler. The unit was fueled by natural gas during these tests. The average unit operation was 11.4% of the 99 MMBtu/hr permit limit. This is the normal maximum achievable operation for this unit in the current plant configuration. Continuos instrumental analyses was conducted for NO_X, O_2 and CO_2. Visible emissions were monitored simultaneously with Test Run Gas-3C-1.

Table 2 is a summary of the results of the auxiliary boiler stack emissions testing. This summary documents the unit operating conditions, stack volumetric flow rates, observed concentrations, and calculated mass emission rates for each test run. NO_X concentrations were determined on a part per million volume basis (ppmv, dry). The NO_X, mass emission rates are presented in terms of pounds per hour (lbs/hr) and pounds per million British thermal units (lbs/MMBtu) for comparison with the permit limits.

Visible emission observations of the auxiliary boiler exhaust stack were performed by an Eastern Technical Associates of Raleigh, North Carolina certified EPA Method 9 observer. A one-hour visible emissions test run was conducted. The testing was conducted in the afternoon.

Examples of emission rate calculations, and other calculations necessary for the presentation of the results of this section are contained in Appendix B. Appendix C contains unit operational data obtained during the tests. Quality Assurance Activities are documented in Appendix D. Certificates of calibrations are contained in Appendix E of this report. Copies of the reference method strip chart records obtained during these tests are available in Appendix F of this report. Appendix G contains the "Visible Emissions Observation Forms" and the observer certifications. The FDEP facility permit is presented in appendix H for reference purposes.

Summary of Results
Auxiliary Boiler

Company: Florida Power Corporation
Plant: Hines Energy Complex
Location: near Ft. Meade in Polk County, Florida
Technicians: LJB, RPO, DLD
Source: 99 MMBtu/hr Auxiliary Boiler

Test Number	Gas-3C-1	Gas-3C-2	Gas-3C-3		
Date	3/29/99	3/29/99	3/29/99		
Start Time	16:15	17:25	18:35		FDEP Permit Limits
Stop Time	17:15	18:25	19:35		
Auxiliary Boiler Operation				*Averages*	
Fuel Flow (lbs/hr, natural gas)	490.3	492.3	485.6	*489.4*	
Heat Input (MMBtu/hr, higher heat value (HHV))	11.34	11.38	11.23	*11.32*	99
Boiler Load (% Full Load, of 99 MMBtu/hr)	11.5%	11.5%	11.3%	*11.4%*	
Auxiliary Steam Pressure (psig)	87.7	87.0	87.9	*87.5*	
Auxiliary Steam Temperature (°F)	328.5	325.8	326.4	*326.9*	
Natural Fuel Data (Natural Gas, FGT)					
Fuel Heating Value (Btu/lb, HHV)	23122	23122	23122	*23122*	
Fuel Specific Gravity	0.5982	0.5982	0.5982	*0.5982*	
O_2 "F-factor" (DSCFex/MMBtu @ 0% excess air)	8646	8646	8646	*8646*	
CO_2 "F-factor" (DSCFex/MMBtu @ 0% excess air)	1034	1034	1034	*1034*	
Heat Input (MMBtu/hr, Higher Heat Value)	11.34	11.38	11.23	*11.32*	
Heat Input (MMBtu/hr. Lower Heat Value)	10.20	10.24	10.10	*10.18*	
Ambient Conditions					
Atmospheric Pressure ("Hg)	29.88	29.88	29.90	*29.89*	
Temperature (°F): Dry bulb	84.0	79.7	77.8	*80.5*	
(°F): Wet bulb	67.0	63.2	68.9	*66.4*	
Humidity (lbs moisture/lb of air)	0.0100	0.0084	0.0128	*0.0104*	
Measured Emissions					
NO_x (ppmv, dry basis)	33.19	33.50	32.55	*33.08*	
Visible Emissions (% opacity, w/ Test Run Gas-3C-1)	0			0	10
O_2 (% volume, dry basis)	2.74	2.88	2.85	*2.82*	
CO_2 (% volume. dry basis)	10.47	10.53	10.54	*10.51*	
F_o (fuel factor, range = 1.600-1.836 for NG)	1.73	1.71	1.71	*1.72*	
Stack Volumetric Flow Rates					
via O_2 "F_d-factor" (SCFH, dry basis)	1.13E+05	1.14E+05	1.12E+05	*1.13E+05*	
via CO_2 "F_c-factor" (SCFH. dry basis)	1.12E+05	1.12E+05	1.10E+05	*1.11E+05*	
Calculated Emission Rates (via M-19 O_2 "F-factor")					
NO_x (lbs/hr)	0.447	0.457	0.437	*0.447*	
NO_x (lbs/MMBtu)	0.0394	0.0401	0.0389	*0.0395*	0.1

INITIAL COMPLIANCE TEST REPORT
for
NO. 2 FUEL OIL FUELED STACK EMISSIONS

on
POWER BLOCK 1

consisting of
UNITS 1A AND 1B, TWO WESTINGHOUSE 501F COMBINED CYCLE COMBUSTION TURBINES

at the
HINES ENERGY COMPLEX

in
POLK COUNTY, FLORIDA

Prepared for

FLORIDA POWER CORPORATION

May 1999

Cubix Job No. 4911

Prepared by

Cubix Corporation
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INTRODUCTION

Emission testing was conducted on Power Block 1, which consists of two combined cycle combustion turbines manufactured by Siemens Westinghouse Power Corporation. These units, used to generate power, were recently installed at the Hines Energy Complex located near Fort Meade in Polk County, Florida. Florida Power Corporation (FPC) owns and operates this facility. This report documents the testing of each combustion turbine while fueled with No. 2 fuel oil. A separate report was previously provided for the testing of the units while fueled with natural gas. The testing was conducted by Cubix Corporation, Southeast Regional Office on April 1 through 2 and April 11 through 12, 1999.

The purpose of this testing was to determine the status of initial compliance for combustion turbine emissions with the permit limits set forth by the Florida Department of Environmental Protection (FDEP), Permit Numbers PSD-FL-195A and PA-92-33. Additionally, the emissions were measured to determine compliance with the Environmental Protection Agency (EPA) Code of Federal Regulations, Title 40, Part 60, (40 CFR 60) Subpart GG "Standards of Performance for Stationary Gas Turbines". The tests followed the procedures set forth in 40 CFR 60, Appendix A, Methods 1, 2, 3a, 4, 5, 9, 10, 19, 20, and 25a.

Each turbine's exhaust was analyzed for oxides of nitrogen (NO_X), carbon monoxide (CO), total hydrocarbon compounds (THC), oxygen (O_2), and carbon dioxide (CO_2) using continuous instrumental monitors. Particulate matter (PM) samples were collected iso-kinetically using a combined hot/cold manual sampling train. Visible emissions (VE) were determined by a certified observer. Analysis of the No. 2 fuel oil was provided by Intertek Testing Services laboratory of Tampa, Florida using American Society of Testing and Materials (ASTM) test methods. Table 1 provides background data pertinent to these tests.

This test report has been reviewed and approved for submittal to the FDEP by the following representatives:

Cubix Corporation

Florida Power Corporation

SUMMARY OF RESULTS

Florida Power Corporation (FPC) owns and operates the Hines Energy Complex in Polk County, Florida. At this facility two Westinghouse combined cycle combustion turbines, each equipped with an unfired heat recovery steam generator (HRSG), are used to generate electrical power. The combustion turbines are designated as Unit 1A and Unit 1B by FPC. Stack emissions from these units, while fueled with No. 2 fuel oil, are the subject of this report. Unit emissions, while fueled with natural gas, were previously reported.

A sampling traverse for changes in O_2 concentration (stratification) within the exhaust stack on each unit was conducted previously while fueled with natural gas. The first step in the test matrix for each unit consisted of conducting an initial O_2 sampling traverse of the combustion turbine/heat recovery steam generator (CT/HRSG) exhaust stack. Each turbine was set to the lowest load representative of normal operation, approximately 90 megawatts (MW), while operating under dry, low NO_X combustion and with Selective Catalytic Reduction (SCR) operating. O_2 concentrations were measured at 48 traverse points within the CT/HRSG stack to determine the eight points of lowest O_2 concentration. This initial traverse was conducted on each CT/HRSG stack. No significant stratification was found in either exhaust stack; therefore, all subsequent tests were conducted at the eight most convenient traverse points on each unit.

Cubix conducted three test runs at each of four load conditions across the operational range of the combustion turbine (~85 MW, ~110 MW, ~135 MW, and full load at ~155 MW). Each reduced load test run was 20 minutes in duration (8 sample points, 150 seconds per point). Full load is defined as 90 to 100% of the maximum permitted capacity, expressed as heat input, determined from the Westinghouse performance curve of heat input versus turbine inlet temperature for the unit. NO_X, O_2, and CO_2 were continuously monitored at all load conditions. Additional full load measurements included CO and THC using continuous instrumental monitors and iso-kinetic sampling for collection of PM samples. The full load test runs were 1 hour in duration for all constituents. A one-hour VE test was conducted simultaneously with one of the full load test runs. This test matrix was performed on both CT units.

Table 2, the executive summary, signifies the performance for each unit during the full load testing. These performance results are an average of the three full load test runs for each unit. These emissions are compared to the

permit limits set forth in FDEP Permit Nos. PSD-FL-195A and PA-92-33.

TABLE 2
Fuel Oil Executive Summary

Parameter	Unit 1A Westinghouse 501F Turbine	Unit 1B Westinghouse 501F Turbine	NSPS/FDEP Permit Limits
Percent Load (of capacity as heat input)	102.9%	102.7%	90 to 100%
NO_x (lbs/hr at 76°F inlet temperature)	234.0	-	294.92
NO_x (lbs/hr at 78°F inlet temperature)	-	206.0	293.38
VOC (lbs/hr, from THC measurements)	0.68	0.30	19.0
CO (lbs/hr)	4.24	3.78	93
PM/PM_{10} (lbs/hr)	26.0	27.2	44.8
SO_2 (lbs/hr)	5.11	5.25	94.0
Visible Emissions (% opacity)	2.2%	5%	20%

Tables 3 and 4 represent the Unit 1A test results for full load fuel oil (FO) and reduced load FO testing, respectively. These tabular summaries contain all pertinent operational parameters, ambient conditions, measured emissions, corrected concentrations, and calculated emission rates. NO_X emissions are reported in units of parts per million by volume (ppmv) on a dry basis, ppmv corrected to 15% excess O_2, and ppmv corrected to 15% excess O_2 and ISO conditions. The EPA defines ISO conditions as ambient atmospheric conditions of 59 degrees Fahrenheit (°F) temperature, 101.3 kilopascals (kPa) pressure, and 60% relative humidity. CO concentrations were determined on ppmv, dry basis. Volatile organic compound (VOC) concentrations were determined from THC measurements and were determined on a ppmv, wet basis as methane. Concentrations of PM were determined in units of grams per dry standard cubic feet (grams PM/DSCF). Mass emission rates for NO_X, CO, VOC, PM, and SO_2 are reported in terms of pounds per hour (lbs/hr). As stated in the test matrix above, only NO_X concentrations and emissions were applicable for the reduced load tests.

Tables 5 and 6 represent the Unit 1B test results for full load FO and reduced load FO testing, respectively. These tabular summaries contain all pertinent operational parameters, ambient conditions, measured emissions, corrected concentrations, and calculated emission rates. NO_X emissions are reported in units of ppmv on a dry basis, ppmv at 15% excess O_2, and ppmv at 15% excess O_2 and ISO conditions. CO concentrations were determined on ppmv, dry basis. VOC concentrations were determined from THC measurements and were determined on a ppmv, wet basis as methane. Concentrations of PM

were determined in units of grams PM/DSCF. Mass emission rates for NO_X, CO, VOC, PM, and SO_2 are reported in terms of lbs/hr.

Volumetric flow and mass emission rates were determined by stoichiometric calculation (EPA Method 19) based on measurements of diluent gas (O_2 or CO_2) concentrations, "F-factors" determined from fuel composition, and unit fuel flow rates. Examples of iso-kinetic calculations, emission rate calculations, and other calculations necessary for the presentation of the results of this section are contained in Appendix B.

The fuel sulfur content analyses, concentration percent weight, is contained in Appendix C of this report. A fuel oil sample was collected during the testing for each unit and shipped to Intertek Testing Services of Tampa, Florida for analysis. The fuel was analyzed for total fuel sulfur content by ASTM Method D2622. The SO_2 emission rates, reported in lbs/hr, were calculated from the results of these analyses and the measured fuel flow rates recorded during the tests.

The fuel bound nitrogen (FBN) analyses, concentration in parts per million (ppm) by weight, is contained in Appendix C of this report. A fuel sample was collected and shipped to the laboratory designated above for analysis. The fuel was analyzed for FBN by ASTM Method D4629. Results of FBN were below 150 ppm, the breakpoint value used for correction of exhaust NO_X emissions.

Visible emission observations of each CT/HRSG exhaust stack per EPA Method 9 were performed by an observer certified by Eastern Technical Associates of Raleigh, North Carolina. A one-hour visible emissions test run was conducted on each unit. VE were an average of 2.2% opacity on Unit 1A in the highest six-minute average and 5% opacity on Unit 1B in the highest six-minute average. No VE greater than 5% opacity was observed during the tests.

Appendix A contains all field data sheets used during these tests as well as the particulate matter analysis worksheets. Appendix B contains examples of all calculations necessary for the reduction of the data presented in this report. Appendix C contains the fuel analysis and Cubix's fuel calculation worksheet. Quality Assurance Activities are documented in Appendix D. Certificates of calibrations are contained in Appendix E of this report. Copies of the reference method strip chart records obtained during these tests are available in Appendix F of this report. Appendix G contains the "Visible Emissions Observation Forms" and the observer certifications. Appendix H contains the operational data provided by FPC during the test runs. The FDEP facility permit is presented in Appendix I for reference purposes.

Company: Florida Power Corporation
Plant: Hines Energy Complex
Location: near Ft. Meade in Polk County, Florida
Technicians: LJB, RPO, DLD
Source: Unit 1A, a Westinghouse 501F Power Turbine

TABLE 3: Summary of Results
Full Load FO Tests
Unit 1A

Test Run Number	Oil-AC-1	Oil-AC-2	Oil-AC-3		FDEP Permit Limits
Date	4/11/99	4/11/99	4/11/99		
Start Time	18:28	20:14	22:28		
Stop Time (24 hour clock	19:28	21:20	23:28		
Power Turbine Operation				*Averages*	
Generator Output (MW, simple cycle mode)	153.8	156.3	158.1	*156.1*	
Heat Input (MMBtu/hr, based on GHV)	1795	1818	1835	*1816*	
Turbine Capacity (Mfg.'s Curve, heat input vs. capacity)	1746	1763	1788	*1766*	
Percent Load (% of maximum heat input at inlet temp)	102.9%	103.1%	102.6%	*102.9%*	
Engine Compressor Discharge Pressure (psia)	207.5	209.4	211.8	*209.5*	
Turbine Air Inlet Temperature (°F)	79.8	76.2	71.2	*75.7*	
Mean Turbine Exhaust Temperature (°F)	1106	1103	1100	*1103*	
Water Injection Stage A & B Flow (gpm)	97.2	98.8	98.8	*98.3*	
Water to Fuel Ratio (lbs H_2O/lb fuel)	0.6	0.6	0.6	*0.6*	
Water Injection Stage A & B Flow (KPPH)	48.6	49.4	49.4	*49.2*	
Water to Fuel Ratio (lbs H_2O/lb fuel, calculated)	0.539	0.541	0.536	*0.538*	
Fuel Data (No. 2 Fuel Oil)					
O_2 "F-factor" (DSCFex/MMBtu fuel burned, calculated)	9151	9151	9151	*9151*	
CO_2 "F-factor" (DSCFex/MMBtu fuel burned, calculated)	1389	1389	1389	*1389*	
O_2 "F-factor" (DSCFex/MMBtu fuel burned, published)	9190	9190	9190	*9190*	
CO_2 "F-factor" (DSCFex/MMBtu fuel burned, published)	1420	1420	1420	*1420*	
Fuel Flow (KPPH)	90.25	91.40	92.24	*91.30*	
Total Sulfur in Fuel (% weight)	0.0028	0.0028	0.0028	*0.0028*	0.05
Fuel Bound Nitrogen (ppm, weight)	97	97	97	*97*	
Fuel Heating Value (Btu/lb, GHV)	19,892	19,892	19,892	*19,892*	
Heat Input (MMBtu/hr, based on GHV)	1795.3	1818.2	1834.9	*1816.1*	
Ambient Conditions					
Atmospheric Pressure ("Hg)	29.66	29.71	29.73	*29.70*	
Temperature (°F): Dry bulb	82.0	74.8	72.3	*76.4*	
(°F): Wet bulb	72.9	71.6	71.4	*72.0*	
Humidity (lbs moisture/lb of air)	0.0150	0.0157	0.0161	*0.0156*	
Cubix Measurements					
NOx (ppmv, dry basis)	45.24	41.31	38.55	*41.70*	
NO_X (ppmv, dry @ 15% O_2)	36.0	32.9	30.7	*33.2*	
NO_X (ppmv @ 15% O_2, ISO Day)	40.2	37.5	35.8	*37.8*	
CO (ppmv, dry basis)	1.25	1.25	1.23	*1.24*	
O_2 (% volume, dry basis)	13.49	13.50	13.50	*13.50*	
CO_2 (% volume, dry basis)	5.63	5.62	5.72	*5.66*	
THC (ppmv as CH_4, wet basis)	0.26	0.33	0.36	*0.32*	
PM (grams PM/DSCF exhaust gas)	2.32E-04	2.93E-04	2.29E-04	*2.51E-04*	
Visible Emissions (% opacity)	**2.2**			2.2	20
H_2O (% volume)	7.50	7.95	9.34	*8.26*	
F_o (Fuel factor = 1.260 - 1.413 for distillate oil)	1.32	1.32	1.29	*1.31*	
Stack Volumetric Flow Rates (from calculated "F-factors")					
via O_2 "F-factor" (SCFH, dry basis)	4.63E+07	4.70E+07	4.74E+07	*4.69E+07*	
via CO_2 "F-factor" (SCFH, dry basis)	4.43E+07	4.49E+07	4.46E+07	*4.46E+07*	
Calculated Emission Rates (via M-19 "F-factors")					
NO_X (lbs/hr)	**250**	**232**	**218**	*234*	294.92'
CO (lbs/hr)	**4.21**	**4.27**	**4.24**	*4.24*	93.0
THC (lbs/hr)	**0.54**	**0.70**	**0.78**	*0.68*	19.0
PM/PM_{10} (lbs/hr, including H_2SO_4 mist)	**23.7**	**30.3**	**23.9**	*26.0*	44.8
SO_2 (lbs/hr, based on fuel flow and fuel S)	**5.05**	**5.11**	**5.16**	*5.11*	94.0

' Permit Limit based upon actual average turbine air inlet temperature during testing

Testing by Cubix Corporation, - Austin, Texas - Gainesville, Florida

Company: Florida Power Corporation
Plant: Hines Energy Complex
Location: near Ft. Meade in Polk County, Florida
Technicians: LJB, RPO, DLD
Source: Unit 1A, a Westinghouse 501F Power Turbine

TABLE 4: Summary of Results
Reduced Load FO Testing
Unit 1A

Test Run No.	Oil-AC-4	Oil-AC-5	Oil-AC-6	Oil-AC-7	Oil-AC-8	Oil-AC-9	Oil-AC-10	Oil-AC-11	Oil-AC-12
Date	4/11-12/99	4/12/99	4/12/99	4/12/99	4/12/99	4/12/99	4/12/99	4/12/99	4/12/99
Start Time	23:55	00:24	00:52	01:30	01:59	02:28	04:00	04:29	04:57
Stop Time	00:16	00:44	01:14	01:50	02:19	02:48	04:20	04:49	05:17
Power Turbine Operation	**~136 MW Generator Output**			**~111 MW Generator Output**			**~85 MW Generator Output**		
Generator Output (MW, simple cycle mode)	136.0	135.9	136.6	111.5	112.3	111.3	84.3	85.8	85.0
Heat Input (MMBtu/hr, based on GHV)	1600.6	1597.0	1609.5	1354.9	1362.6	1359.8	1118.4	1128.9	1126.5
Turbine Capacity (Mfg.'s Curve, heat input vs. capacity)	1787	1789	1791	1784	1794	1794	1794	1794	1794
Percent Load (% of maximum heat input at inlet temp)	89.6%	89.3%	89.8%	75.9%	76.0%	75.8%	62.3%	62.9%	62.8%
Engine Compressor Discharge Pressure (psia)	192.1	192.6	192.6	172.4	172.4	171.8	156.3	155.7	155.7
Turbine Air Inlet Temperature (°F)	71.5	71.0	70.5	72.0	70.0	70.0	70.0	70.0	70.0
Mean Turbine Exhaust Temperature (°F)	1068	1065	1065	1037	1039	1034	969	969	969
Water Injection Stage A & B Flow (gpm)	70.4	71.5	71.5	46.0	46.0	47.0	28.2	28.2	28.2
Water to Fuel Ratio (lbs H_2O/lb fuel)	0.5	0.5	0.5	0.4	0.4	0.4	0.2	0.2	0.2
Water Injection Stage A & B Flow (KPPH)	35.2	35.7	35.8	23.0	23.0	23.5	14.1	14.1	14.1
Water to Fuel Ratio (lbs H_2O/lb fuel, calculated)	0.437	0.445	0.442	0.338	0.336	0.344	0.251	0.249	0.249
Fuel Data (No.2 Fuel Oil)									
O_2 "F-factor" (DSCFex/MMBtu fuel burned) Published	9151	9151	9151	9151	9151	9151	9151	9151	9151
CO_2 "F-factor" (DSCFex/MMBtu fuel burned) Published	1390	1390	1390	1390	1390	1390	1390	1390	1390
O_2 "F-factor" (DSCFex/MMBtu fuel burned, published)	9190	9190	9190	9190	9190	9190	9190	9190	9190
CO_2 "F-factor" (DSCFex/MMBtu fuel burned, published)	1420	1420	1420	1420	1420	1420	1420	1420	1420
Fuel Flow (KPPH)	80.48	80.30	80.93	68.13	68.51	68.37	56.23	56.76	56.64
Total Sulfur in Fuel (% weight)	0.0029	0.0029	0.0029	0.0029	0.0029	0.0029	0.0029	0.0029	0.0029
Fuel Bound Nitrogen (ppm by weight)	92	92	92	92	92	92	92	92	92
Fuel Heating Value (Btu/lb, GHV)	19,889	19,889	19,889	19,889	19,889	19,889	19,889	19,889	19,889
Heat Input (MMBtu/hr, based on GHV)	1600.6	1597.0	1609.5	1354.9	1362.6	1359.8	1118.4	1128.9	1126.5
Ambient Conditions									
Atmospheric Pressure ("Hg)	29.71	29.72	29.70	29.70	29.70	29.69	29.68	29.68	29.69
Temperature (°F): Dry bulb	72.1	71.8	71.0	71.1	70.3	70.3	70.6	71.2	71.3
(°F): Wet bulb	71.2	71.2	71.0	70.2	69.9	69.9	69.8	70.0	69.9
Humidity (lbs moisture/lb of air)	0.0160	0.0161	0.0161	0.0154	0.0154	0.0154	0.0153	0.0153	0.0152
Cubix Measurements									
NO_x (ppmv, dry basis)	40.09	38.97	38.43	31.63	30.74	29.42	24.92	24.78	24.56
O_2 (% volume, dry basis)	13.88	13.88	13.87	14.38	14.42	14.45	15.26	15.22	15.22
CO_2 (% volume, dry basis)	5.29	5.32	5.36	4.96	4.95	4.95	4.20	4.30	4.30
F_o (fuel factor, range = 1.260 - 1.413 for FO)	1.33	1.32	1.31	1.31	1.31	1.30	1.34	1.32	1.32
Stack Volumetric Flow Rates (from calculated "F-factors")									
via O_2 "F-factor" (SCFH, dry basis)	4.38E+07	4.37E+07	4.40E+07	3.99E+07	4.04E+07	4.05E+07	3.81E+07	3.82E+07	3.81E+07
via CO_2 "F-factor" (SCFH, dry basis)	4.30E+07	4.26E+07	4.26E+07	3.88E+07	3.91E+07	3.90E+07	3.78E+07	3.73E+07	3.72E+07
Calculated Emission Rates (via M-19 "F-factors")									
NO_x (ppmv, dry @ 15% O_2)	33.7	32.8	32.3	28.6	28.0	26.9	26.1	25.7	25.5
NO_x (ppmv, dry @ 15% O_2, ISO Day)	39.1	38.1	37.6	32.9	32.3	31.1	30.0	29.6	29.3
NO_x (lbs/hr)	**210**	**203**	**202**	**151**	**148**	**142**	**113**	**113**	**112**

Company: Florida Power Corporation
Plant: Hines Energy Complex
Location: near Ft. Meade in Polk County, Florida
Technicians: LJB, RPO, DLD
Source: Unit 1B, a Westinghouse 501F Power Turbine

TABLE 5: Summary of Results
Full Load FO Tests
Unit 1B

Test Run Number	Oil-BC-4	Oil-BC-5	Oil-BC-6		FDEP Permit Limits
Date	4/1/99	4/1/99	4/1/99		
Start Time	13:10	15:50	17:50		
Stop Time	14:10	16:50	18:50		
Power Turbine Operation				*Averages*	
Generator Output (MW, simple cycle mode)	153.0	153.8	159.1	*155.3*	
Heat Input (MMBtu/hr, based on GHV)	1781	1790	1832	*1801*	
Turbine Capacity (Mfg.'s Curve, heat input vs. capacity)	1740	1736	1786	*1754*	
Percent Load (% of maximum heat input at inlet temp)	102.4%	103.1%	102.6%	*102.7%*	
Engine Compressor Discharge Pressure (psia)	207.9	207.2	212.0	*209.0*	
Turbine Air Inlet Temperature (°F)	81.0	81.8	71.6	*78.1*	
Mean Turbine Exhaust Temperature (°F)	1103	1109	1099	*1104*	
Water Injection Stage A & B Flow (gpm)	97.20	98.26	96.30	*97.25*	
Water to Fuel Ratio (lbs H_2O/lb fuel)	0.6	0.6	0.6	*0.6*	
Water Injection Stage A & B Flow (KPPH)	48.62	49.15	48.17	*48.65*	
Water to Fuel Ratio (lbs H_2O/lb fuel, calculated)	0.543	0.546	0.523	*0.537*	
Fuel Data (No. 2 Fuel Oil)					
O_2 "F-factor" (DSCFex/MMBtu fuel burned, calculated)	9151	9151	9151	*9151*	
CO_2 "F-factor" (DSCFex/MMBtu fuel burned, calculated)	1390	1390	1390	*1390*	
O_2 "F-factor" (DSCFex/MMBtu fuel burned, published)	9190	9190	9190	*9190*	
CO_2 "F-factor" (DSCFex/MMBtu fuel burned, published)	1420	1420	1420	*1420*	
Fuel Flow (KPPH)	89.55	90.00	92.12	*90.56*	
Total Sulfur in Fuel (% weight)	0.0029	0.0029	0.0029	*0.0029*	0.05
Fuel Bound Nitrogen (ppm by weight)	92	92	92	*92*	
Fuel Heating Value (Btu/lb, GHV)	19,889	19,889	19,889	*19,889*	
Heat Input (MMBtu/hr, based on GHV)	1781.1	1790.0	1832.2	*1801.1*	
Ambient Conditions					
Atmospheric Pressure ("Hg)	29.69	29.64	29.65	*29.66*	
Temperature (°F): Dry bulb	87.0	85.0	76.2	*82.7*	
(°F): Wet bulb	74.0	73.0	70.3	*72.4*	
Humidity (lbs moisture/lb of air)	0.0148	0.0144	0.0144	*0.0145*	
Cubix Measurements					
NOx (ppmv, dry basis)	38.88	38.14	36.78	*37.93*	
NO_x (ppmv, dry @ 15% O_2)	30.3	29.6	28.7	*29.6*	
NO_x (ppmv @ 15% O_2, ISO Day)	33.5	32.5	32.3	*32.8*	
CO (ppmv, dry basis)	1.24	1.10	1.09	*1.14*	
O_2 (% volume, dry basis)	13.34	13.30	13.34	*13.33*	
CO_2 (% volume, dry basis)	5.57	5.56	5.48	*5.54*	
THC (ppmv as CH_4, wet basis)	0.26	0.12	0.05	*0.14*	
PM (grams PM/DSCF exhaust gas)	2.51E-04	2.97E-04	2.65E-04	*2.71E-04*	
Visible Emissions (% opacity)		**5.0**		**5.0**	20
H_2O (% volume)	8.97	9.12	9.25	*9.11*	
F_c (Fuel factor = 1.260 - 1.413 for distillate oil)	1.36	1.37	1.38	*1.37*	
Stack Volumetric Flow Rates (from calculated "F-factors")					
via O_2 "F-factor" (SCFH, dry basis)	4.51E+07	4.50E+07	4.64E+07	*4.55E+07*	
via CO_2 "F-factor" (SCFH, dry basis)	4.44E+07	4.48E+07	4.65E+07	*4.52E+07*	
Calculated Emission Rates (via M-19 "F-factors")					
NO_x (lbs/hr)	**209**	**205**	**204**	*206*	293.38[1]
CO (lbs/hr)	**4.06**	**3.60**	**3.68**	*3.78*	93.0
THC (lbs/hr)	**0.54**	**0.25**	**0.11**	*0.30*	19.0
PM/PM_{10} (lbs/hr, including H_2SO_4 mist)	**24.9**	**29.5**	**27.1**	*27.2*	44.8
SO_2 (lbs/hr, based on fuel flow and fuel S)	**5.19**	**5.22**	**5.34**	*5.25*	94.0

[1] Permit Limit based upon actual average turbine air inlet temperature during testing

Testing by Cubix Corporation, - Austin, Texas - Gainesville, Florida

Company: Florida Power Corporation
Plant: Hines Energy Complex
Location: near Ft. Meade in Polk County, Florida
Technicians: LJB, RPO, DLD
Source: Unit 1B, a Westinghouse 501F Power Turbine

TABLE 6: Summary of Results
Reduced Load FO Testing
Unit 1B

Test Run No.	Oil-BC-1	Oil-BC-2	Oil-BC-3	Oil-BC-7	Oil-BC-8	Oil-BC-9	Oil-BC-10	Oil-BC-11	Oil-BC-12
Date	4/1/99	4/1/99	4/1/99	4/2/99	4/2/99	4/2/99	4/2/99	4/2/99	4/2/99
Start Time	08:55	09:28	10:04	08:10	08:45	09:18	10:20	10:53	11:25
Stop Time	09:15	09:48	10:24	08:30	09:05	09:39	10:40	11:13	11:45
Power Turbine Operation	**~85 MW Generator Output**			**~132 MW Generator Output**			**~110 MW Generator Output**		
Generator Output (MW, simple cycle mode)	86.0	85.2	85.3	131.9	131.9	131.5	110.9	110.2	109.1
Heat Input (MMBtu/hr, based on GHV)	1133.6	1123.9	1129.1	1539.5	1547.3	1547.1	1352.2	1343.9	1330.6
Turbine Capacity (Mfg.'s Curve, heat input vs. capacity)	1789	1774	1769	1804	1804	1804	1787	1769	1769
Percent Load (% of maximum heat input at inlet temp)	63.4%	63.3%	63.8%	85.4%	85.8%	85.8%	75.7%	76.0%	75.2%
Engine Compressor Discharge Pressure (psia)	155.2	155.2	155.2	189.6	189.6	189.6	171.6	171.0	170.5
Turbine Air Inlet Temperature (°F)	71.0	74.0	75.0	68.0	68.0	68.0	71.5	75.0	75.0
Mean Turbine Exhaust Temperature (°F)	995	994	995	1041	1043	1046	1038	1041	1038
Water Injection Stage A & B Flow (gpm)	28.3	28.3	28.3	63.2	63.2	64.4	44.2	44.2	44.2
Water to Fuel Ratio (lbs H_2O/lb fuel)	0.3	0.3	0.3	0.5	0.5	0.5	0.4	0.4	0.4
Water Injection Stage A & B Flow (KPPH)	14.2	14.2	14.2	31.6	31.6	32.2	22.1	22.1	22.1
Water to Fuel Ratio (lbs H_2O/lb fuel, calculated)	0.248	0.251	0.249	0.408	0.406	0.414	0.325	0.327	0.331
Fuel Data (No.2 Fuel Oil)									
O_2 "F-factor" (DSCFex/MMBtu fuel burned, calculated)	9151	9151	9151	9151	9151	9151	9151	9151	9151
CO_2 "F-factor" (DSCFex/MMBtu fuel burned, calculated)	1389	1389	1389	1389	1389	1389	1389	1389	1389
O_2 "F-factor" (DSCFex/MMBtu fuel burned, published)	9190	9190	9190	9190	9190	9190	9190	9190	9190
CO_2 "F-factor" (DSCFex/MMBtu fuel burned, published)	1420	1420	1420	1420	1420	1420	1420	1420	1420
Fuel Flow (KPPH)	56.99	56.50	56.76	77.40	77.79	77.78	67.98	67.56	66.89
Total Sulfur in Fuel (% weight)	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028
Fuel Bound Nitrogen (ppm by weight)	97	97	97	97	97	97	97	97	97
Fuel Heating Value (Btu/lb, GHV)	19,892	19,892	19,892	19,892	19,892	19,892	19,892	19,892	19,892
Heat Input (MMBtu/hr, based on GHV)	1133.6	1123.9	1129.1	1539.5	1547.3	1547.1	1352.2	1343.9	1330.6
Ambient Conditions									
Atmospheric Pressure ("Hg)	29.76	29.76	29.76	29.74	29.74	29.75	29.75	29.75	29.75
Temperature (°F): Dry bulb	78.3	79.2	83.1	71.0	71.8	72.2	76.3	78.2	81.8
(°F): Wet bulb	71.7	72.1	73.0	70.4	71.2	71.7	72.8	73.8	75.0
Humidity (lbs moisture/lb of air)	0.0149	0.0150	0.0148	0.0156	0.0160	0.0163	0.0163	0.0166	0.0168
Cubix Measurements									
NO_x (ppmv, dry basis)	26.40	25.44	25.72	29.62	31.39	32.46	31.44	32.84	32.93
O_2 (% volume, dry basis)	15.14	15.15	15.12	14.11	14.07	14.03	14.48	14.48	14.46
CO_2 (% volume, dry basis)	4.37	4.37	4.37	5.15	5.19	5.20	4.84	4.93	4.89
F_o (fuel factor, range = 1.260 - 1.413 for FO)	1.32	1.32	1.32	1.32	1.32	1.32	1.33	1.30	1.32
Stack Volumetric Flow Rates (from calculated "F-factors")									
via O_2 "F-factor" (SCFH, dry basis)	3.76E+07	3.74E+07	3.74E+07	4.34E+07	4.33E+07	4.31E+07	4.03E+07	4.00E+07	3.95E+07
via CO_2 "F-factor" (SCFH, dry basis)	3.60E+07	3.57E+07	3.59E+07	4.15E+07	4.14E+07	4.13E+07	3.88E+07	3.79E+07	3.78E+07
Calculated Emission Rates (via M-19 "F-factors")									
NO_x (ppmv, dry @ 15% O_2)	27.0	26.1	26.3	25.7	27.1	27.9	28.9	30.2	30.2
NO_x (ppmv, dry @ 15% O_2, ISO Day)	30.8	29.5	29.5	30.0	31.8	32.9	33.7	35.1	35.2
NO_x (lbs/hr)	**119**	**114**	**115**	**153**	**162**	**167**	**151**	**157**	**155**

ATTACHMENT HEC-EU5-B6

EMISSIONS UNIT COMMENT

TRIVIAL ACTIVITIES

The trivial activities identified in this application are provided for information only and are identified as examples of, but not limited to, the trivial activities identified by the Division of Air Resources Management's (DARM's) guidance. It is understood that such activities do not have to be included in with the Title V Application. The trivial activities identified herein are consistent, in terms of amounts of emissions and types, with those activities listed in DARM's guidance.

NOTIFICATION OF TEMPORARY EXEMPTIONS

Pursuant to Rule 62-210.300(3)(b)1., notice is herein provide that the emissions units listed below are not subject to a permit issued by the Department of Environmental Protection and are exempt from permitting until a final determination is made under the Title V permitting requirements (Rule 62-213 F.A.C.). These units would not have triggered review under Rules 62-212.400 or 62-212.500 or any new source performance standard listed in Rule 62-204.800 F.A.C.

Attachment HEC-EU5-B6
General Emissions Unit Information for Unregulated Emissions Unit

Table 1. FPC, Hines Energy Complex, Unregulated Emissions Unit

Area	Emission Unit Description	Status
Offices	Office equipment operation	TR
	Routine repairs	TR
	Heating & cooling systems	TR (except Part 82)
Parking Lot	Vehicles	TR/ER
Maintenance	Sand blaster, welding, lathes, hand-held tools, etc.	ER/TR
	Cabinets with solvents, oils, flammables, etc.	TR
	Routine maintenance	TR
	Parts washer- Safety Kleen	TR
	Air compressors	TR
	Cylinders (acetylene, N2, O2, argon, CO2., etc.)	TR
	Golf carts	TR
Oil/ water separator area	Oil/water separator (2)	TR
Fire pump	Diesel generator	ER/UR
	Diesel oil tank	UR
Water storage tanks	Fire water tank(s)	ER
Gas turbine	On-line cleaner for gas turbine (clean for compressor efficiency); degreaser added; stored in 55 gal. drums	TR
	Electric motor (115v/230)	TR
Water treatment	Sealed tanks	TR
	Work bench area	TR
	Electric motors	TR
	Welding equipment	ER/TR
	Fire equipment	ER/TR
Combustion turbines	Lube oil vents with demister	UR
	False Start Drain Tank	TR
	Hydrogen venting & purge	TR
	CO2 tank (liquid)/ purge	TR
	Fire System	ER/TR

Attachment HEC-EU5-B6
General Emissions Unit Information for Unregulated Emissions Unit

Table 1. FPC, Hines Energy Complex, Unregulated Emissions Unit

Area	Emission Unit Description	Status
	Air compressors	TR
HRSG	Steam Vents CEM Ammonium Tank (30,000 gal)	
Oil storage tanks	90,470 bbl capacity	UR
	Lube oil vent with demister	UR
Substation/ switchyard	Transformers and associated equipment	TR
General Site	Surface coating < 6.0 gal/day	ER
	Brazing, soldering or welding	ER/TR
	Plant grounds maintenance	TR
	Routine maintneance	TR
	Oil water separators	TR
	CEM equipment & calibration gas venting	TR
	Compressed air system & miscellaneous compresors	TR
	Non-halogenerated solvents	TR/UR
	Fire water tank	ER/TR
	Plant vehicles/ Fugitive PM	UR

Status Key: ER = Exempt by Rule 62-210.300(3)(a)
TR = Trivial
UR = Unregulated

Florida Power Corporation Storage

Master Listing of Active Tanks

SC = Spill Containment
LLD = Line leak detector
LINED = Lined dike
DL = Dispenser Liner
SS = Stainless Steil
N/A = —

LOCATION	DEP TANK#	MATERIAL	SIZE (GAL)	SIZE (BBL)	INSTALL	CONTENT	CONFIG	STATUS	SC	LLD	DL	MONITOR
HIGGINS C.T. #01 (#1 TANK)	1	PAINT STL	404922	9,641	3/15/69	#2 FUEL OIL	ABOVE	IN USE		N	—	—
HIGGINS C.T. #02 (#2 TANK)	2	PAINT STL	635670	15,135	12/1/70	#2 FUEL OIL	ABOVE	T.O.S.		N	—	—
HIGGINS C.T. #11	11	DW-FRP	546	13	12/15/92	WASTE OIL	BELOW	IN USE	Y	Y	—	—
HIGGINS C.T. #12	12	DW-FRP	546	13	12/15/92	WASTE OIL	BELOW	IN USE	Y	Y	—	—
HIGGINS C.T. #13	13	DW-FRP	546	13	12/15/92	WASTE OIL	BELOW	IN USE	Y	Y	—	—
HIGGINS C.T. #14	14	DW-FRP	546	13	12/15/92	WASTE OIL	BELOW	IN USE	Y	Y	—	—
HIGGINS PLANT #01 (#1 TANK)	3	PAINT STL	2335704	55,612	6/1/51	#6 FUEL OIL	ABOVE	T.O.S.		N	—	—
HIGGINS PLANT #02 (#2 TANK)	4	PAINT STL	3369702	80,231	5/1/53	#6 FUEL OIL	ABOVE	T.O.S.		N	—	—
HIGGINS PLANT #04	\	PAINT STL	110	3	1/1/68	DIESEL-EQUIPMENT	ABOVE	IN USE	N	N	—	—
HIGGINS PLANT #05	\	PAINT STL	110	3	1/1/68	DIESEL-EQUIPMENT	ABOVE	IN USE	N	N	—	—
HIGGINS PLANT #07	\	PAINT STL	500	12	1/1/86	AUX. DIESEL	ABOVE	IN USE	N	N	—	—
HIGGINS PLANT #08	\	PAINT STL	0		1/1/50	WATER	ABOVE	IN USE	—	—	—	—
HIGGINS PLANT #09	\	PAINT STL	2184	52		HYDRAULIC OIL	ABOVE	IN USE	N	N	—	—
HIGHLANDS OPERATING CENTER	1	CONVAULT	2000	48	2/95	DIESEL FUEL	ABOVE	IN USE	Y	—	—	
HINES ENERGY COMPLEX (1)	1	PAINT STL	3799740	90,470		#2 FUEL OIL	ABOVE		Y	—	—	Y
HINES ENERGY COMPLEX (2)			6550			LUBE OIL	ABOVE					
HINES ENERGY COMPLEX (3)			300			DIESEL FUEL	ABOVE					
HINES ENERGY COMPLEX (4)			4800			SODIUM HYPOCHLORITE	ABOVE					
HINES ENERGY COMPLEX (5)			7000			LUBE OIL	ABOVE					
HINES ENERGY COMPLEX (6)			7000			LUBE OIL	ABOVE					
HINES ENERGY COMPLEX (7)			500			WASTE OIL	BELOW					
HINES ENERGY COMPLEX (8)			500			WASTE OIL	BELOW					
(9)	2		30000			Ammonia	Above					
INTRCSN. CITY C.T. P1A	23	DW-FRP	183	4	4/1/93	WASTE OIL	BELOW	IN USE	Y	Y	—	—
INTRCSN. CITY C.T. P1B	24	DW-FRP	183	4	4/1/93	WASTE OIL	BELOW	IN USE	Y	Y	—	—
INTRCSN. CITY C.T. P2A	25	DW-FRP	183	4	4/1/93	WASTE OIL	BELOW	IN USE	Y	Y	—	—
INTRCSN. CITY C.T. P2B	26	DW-FRP	183	4	4/1/93	WASTE OIL	BELOW	IN USE	Y	Y	—	—
INTRCSN. CITY C.T. P3A	27	DW-FRP	183	4	4/1/93	WASTE OIL	BELOW	IN USE	Y	Y	—	—
INTRCSN. CITY C.T. P3B	28	DW-FRP	183	4	4/1/93	WASTE OIL	BELOW	IN USE	Y	Y	—	—
INTRCSN. CITY C.T. P4A	29	DW-FRP	183	4	4/1/93	WASTE OIL	BELOW	IN USE	Y	Y	—	—
INTRCSN. CITY C.T. P4B	30	DW-FRP	183	4	4/1/93	WASTE OIL	BELOW	IN USE	Y	Y	—	—
INTRCSN. CITY C.T. P5A	31	DW-FRP	183	4	4/1/93	WASTE OIL	BELOW	IN USE	Y	Y	—	—
INTRCSN. CITY C.T. P5B	32	DW-FRP	183	4	4/1/93	WASTE OIL	BELOW	IN USE	Y	Y	—	—
INTRCSN. CITY C.T. P6A	33	DW-FRP	183	4	4/1/93	WASTE OIL	BELOW	IN USE	Y	Y	—	—
INTRCSN. CITY C.T. P6B	34	DW-FRP	183	4	4/1/93	WASTE OIL	BELOW	IN USE	Y	Y	—	—
INTRCSN. CITY C.T. #13	15	PAINT STL	50000	1,190	10/1/78	WASTE OIL	ABOVE	IN USE	—	—	—	—
INTERCESSION CITY C.T. P7	19	DW-FRP	2500	48	1/1/93	WASTE OIL	BELOW	IN USE	Y	Y	—	INSTALL
INTERCESSION CITY C.T. P8	20	DW-FRP	2500	48	1/1/93	WASTE OIL	BELOW	IN USE	Y	Y	—	INSTALL
INTERCESSION CITY C.T. P9	21	DW-FRP	2500	48	1/1/93	WASTE OIL	BELOW	IN USE	Y	Y	—	INSTALL
INTERCESSION CITY C.T. P10	22	DW-FRP	2500	48	1/1/93	WASTE OIL	BELOW	IN USE	Y	Y	—	INSTALL
I.C. C.T. #2 (W. TANK)	17	PAINT STL	4209072	100,216	5/1/74	#2 FUEL OIL	ABOVE	IN USE	N	N	—	MW
I.C. C.T. #1 (E. TANK)	18	PAINT STL	4209072	100,216	5/1/74	#2 FUEL OIL	ABOVE	IN USE	N	N	—	MW
I.C. C.T. #3 (S. TANK)	35	PAINT STL	3999996	95,238	9/93	#2 FUEL OIL	ABOVE	IN USE	N	N	—	MW
INTERCESSION CITY C.T. P11	36	DW-FRP	2500	59	5/96	WASTE OIL	BELOW	IN USE	Y	—	—	INSTALL
INTRCSN. CITY C.T. #18	\	PAINT STL	250	6	1/1/71	UNLEAD GAS	ABOVE	IN USE	N	N		—
INTERCESSION CITY		PLASTIC				ACID	INSIDE	IN USE	Y	—	—	NONE
INTERCESSION CITY #22	\	PAINT STL	49980	1,190	5/1/74	SERVICE WATER	ABOVE	IN USE	—	—	—	—
INTERCESSION CITY		PAINT STL	60018	1,429	9/93	R.O. PRODUCT	ABOVE	IN USE	—	—	—	—
INTERCESSION CITY		PAINT STL	180012	4,286	9/93	FIRE WTR STORAGE 1A	ABOVE	IN USE	—	—	—	—
INTERCESSION CITY		PAINT STL	180012	4,286	9/93	FIRE WTR STORAGE 1B	ABOVE	IN USE	—	—	—	—
INTERCESSION CITY		PAINT STL	1099980	26,190	9/93	DEMIN WTR STRG 1A	ABOVE	IN USE	—	—	—	—
INTERCESSION CITY		PAINT STL	1099980	26,190	9/93	DEMIN WTR STRG 1B	ABOVE	IN USE	—	—	—	—
INTERCESSION CITY		PAINT STL	500010	11,905	9/93	WASTE WTR EQULATN	ABOVE	IN USE	—	—	—	—

ATTACHMENT HEC-FE-8

LIST OF EQUIPMENT/ACTIVITIES REGULATED UNDER TITLE VI

ATTACHMENT HEC-FE-8
LIST OF EQUIPMENT / ACTIVITIES REGULATED — TITLE VI

The FPC Hines Energy Complex does not currently have any refrigeration and air-conditioning units on the plant site that meet the 50-pound threshold established by the Department.