Florida Department of Environmental Regulation

Southeast District • 1900 S. Congress Ave., Suite A • West Palm Beach, Florida 33406

Lawton Chiles, Governor

Telephone No. 407/433-2650

Carol M. Browner, Secretary

PERMITTEE:
Mr. H. P. Lamb
Superintendent/Power Resources
Fort Pierce Utilities Authority
322 North Indian River Drive
Fort Pierce, Florida 334500

I.D. NUMBER: 50/WPB/56/0003
PERMIT/CERTIFICATION NUMBER: AO 56-190275 *
DATE OF ISSUE: MAY 23 1991
EXPIRATION DATE: February 28, 1996
COUNTY: St. Lucie
LATITUDE/LONGITUDE: 27°27'00"N/80°19'26"W
UTM: Zone 17; 566 8 Km. E; 3935.3 Km. N
PROJECT: Ft. Pierce Utilities Authority
Units 6 - 8, Diesels 1 and 2

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Rule 17-2, and in conformance with all existing regulations of the Florida Department of Environmental Regulation. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

OPERATE: An air pollution source consisting of:

a) Two (2) General Motors Corporation, Model MP-45, diesel electric generators, burning No. 2 fuel oil at 28.9 million BTU/hr. maximum; discharging pollutants through a 3-ft. diameter stack 23 feet above ground level (peaking units);

b) Babcock & Wilcox Boiler, Unit No. 6, 218.9 million BTU/hr. discharging pollutants through a 5-ft. diameter stack 148 feet above ground level;

c) A Foster Wheeler Boiler, Unit No. 7, 470 million BTU/hr. maximum; discharging pollutants through a multicyclone collector and a 7.1-ft. diameter stack 147 feet above ground level, and

d) A Foster Wheeler Boiler, Unit No. 8, 611 million BTU/hr. maximum: discharging pollutants through an 8-foot diameter stack 150 feet above ground level; equipped with continuous in-stack NO_x and O_2 monitors.

IN ACCORDANCE WITH: Application for Renewal received December 14, 1990, additional information received January 28, January 31 and February 27, 1991, AC 56-141460 issued March 14, 1988 and modified May 1, 1990; Application to Operate/Construct Air Pollution Sources received December 12, 1985 (Diesels 1 and 2); AC 56-12778 issued September 4, 1979 (Unit 8); and Application to Operate received July 21, 1980 (Units 6 and 7) (none are attached).

LOCATED AT: 311 North Indian River Drive, Fort Pierce, St.Lucie County, Florida.

TO SERVE: An electric generating utility (SIC # 4911).

SUBJECT TO: General Conditions 1-14. and Specific Conditions 1-8.

* This permit is a renewal of Permit No. AO 56-113533 issued February 28, 1986, AO 56-113534 issued February 28, 1986, AO 56-112670 issued February 14, 1986, and AO 56-112678 issued February 14, 1986.

DER Form 17-1 201(5)
Effective November 30, 1982

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 403.141, 403.727, or 403.859 through 403.861, F.S. 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), F.S., the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

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

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or 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 reasonable times, 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 the permit, the permittee shall immediately notify and provide the Department with the following information:

   (a) A description of and cause of noncompliance; and

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

GENERAL CONDITIONS:

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 403.111 and 403.73, F.S. 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 Rule 17-4.120 and 17-30.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

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

13. 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 date(s) analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

14. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware the 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 submitted or corrected promptly.

SPECIFIC CONDITIONS:

1. Compliance testing shall be conducted for the sources covered by this permit by September 1991 and annually thereafter in accordance with the methods specified below.

2. Emission limiting standards are as follow:

a) Units 6, 7, and 8

1. Visible emissions shall not exceed 5% opacity while firing natural gas.

2. The operating permits emission limits for this facility's existing boilers shall not exceed the following rates:

	Unit 6		Unit 7		Unit 8	
Parameter	lbs/hr	ton/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
Part.	0.4	0.0024	0.568	0.382	0.945	3.018
SO_x	12.38	0.0743	0.1199	0.0806	0.1917	0.617
NO_x	1.31	0.007854	104.35	70.126	173.20	552.860
VOC	0.0236	0.000142	0.266	0.179	0.441	1.407
CO	0.15	0.0009	7.589	5.100	12.59	40.2
hrs/yr	12		1344		6384	

The operating permits emission limits for these boilers (units No. 6, 7, and 8) shall be modified as stated above.

3. Natural gas is the only permitted fuel for normal operation for Units 7 and 8. Unit 6 is allowed to burn natural gas with a No. 6 fuel oil (0.76% sulfur content) as the standby fuel. If the gas supply is curtailed or an emergency is declared, the facility shall obtain an emergency order for Units 7 and 8 to burn fuel oil. Visible emissions shall not exceed 15% opacity while burning fuel oil. If fuel oil usage exceeds 15 days per calendar year, the Department shall be notified and provision made for emissions testing within 30 days.

b) Unit 8

1. Continuous emission monitors are required for nitrogen oxides and oxygen.

2. Quarterly excess emissions reports pursuant to 40CFR60 shall be submitted to the Southeast District Office postmarked no later than the 30th day following the end of each calendar quarter.

c) Diesels 1 and 2

Visible emissions shall not exceed 20 percent opacity while using No. 2 fuel oil.

3.

Source/Emission Point	Pollutant	Test Method
Diesels 1 & 2, Boilers 6, 7, & 8	Visible Emissions	EPA Method 9
Boilers 6, 7, & 8	Particulate	EPA Method 5
	SO_x	EPA Method 6
	NO_x	EPA Method 7,7E
	VOC	EPA Method 25A
	CO	EPA Method 10

The compliance test report shall be submitted to the Department in accordance with Florida Administrative Code (F.A.C.) Rule 17-2 700(7).

PERMITTEE:
Mr. H. P. Lamb
Fort Pierce Utilities Authority
Fort Pierce, Florida

I.D. NUMBER: 50/WPB/56/0003
PERMIT/CERTIFICATION NUMBER: AO 56-190275
DATE OF ISSUE: MAY 23 1991
EXPIRATION DATE: February 28, 1996

SPECIFIC CONDITIONS:

4. Testing of emissions should be conducted using the fuel and/or process input which are expected to result in the highest emissions and within ten percent (10%) of the rated capacity of the source, otherwise the Department may require the test to be repeated or require modification of the permit to reflect tested rates and/or fuels.

5. The Department shall be notified of expected test dates at least fifteen (15) days prior to compliance testing.

6. On or before March 1 of each calendar year, a completed DER Form 17-1 202(6), Annual Operations Report Form for Air Emissions Sources shall be submitted to the Department.

7. Ambient monitoring for particulate and sulfur dioxide is required when fuel oil is used .

8. Copies of all reports, tests, notifications or other submittals required by this permit shall be submitted to both the Department of Environmental Regulation, Southeast District Office and Palm Beach County Public Health Unit.

9. The permittee shall be aware of and operate under the attached "General Permit Conditions #1 thru #14." General Permit Conditions are binding upon the permittee and enforceable pursuant to Chapter 403 of the Florida Statutes.

Issued this 23rd day of May, 1991

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

J. Scott Benyon
Deputy Assistant Secretary

DEPARTMENT OF ENVIRONMENTAL REGULATION

ROUTING AND TRANSMITTAL SLIP

ACTION NO

ACTION DUE DATE

1. TO: (NAME, OFFICE, LOCATION) Preston Leeves DER Tallahassee	Initial	
	Date	
2.	Initial	
	Date	
3.	Initial	
	Date	
4.	Initial	
	Date	

REMARKS:

RECEIVED
MAY 29 1991
Division of Air
Resources Management

INFORMATION

- Review & Return
- Review & File
- Initial & Forward

DISPOSITION

- Review & Respond
- Prepare Response
- For My Signature
- For Your Signature
- Let's Discuss
- Set Up Meeting
- Investigate & Report
- Initial & Forward
- Distribute
- Concurrence
- For Processing
- Initial & Return

FROM:

DATE

PHONE

Florida Department of Environmental Regulation

Southeast District • 1900 S. Congress Ave., Suite A • West Palm Beach, Florida 33406

Lawton Chiles, Governor

Telephone No. 407/433-2650

Carol M. Browner, Secretary

MAY 2 4 1991

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
NOTICE OF PERMIT ISSUANCE

CERTIFIED MAIL

In the Matter of an Application for Permit by:

Mr. H. P. Lamb /
Superintendent/Power Resources /
Fort Pierce Utility Authority /
311 North Indian River Drive /
Fort Pierce, Florida 33450 /
/

DER File No. AO 56-190275
St. Lucie County
Air Program

Enclosed is Permit Number AO 56-190275 to operate an air pollution source issued pursuant to Section 17-2, Florida Statutes.

A person whose substantial interests are affected by this permit may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within 14 days of receipt of this Permit. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

The Petition shall contain the following information;

(a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;

(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;

(c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;

(d) A statement of the material facts disputed by Petitioner, if any;

(e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;

(f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and

(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this permit. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of receipt of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5 207, F.A.C.

This permit is final and effective on the date filed with the Clerk of the Department unless a petition is filed in accordance with the above paragraphs or unless a request for extension of time in which to file a petition is filed within the time specified for filing a petition and conforms to Rule 17-103 070, F.A.C. Upon timely

Mr. H. P. Lamb
Fort Pierce Utilities Authority
Fort Pierce, Florida

DER Permit No. AO 56-190275

filing of a petition or a request for an extension of time this permit will not be effective until further Order of the Department.

When the Order (Permit) is final, any party to the Order has the right to seek judicial review of the Order pursuant to Section 120 68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9 110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date the Final Order is filed with the Clerk of the Department.

Executed in West Palm Beach, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

J. Scott Benyon
Deputy Assistant Secretary
1900 South Congress Ave., Suite A
West Palm Beach, FL 33406
407/433-2650

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF PERMIT ISSUANCE and all copies were mailed by certified mail before the close of business on MAY 24 1991 to the listed persons.

Clerk Stamp

FILING AND ACKNOWLEDGMENT
FILED, on this date, pursuant to §120 52(11), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Phyllis D. Kern (Clerk) MAY 24 1991 (Date)

Copies furnished to:

Harry Schindette
Preston Lewis

H. D. KING POWER PLANT
311 North Indian River Drive
Fort Pierce, Florida 34950
(407) 464-5792

RECEIVED
APR 19 1996
BUREAU OF
AIR REGULATION

April 12, 1996

Mr. Al Linero
Director, Air Permitting
Department of Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Dear Mr. Linero:

RE: Fees for Permit Modification

Initially it was our understanding that a fee was required for each permit modification. Thus we submitted a $500.00 fee (our check number S-047502) for our Operating Permits AO56-190275 and AO56-175955. The only fee we should have paid was $250.00 for modification of the Construction Permit AC56-141460. Please refund the overpayment of $250.00.

Sincerely,

Thomas W. Richards, P.E.
Director of Operations

TWR:HL/s

pc: T. Prentice
J. Stevens

1110003

Department of Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

Notice of Permit Amendment

In the matter of an
Application for Permit by:

Mr. Thomas Richards, P.E.
Director of Operations
H. D. King Power Plant
311 North Indian River Drive
Ft. Pierce, Florida 34950

DEP File No. AC 56-141460A
31.6 MW Combined Cycle
Gas Turbine

Enclosed is amended Permit Number AC 56-141460A for a 31.6 MW Combined Cycle Gas Turbine. This amendment corrects the sulfur dioxide emission limits for Units 6, 7, and 8 when natural gas fuel is burned at this facility and allows alternate means to determine compliance with the sulfur dioxide and particulate matter emission limits. This permit amendment is issued pursuant to Section 403, Florida Statutes.

Any party to this Order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, Florida Statutes, by filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 14 days from the date this Notice is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

C. H. Fancy, P.E., Chief
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400
904-488-1344

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this NOTICE OF PERMIT AMENDMENT and all copies were mailed by certified mail before the close of business on 4-8-96 to the listed persons.

Clerk Stamp

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

Clerk 4-8-96
Date

Copies furnished to:

Isidore Goldman, SED

FINAL DETERMINATION
Permit No. AC 56-141460A

The Intent to Issue an amended air construction permit to the Ft. Pierce Utility Authority for the H. D. King Power Plant at 311 North Indian River Drive, Ft. Pierce, St. Lucie County, Florida 34950 to correct the sulfur dioxide emission limits when natural gas fuel is burned in Units 6, 7, 8, and 9 and to allow alternate means to determine compliance with the sulfur dioxide and particulate matter emission limits was distributed on March 7, 1996. The Notice of Intent to Issue Permit Amendment was published in the Tribune on March 18, 1996. Copies of the evaluation were available for public inspection at the Department's offices in West Palm Beach and Tallahassee.

Comments were submitted on the Department's Intent by our Southeast District office. The District asked that the amendment clarify that the facility has separate emission limits for natural gas and fuel oil. They also asked that the EPA test methods be listed in the permit. In response to this request, the Department has clarified that the unit has separate emission limits for natural gas and fuel oil and has listed the methods that can be used to determine compliance with the sulfur dioxide and particulate matter emission limits.

The final action of the Department will be to issue amended permit No. AC 56-141460A as proposed.

Department of Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

PERMITTEE:
Ft. Pierce Utilities Authority
H. D. King Power Plant
311 North Indian River Drive
Ft. Pierce, Florida 34950

Permit Number: AC 56-141460A
Expiration Date: July 1, 1996
County: St. Lucie
Project: 31.6 MW Combined Cycle Gas Turbine

This permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code, (F.A.C.), Chapters 62-4, 62-210 through 297. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the re-issuance of permit No. AC 56-141460, subject to all previous conditions, amendments, and modifications, except for the changes by the Specific Conditions of this permit for Units Nos. 6, 7, 8, and 9 . Permit No. AC 56-141460 expired June 1,1990.

The H. D. King Power Plant is located at 311 North Indian River Drive, Ft. Pierce, St. Lucie County, Florida 34950. The UTM coordinates of the plant are Zone 17, 566.8 km E and 3,036.3 km N.

The project shall be constructed/operated in accordance with the attached request, plans, documents, amendments and drawings, except as otherwise noted in the General and Specific Conditions.

Attachments are listed below:

1. Original construction permit AC 56-141460 issued March 28, 1988.
2. Amendment dated October 31, 1988.
3. Amendment dated August 31, 1989.
4. Amendment dated April 18, 1990.
5. Amendment dated November 9, 1990.
6. Amendment dated June 28, 1991.
7. Amendment/Settlement Agreement, DOAH Case No. 91-6989
8. Request for amendment dated February 21, 1996.
9. Interoffice Memorandum dated March 29, 1996.

PERMITTEE:
Ft. Pierce Utility Authority

Permit No. AC 56-141460A
Expiration Date: July 1, 1996

SPECIFIC CONDITIONS:

1. This permit supersedes permit No. AC 56-141460 issued March 28, 1988.

2. The provisions of permit No. AC 56-141460 are incorporated into this air construction permit except for the following changes:

3. The sulfur dioxide emission standards in Specific Condition No. 2A of permit No. AC 56-141460 for Units 6, 7, and 8 when natural gas fuel is being burned are changed:

FROM

Parameter	Unit 6 lbs/hr	Unit 7 lbs/hr	Unit 8 lbs/hr
SO_2	12.38	0.1199	0.1917

TO

Parameter	Unit 6 lbs/hr	Unit 7 lbs/hr	Unit 8 lbs/hr
SO_2	2.5	2.5	2.5

The emission standards for other regulated air pollutants for natural gas fuel and all air pollutants for fuel oil are not changed by this amendment.

4. Compliance testing requirements for the sulfur dioxide emission limits for unit 9 of permit No. AC 56-141460 are changed:

FROM:

Compliance with the sulfur dioxide emission limits will be determined by Reference Method 20 or by calculations based on fuel analysis (ASTM D1552) for sulfur content.

TO:

Compliance with the sulfur dioxide emission limits will be determined by Reference Method 20 or by calculation based on fuel analysis (ASTM 1552, D1072, D3031, D4084, or D3246) for sulfur content of the oil and natural gas. Certified analysis by the appropriate test method from the fuel supplier is acceptable to the Department.

PERMITTEE: **Permit No. AC 141460A**
Ft. Pierce Utility Authority **Expiration Date: July 1, 1996**

New Specific Condition for Permit No. AC 56-141460A;

11. Compliance testing requirements for the sulfur dioxide and particulate matter emission limits for units 6, 7, and 8 are:

Compliance with the sulfur dioxide emission limits will be determined by Reference Method 6 or 6C or by calculation based on fuel analysis (ASTM 1552, D1072, D3031, D4084, or D3246) for sulfur content of the oil and natural gas. Certified analysis by the appropriate test method from the fuel supplier is acceptable to the Department.

Particulate matter tests on these units are waived when burning natural gas provided that the visible emissions do not exceed 5 percent opacity.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Howard L. Rhodes, Director
Division of Air Resources
Management

H. D. KING POWER PLANT
311 North Indian River Drive
Fort Pierce, Florida 34950
(407) 464-5792

March 20, 1996

Mr. Joe Kahn
Department of Environmental Protection
Southeast District - Air Program
P. O. Box 15425
West Palm Beach, FL 33416-5425

Dear Mr. Kahn:

RE: Modification of FPUA Operating Air Permits

Fort Pierce Utilities Authority is requesting modifications of Operating Permits A056-190275 and A056-175955 to incorporate the recent amendments as detailed in Construction Permit AC56-141460A. The March 5, 1996 letter (with attachments) from C. H. Fancy, Chief, Bureau of Air Regulation, and the FPUA publication of "Notice of Intent to Issue" are attached. Also attached for your convenience are copies of our operating permits.

Please advise if there are any charges for the operating permit modifications.

Sincerely,

Thomas W. Richards, P.E.
Director of Operations

TWR:HL/s

Attachments (4)

pc: Willard Hanks, Tallahassee

BEST AVAILABLE COPY

X

No. 21730

THE TRIBUNE

P.O. Box 69
Fort Pierce, St. Lucie County, Florida 34954-0069

STATE OF FLORIDA
COUNTY OF ST. LUCIE

Before the undersigned authority personally appeared David T. Rutledge or Kathleen K. LeClair, who on oath says that he/she is publisher, business manager of The Tribune, a daily newspaper published at Fort Pierce in St. Lucie County, Florida; that the attached copy of the advertisement, being a NOTICE OF INTENT TO ISSUE PERMIT (AMENDED) in the matter of AC 56-141460A,

was published in said newspaper in the issues of March 18, 1996

Affiant further says that The Tribune is a newspaper published at Fort Pierce, in said St. Lucie County, Florida, and that the said newspaper has heretofore been continuously published in St. Lucie County, Florida, each day and has been entered as second class mail matter at the post office in Fort Pierce, in said St. Lucie County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement and affiant further says that he has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.

Sworn to and subscribed before me March 18, 1996

Lilli-Anne Senesac

Notary Public

NOTARY PUBLIC STATE OF FLORIDA

LILLI-ANNE SENESAC
My Comm Exp. 4/25/98
Bonded By Service Ins
No. CC367364
Personally Known [ ] Other I.D.

STATE OF FLORIDA
DEPARTMENT OF
ENVIRONMENTAL
PROTECTION
NOTICE OF INTENT
TO ISSUE PERMIT
AC 56-141460A

The Department of Environmental Protection (Department) gives notice of its intent to issue an amended permit to the H.D. King Power Plant which is operated by the Ft. Pierce Utilities Authority, P.O. Box 3191, Ft. Pierce, Florida 34948. The H.D. King Power Plant is located at 311 North Indian River Drive, Ft. Pierce, St. Lucie County, Florida 34950. The amendment will correct the hourly sulfur dioxide emission limits to reflect the minimal sulfur content of natural gas. The annual sulfur dioxide emissions are unchanged. The amendment will also allow determination of compliance with the sulfur dioxide emission limits by fuel analysis and particulate matter emission limits by visible emissions tests when natural gas is being used as a fuel. No other emission limit or test procedure is being changed by this amendment. This amendment does not require a Best Available Control Technology Determination. No change in sulfur dioxide and particulate matter ground level concentrations are expected as a result of this amendment.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within 14 days of publication of this notice. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, F.S. The petition shall contain the following information: (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed; (b) A statement of how and when each petitioner received notice of the Department's action or proposed action; (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action; (d)

waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, Florida Administrative Code.

The application/request is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at: Department of Environmental Protection, Bureau of Air Regulation, 111 S. Magnolia Drive, Suite 4, Tallahassee, Florida 32301 and the Southeast Florida District Office, 400 N. Congress Avenue, West Palm Beach, Florida 33401. Any person may send written comments on the proposed action to the Administrator, New Source Review Section, at the Department's Tallahassee address. All comments received within 14 days of the publication of this notice will be considered in the Department's final determination.

Publish: March 18, 1996

if any; (e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action; (f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and (g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this Notice. Persons whose substantial interests will be affected any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of publication of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a

Is your RETURN ADDRESS completed on the reverse side?

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Mr Thomas Richards, PE
Director of Operations
HD King Power Plant
311 N. Indian River Dr
Ft. Pierce, Fl 34950

4a. Article Number
Z 127 633 196

4b. Service Type
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery
APR 10

5. Signature (Addressee)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature (Agent)
[signature]

PS Form **3811**, December 1991 ★U.S. GPO: 1993—352-714 **DOMESTIC RETURN RECEIPT**

Thank you for using Return Receipt Service.

Z 127 633 196

Receipt for Certified Mail
No Insurance Coverage Provided
Do not use for International Mail
(See Reverse)

UNITED STATES POSTAL SERVICE

Sent to: Thomas Richards	
Street and No.: HD King Power Plant	
P.O., State and ZIP Code: Ft. Pierce, Fl	
Postage	$
Certified Fee: Ft. Pierce	Utilities
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, and Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date 4-8-96 AC56-141460A	

PS Form 3800, March 1993

Department of Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

March 5, 1996

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Thomas W. Richards, P.E.
Director of Operations
H. D. King Power Plant
311 North Indian River Drive
Ft. Pierce, Florida 34950

Dear Mr. Richards:

Re: Amendment of Permit
Permit No. AC 56-141460A

Enclosed is a re-issued/amended air construction permit for Units 6, 7, 8, and 9 at the H. D. King Power Plant. This action will correct the sulfur dioxide emission limits when natural gas fuel is burned at this facility and will allow alternate means to determine compliance with the sulfur dioxide and particulate matter emission limits.

You are required to publish the enclosed Notice of Intent to Issue Permit Amendment in a newspaper having circulation in St. Lucie County. Actual amendment of the permit is contingent on all comments and requests for an administrative hearing being resolved.

Submit any written comments you wish to have considered concerning the Department's proposed action to Mr. A. A. Linero, Administrator, New Source Review Section, of the Bureau of Air Regulation. If you have any questions regarding this matter, please call Willard Hanks at (904) 488-1344.

Sincerely,

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

CHF/wh/h

Enclosure

cc: Isidore Goldman, SED

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

CERTIFIED MAIL

In the Matter of an
Application for Permit Amendment

DEP File No. AC 56-141460A
County: St. Lucie

Ft. Pierce Utility Authority
H. D. King Power Plant
311 North Indian River Drive
Ft. Pierce, Florida 34950

INTENT TO ISSUE

The Department of Environmental Protection gives notice of its intent to issue a permit amendment for a modification (copy attached) to the applicant's facility as detailed in the request specified, above, for the reasons stated in the request.

The applicant, the Ft. Pierce Utility Authority, H. D. King Power Plant, 311 North Indian River Drive, Ft. Pierce, Florida 34950, applied on February 26, 1996, to the Department of Environmental Protection for an amendment of their previously issued air construction permit for the H. D. King Power Plant. This facility is located at 311 North Indian River Drive in Ft. Pierce, St. Lucie County, Florida 34950. The permit amendment will correct the sulfur dioxide emission limits for natural gas fuel and allow an alternate means to determine compliance with the sulfur dioxide and particulate matter emission limits for Units 6, 7, 8, and 9.

The Department has permitting jurisdiction under the provisions of Chapter 403, Florida Statutes (F.S.), and Chapters 62-212 and 62-4, Florida Administrative Code (F.A.C.). The project is not exempt from permitting procedures. The Department has determined that a permit amendment is required for the proposed change.

Pursuant to Section 403.815, F.S., and Rule 62-103.150, F.A.C., you (the applicant) are required to publish at your own expense the enclosed Notice of Intent to Issue Permit Amendment. The notice shall be published one time only within 30 days in the legal ad section of a newspaper of general circulation in the area affected. For the purpose of this rule, "publication in a newspaper of general circulation in the area affected" means publication in a newspaper meeting the requirements of Sections 50.011 and 50.031, F.S., in the county where the activity is to take place. The applicant shall provide proof of publication to the Department's Bureau of Air Regulation, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within seven days of publication. Failure to publish the notice and provide proof of publication within the allotted time may result in

the denial of the permit amendment.

The Department will issue the permit amendment with the attached conditions unless a petition for an administrative proceeding (hearing) is filed pursuant to the provisions of Section 120.57, F.S.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, F.S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Petitions filed by the permit applicant and the parties listed below must be filed within 14 days of receipt of this intent. Petitions filed by other persons must be filed within 14 days of publication of the public notice or within 14 days of their receipt of this intent, whichever first occurs. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, F.S.

The Petition shall contain the following information;

(a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;
(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;
(c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;
(d) A statement of the material facts disputed by Petitioner, if any;
(e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;
(f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and,
(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this intent. Persons whose substantial interests will be affected by any decision of the Department with regard to the application/ request have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of receipt of this intent in the Office of General Counsel at the above address of the

Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, F.A.C.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

C. H. Fancy, P.E., Chief
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399
904-488-1344

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that all copies of this INTENT TO ISSUE PERMIT AMENDMENT all copies were mailed by certified mail before the close of business on 3-7-96 to the listed persons.

Clerk Stamp

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

Clerk 3-7-96
Date

Copies furnished to:

Isidore Goldman, SED

Is your RETURN ADDRESS completed on the reverse side?

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Thomas W Richards PE
H.D. King Power Plant
311 N. Indian River Dr
Ft. Pierce, Fl 34950

4a. Article Number
Z 127 633 182

4b. Service Type
☐ Registered ☐ Insured
☑ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery
MAR 11

5. Signature (Addressee)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature (Agent)
P. [illegible]

PS Form **3811**, December 1991 ☆U.S. GPO: 1993—352-714 **DOMESTIC RETURN RECEIPT**

Thank you for using Return Receipt Service.

Z 127 633 182

Receipt for Certified Mail
No Insurance Coverage Provided
Do not use for International Mail
(See Reverse)

Sent to Thomas Richards	
Street and No. HD King PP	
P.O., State and ZIP Code Ft. Pierce UA	
Postage Ft. Pierce, FL	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, and Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date 3-7-96	
AC56-144460A	

PS Form **3800**, March 1993

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF INTENT TO ISSUE PERMIT AMENDMENT
AC 56-141460A

The Department of Environmental Protection (Department) gives notice of its intent to issue an amended permit to the H. D. King Power Plant which is operated by the Ft. Pierce Utilities Authority, P. O. Box 3191, Ft. Pierce, Florida 33448. The H. D. King Power Plant is located at 311 North Indian River Drive, Ft. Pierce, St. Lucie County, Florida 34950. The amendment will correct the hourly sulfur dioxide emission limits to reflect the minimal sulfur content of natural gas. The annual sulfur dioxide emissions are unchanged. The amendment will also allow determination of compliance with the sulfur dioxide emission limits by fuel analysis and particulate matter emission limits by visible emissions tests when natural gas is being used as a fuel. No other emission limit or test procedure is being changed by this amendment. This amendment does not require a Best Available Control Technology Determination. No change in sulfur dioxide and particulate matter ground level concentrations are expected as a result of this amendment.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes (F.S.). The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within 14 days of publication of this notice. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, F.S.

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

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this Notice. Persons whose substantial interests will be affected by any decision of the Department with regard to the application/ request have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of publication of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, Florida Administrative Code.

The application/request is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Department of Environmental Protection
Bureau of Air Regulation
111 S. Magnolia Drive, Suite 4
Tallahassee, Florida 32301

Department of Environmental Protection
Southeast District
400 N. Congress Avenue
West Palm Beach, Florida 33401

Any person may send written comments on the proposed action to the Administrator, New Source Review Section, at the Department's Tallahassee address. All comments received within 14 days of the publication of this notice will be considered in the Department's final determination.

Department of Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

PERMITTEE:
Ft. Pierce Utilities Authority
H. D. King Power Plant
311 North Indian River Drive
Ft. Pierce, Florida 34950

Permit Number: AC 56-141460A
Expiration Date: July 1, 1996
County: St. Lucie
Project: 31.6 MW Combined Cycle Gas Turbine

This permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code, (F.A.C.) Chapter 62-4, 62-210 through 297. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the re-issuance of permit No. AC 56-141460, subject to all previous conditions, amendments, and modifications, except for the changes in the Specific Conditions of this permit to Units Nos. 6, 7, 8, and 9 . Permit No. AC 56-141460 expired June 1,1990.

The H. D. King Power Plant is located at 311 North Indian River Drive, Ft. Pierce, St. Lucie County, Florida 34950. The UTM coordinates of the plant are Zone 17, 566.8 km E and 3,036.3 km N.

The project shall be constructed/operated in accordance with the attached request, plans, documents, amendments and drawings, except as otherwise noted in the General and Specific Conditions.

Attachments are listed below:

1. Original construction permit AC 56-141460 issued March 28, 1988.
2. Amendment dated October 31, 1988.
3. Amendment dated August 31, 1989.
4. Amendment dated April 18, 1990.
5. Amendment dated November 9, 1990.
6. Amendment dated June 28, 1991.
7. Amendment/Settlement Agreement, DOAH Case No. 91-6989
7. Request for amendment dated February 21, 1996.

DRAFT

PERMITTEE:
Ft. Pierce Utility Authority

Permit No. AC 56-141460A
Expiration Date: 01-July-1996

SPECIFIC CONDITIONS:

1. This permit supersedes permit No. AC 56-141460 issued March 28, 1988.

2. The provisions of permit No. AC 56-141460 are incorporated into this air construction permit except for the following changes:

3. The sulfur dioxide emission standards is Specific Condition No. 2A of permit No. AC 56-141460 are changed:

FROM

Parameter	Unit 6 lbs/hr	Unit 7 lbs/hr	Unit 8 lbs/hr
SO_2	12.38	0.1199	0.1917

TO

Parameter	Unit 6 lbs/hr	Unit 7 lbs/hr	Unit 8 lbs/hr
SO_2	2.5	2.5	2.5

4. Compliance testing requirements for the sulfur dioxide emission limits for units 6, 7, 8, and 9 of permit No. AC 56-141460 are changed:

FROM

Compliance with the sulfur dioxide emission limits will be determined by Reference Method 20 or by calculation based on fuel analysis (ASTM D1552) for sulfur content.

TO

Compliance with the sulfur dioxide emission limits will be determined by Reference Method 20 or by calculation based on fuel analysis (ASTM 1552, D1072, D3031, D4084, or D3246) for sulfur content of the oil and natural gas. Certified analysis by the appropriate test method from the fuel supplier is acceptable to the Department.

PERMITTEE:
Ft. Pierce Utility Authority

Permit No. AC 141460A
Expiration Date: July 1, 1996

New Specific Condition for Permit No. AC 56-141460A:

Particulate matter tests on these units are waived when burning natural gas provided that the visible emissions do not exceed 5 percent opacity.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Howard L. Rhodes, Director
Division of Air Resources
Management

H. D. KING POWER PLANT
311 North Indian River Drive
Fort Pierce, Florida 34950
(407) 464-5792

February 21, 1996

Mr. Al Linero
Director, Air Permitting
Department of Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: Modifications of Permit AO 56-190275 and
Permit AO 56-175955

Dear Mr. Linero:

Fort Pierce Utilities Authority is requesting modifications of its operating air permits. The permits presently limit the SO_2 to less than .2 lb/hour when natural gas is utilized as fuel. This unrealistic low number results in non-compliance due to the sulfur normally contained in natural gas. The permits additionally limit particulate matter to less than one (1) lb/hour while burning natural gas.

We would request that the SO_2 limits be revised to a maximum of 2.5 lb/hour per unit which is in line with permits issued to other gas fueled units of similar size, and the particular matter limits be removed from the permits. Additionally, we would request the permits be revised to delete annual testing for sulfur dioxide or particular matter.

We have enclosed copies of the subject permits for your convenience and a check for $500.00 for permit modifications. Your assistance in correcting these long-standing problems is certainly appreciated.

Sincerely,

Thomas W. Richards, P.E.
Director of Operations

cc: W. Hanks
SED

Attachments

TWR:HL/p

1110003-001-AC

FORT PIERCE UTILITIES AUTHORITY
OPERATING ACCOUNT

CHECK NUMBER S 047502
VOID AFTER 90 DAYS

CHECK NO

PAY ***** FIVE HUNDRED AND 00/100 ***

DATE	AMOUNT
02/22/96	********500.00

TO THE ORDER OF

EL DEPT. OF ENVIRONMENTAL
PROTECTION
2600 BLAIR STONE ROAD
TALLAHASSEE, FL 32399-2400

Riverside
National Bank of Florida
Fort Pierce, Florida 34950

DIRECTOR OF UTILITIES

DIRECTOR OF FINANCE

[redacted]

DETACH BEFORE DEPOSITING

PURCH. ORDER NO.	INVOICE NO.	AMOUNT	PURCH. ORDER NO.	INVOICE NO.	AMOUNT
	PO 34464	02/21/96	500.00		

Florida Department of Environmental Regulation

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

Lawton Chiles, Governor

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

Virginia B. Wetherell, Secretary

MAY 7 - 1993

PERMITTEE:

Mr. H. P. Lamb
Superintendent/Power Resources
Fort Pierce Utilities Authority
311 North Indian River Drive
Fort Pierce, Florida 34950

I.D. NUMBER: 50/WPB/56/0003
PERMIT/CERTIFICATION NUMBER: AO 56-190275*
DATE OF ISSUE: MAY 7 - 1993
EXPIRATION DATE: February 28, 1996
COUNTY: St. Lucie
LATITUDE/LONGITUDE: 27°27'00"N/80°19'26"W
UTM: Zone 17; 566.4 Km. E; 3036.3 Km. N
PROJECT: Ft. Pierce Utilities Authority
Units 6 - 8, Diesels 1 and 2

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Rule 17-296, and in conformance with all existing regulations of the Florida Department of Environmental Regulation. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

OPERATE: An air pollution source consisting of:

a) Two (2) General Motors Corporation, Model MP-45, diesel electric generators burning No. 2 fuel oil at 28.9 million BTU/hr. maximum, discharging pollutants through a 3-ft. diameter stack 23 feet above ground level (peaking units);

b) Babcock & Wilcox Boiler, Unit No. 6, 218.9 million BTU/hr. discharging pollutants through a 5-ft. diameter stack 148 feet above ground level;

c) A Foster Wheeler Boiler, Unit No. 7, 470 million BTU/hr. maximum; discharging pollutants through a multicyclone collector and a 7.1 ft. diameter stack 147 feet above ground level, and

d) A Foster Wheeler Boiler, Unit No. 8, 611 million BTU/hr. maximum; discharging pollutants through an 8 foot diameter stack 150 feet above ground level, equipped with continuous in-stack NO_x and O_2 monitors.

IN ACCORDANCE WITH: Settlement Agreement for OGC Case No. 91-1610 signed July 8,1992; Application for Renewal received December 14, 1990, additional information received January 28, January 31 and February 27, 1991, AC 56-141460 issued March 14, 1988 and modified May 1, 1990; Application to Operate/Construct Air Pollution Sources received December 12, 1985 (Diesels 1 and 2); AC 56-12778 issued September 4, 1979 (Unit 8); and Application to Operate received July 21, 1980 (Units 6 and 7) (none are attached).

LOCATED AT: 311 North Indian River Drive, Fort Pierce, St. Lucie County, Florida.

TO SERVE: An electric generating utility (SIC # 4911).

SUBJECT TO: General Conditions 1-14 and Specific Conditions 1-10.

*This permit is a renewal of permit no. AO 56-113533 issued February 28, 1986; AO 56-113534 issued February 28, 1986; AO 56-112679 issued February 14, 1986; and AO 56-112678 issued February 14, 1986; and modifies and supersedes permit no. AO 56-190275 issued May 1991.

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth in this permit, are "permit conditions" and are binding and enforceable pursuant to Sections 403.141, 403.727, or 403.859 through 403.861, F.S. 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), F.S., the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

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

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or 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 reasonable times, 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 reason-ably 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 the permit, the permittee shall immediately notify and provide the Department with the following information:

(a) A description of and cause of noncompliance; and

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

GENERAL CONDITIONS:

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 403.111 and 403.73, F.S. 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 Rule 17-4.120 and 17-30.300, F.A.C., as applicable. The permittee shall be liable for any noncompliance of the permitted activity until the transfer is approved by the Department.

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

13. The permittee shall comply with the following :

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

(b) The permittee shall hold at the facility or other location designated by this permit, records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report or application unless otherwise specified by Department rule.

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

14. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware the 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 submitted or corrected promptly.

PERMITTEE:
Mr. H. P. Lamb
Fort Pierce Utilities Authority
Fort Pierce, Florida 34950

I.D. NUMBER: 50/WPB/56/0003
PERMIT/CERTIFICATION NUMBER: AO 56-190275
DATE OF ISSUE: MAY 7 - 1993
EXPIRATION DATE: February 28, 1996

SPECIFIC CONDITIONS:

1. Compliance testing shall be conducted for the sources covered by this permit by September 1991 and annually thereafter in accordance with the methods specified below.

2. Emission limiting standards are as follow:

a) Units 6, 7, and 8

(1) Visible emissions shall not exceed 5% opacity while firing natural gas.

For Units 6 and 7, visible emissions shall not exceed 20% opacity when the unit is burning fuel oil, except for one two-minute period per hour during which opacity shall not exceed 40%.

For Unit 8 visible emissions shall not exceed 20% opacity when the unit is burning fuel oil, except for one six minute period per hour during which opacity shall not exceed 27%.

(2)

A) The emission limits for Units 6,7 and 8 shall not exceed the following rates:

Parameter	Unit 6 lb/hr.	Unit 7 lb/hr.	Unit 8 lb/hr.
PM	0.4	0.568	0.945
SOx	12.38	0.1199	0.1917
NOx	1.31	104.35	173.20
VOC	0.0236	0.266	0.441
CO	0.15	7.589	12.59

B) The total emissions from combined Units 6, 7, and 8 shall not exceed:

Parameter	Tons/Yr.
PM	16.0
SOx	101.6
NOx	622.0
VOC	2.3
CO	45.3

Total combined heat input for the Units 6, 7, and 8 shall not exceed 4,534,930 MBtu per year.

SPECIFIC CONDITIONS:

(3) Natural gas is the only permitted fuel for normal operation for Units 6, 7, and 8. Units 6, 7, and 8 are allowed to burn natural gas with a No. 6 fuel oil (0.8 lbs SOx/MBtu) as a standby fuel for up to a combined total of 400 hours per year, when necessary in order to avoid curtailing electric power service to its customers. FPUA must notify the DER within 24 hours after commencement of oil firing and furnish the following information:

a. Duration or projected duration of the event.

b. Quantity of fuel oil burned or projected to be burned.

c. A description of significant circumstances precipitating the event, which shall include:

i. Availability of power for purchase

ii. Availability of electric transmission capacity relating to power purchases.

iii. Availability of natural gas

iv. Availability of FPUA generation sources.

(4) When burning fuel oil in Units 6, 7, and 8, the emission rates set forth in Specific Condition 2(a)2.A above shall not apply and the following rates shall apply to Units 6, 7, and 8:

Parameter	Unit 6 lb/MBTU	Unit 7 lb/MBTU	Unit 8 lb/MBTU
SOx	0.80	0.80	0.80
PM	n/a	0.1	0.1
VOC	n/a	n/a	n/a

(5) Unit 8

1. Continuous emission monitors are required for nitrogen oxides and oxygen.

2. Quarterly excess emissions reports pursuant to 40CFR60 shall be submitted to the Southeast District Office postmarked no later than the 30th day following the end of each calendar quarter.

(6) Diesels 1 and 2

Visible emissions shall not exceed 20 percent opacity while using No. 2 fuel oil.

PERMITTEE:
Mr. H. P. Lamb
Fort Pierce Utilities Authority
Fort Pierce, Florida 34950

I.D. NUMBER: 50/WPB/56/0003
PERMIT/CERTIFICATION NUMBER: AO 56-190275
DATE OF ISSUE: MAY 7 - 1993
EXPIRATION DATE: February 28, 1996

SPECIFIC CONDITIONS:

3. The compliance test report shall include results of tests by the following method:

Source/Emission Point	Pollutant	Test Method
Diesels 1 & 2 Boilers 6,7, & 8	Visible Emissions	EPA Method 9
Boilers 6,7, & 8	Particulate	EPA Method 5
	SOx	EPA Method 6
	NOx	EPA Method 7,7E
	VOC	EPA Method 25A
	CO	EPA Method 10

The compliance test report shall be submitted to the Department in accordance with Florida Administrative Code (F.A.C.) Rule 17-297.330.

4. Testing of emissions should be conducted using the fuel and/or process input which are expected to result in the highest emissions and within ten percent (10%) of the rated capacity of the source, otherwise the Department may require the test to be repeated or require modification of the permit to reflect tested rates and/or fuels. However, testing on fuel oil in Units 6, 7, and 8 shall be required only if fuel oil usage for the units exceed 400 hours in any calendar year.

5. The Department shall be notified of expected test dates at least fifteen (15) days prior to compliance testing.

On or before March 1 of each calendar year, a completed DER Form 17-210.900(4), Annual Operations Report Form for Air Emissions Sources shall be submitted to the Department.

7. Ambient monitoring for particulate and sulfur dioxide is required if fuel oil usage exceeds 400 hours per calendar year.

8. Copies of all reports, tests, notifications or other submittals required by this permit shall be submitted to the Department of Environmental Regulation, Southeast District Office.

9. The permittee shall be aware of and operate under the attached "General Permit Conditions #1 through 14". General Permit Conditions are binding upon the permittee and enforceable pursuant to Chapter 403 of the Florida Statutes.

PERMITTEE:
Mr. H. P. Lamb
Fort Pierce Utilities Authority
Fort Pierce, Florida 34950

I.D. NUMBER: 50/WPB/56/0003
PERMIT/CERTIFICATION NUMBER: AO 56-190275
DATE OF ISSUE: MAY 7 - 1993
EXPIRATION DATE: February 28, 1996

SPECIFIC CONDITIONS:

10. The facility shall maintain unit logs reflecting the following information:

a. Number of hours per day each unit burns gas.
b. Number of hours per day each unit burns fuel oil.
c. Amount of natural gas used per unit (MBTU/million cubic feet burned).
d. Amount of fuel oil used per unit including sulfur and ash content and heat input rate (MBTU/1000 gallons).

Executed in West Palm Beach, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

Mary E. S. Williams
Director of District Management
F.D.E.R., Southeast District
P.O. Box 15425
West Palm Beach, FL 33416
407/433-2650

MESW:ms:gml

CERTIFICATE OF SERVICE

This is to certify that this NOTICE OF PERMIT and all copies were mailed by certified mail before the close of business on MAY 7 - 1993 to the listed persons.

Clerk Stamp

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

Clerk — Date: MAY 7 - 1993

Florida Department of Environmental Regulation

Southeast District • 1900 S. Congress Ave., Suite A • West Palm Beach, Florida 33406 • 407-964-9668

Bob Martinez, Governor | Dale Twachtmann, Secretary | John Shearer, Assistant Secretary | Scott Benyon, Deputy Assistant Secretary

PERMITTEE:
Mr. Harry Schindehette
Director of Utilities
Fort Pierce Utilities Authority
P. O. Box 3191
Fort Pierce, Florida 33448

I.D. NUMBER: 50/WPB/56/0309
PERMIT/CERTIFICATION NUMBER: AO 56-175955
DATE OF ISSUE: MAY 1 1990
EXPIRATION DATE: March 30, 1995
COUNTY: St. Lucie
LATITUDE/LONGITUDE: 27°27'00"N/80°19'26"W
UTM: Zone 17; 566.8 Km. E; 3306.3 Km. N
PROJECT: Fort Pierce Utilities Unit #9
31.6 MW Combined Cycle Gas Turbine

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Rule 17-2, and in conformance with all existing regulations of the Florida Department of Environmental Regulation. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

OPERATE: An air pollution source consisting of a Unit #9, 31.6 MW combined cycle gas turbine, (a 23.4 MW combustion turbine generator, a steam generator and an 8.2 NW condensing turbine generator). The unit uses steam injection from the waste heat recovery steam generator to control NO_x emissions from the gas turbine.

IN ACCORDANCE WITH: Certificate of Completion of Construction received February 7, 1990, AC 56-141460 issued March 24, 1988 and modified October 31, 1988 and Application to Construct Air Pollution Sources dated November 2, 1987 and additional information dated December 17, 1987 (none are attached).

LOCATED AT: Henry D. King Municipal Electric Station, Fort Pierce Utilities Authority, 2nd Street and B Avenue, Fort Pierce, St. Lucie County, Florida.

TO SERVE: An electrical generating facility (SIC # 4311).

SUBJECT TO: General Conditions 1-14 and Specific Conditions 1-13.

DER Form 17-1.201 (57)
Effective November 30, 1982

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 403.141, 403.727, or 403.859 through 403.861, F.S. 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), F.S., the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

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

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or 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 reasonable times, 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 the permit, the permittee shall immediately notify and provide the Department with the following information:

   (a) A description of and cause of noncompliance; and

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

GENERAL CONDITIONS:

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 o this permitted source which are submitted to the Department, may be used by the Departme 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 403.111 and 403.73, F.S. Such evidence shall only be used to the extent it is consister with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

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

11. This permit is transferable only upon Department approval in accordance with Rule 17-4.120 and 17-30.300, F.A.C., as applicable. The permittee shall be liable for any no compliance of the permitted activity until the transfer is approved by the Department.

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

13. The permittee shall comply with the following :

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

(b) The permittee shall hold at the facility or other location designated by this permit, records of all monitoring information (including all calibration and m tenance records and all original strip chart recordings for continuous monitor instrumentation) required by the permit, copies of all reports required by thi permit, and records of all data used to complete the application for this perm 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 date(s) analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

14. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware the 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 submitted or corrected promptly.

PERMITTEE:
Mr. Harry Schindehette
Fort Pierce Utilities Authority
Fort Pierce, Florida

I.D. NUMBER: 50/WPB/56/0309
PERMIT/CERTIFICATION NUMBER: AO 56-175955
DATE OF ISSUE: MAY 1 1990
EXPIRATION DATE: March 30, 1995

SPECIFIC CONDITIONS:

1. Compliance testing shall be conducted for the sources covered by this permit by September 30, 1990 and annually thereafter in accordance with the methods specified below.

2. Emission limiting standards are as follows:

In accordance with AC 56-141460; 40CFR60. Subpart GG, and 17-2.660 -

a) NO_x emissions shall not exceed 84ppm NOx or 0.0075 $\frac{(14.4)}{Y}$ + F.

b) SO_2 emissions shall not exceed 0.015% by volume at 15% oxygen on a dry basis

c) Visible emissions shall not exceed 15% opacity. Lat MAX 314.11 LBS/HR

d) The sulfur content of the No. 2 fuel oil shall not exceed 0.5% by weight.

e) CO emissions shall not exceed 32.85 lb./hr. and 110.4 ton/yr. when burning natural gas.

3. The compliance test report shall include results of tests by the following methods:

Source/Emission Point	Pollutant	Test Method
Unit #9	SO_2	EPA Method 20 or ASTM 1552
	CO	EPA Method 10
	NO_x	EPA Method 20
	VE	EPA Method 9

During performance tests to determine compliance with the proposed standard, measured NO_x emission at 15 percent oxygen will be adjusted to ISP ambient atmospheric conditions by the following correction factor:

$$NO_x = (NO_{x\ obs}) \left(\frac{P_{ref}}{P_{obs}}\right)^{0.5} e^{19} (H_{obs} - 0.00633) \left(\frac{T_{AMB}}{288°}\right)^{1.53}$$

where:

NO_x = Emissions of NO at 15% oxygen and ISO standard ambient conditions.

NO obs = Measured NO_x emission at 15% oxygen, ppmv.

P_{ref} = Reference combustor inlet absolute pressure at 101.3 kilopascals ambient pressure.

P_{bs} = Measured combustor inlet absolute pressure at test ambient pressure.

H_{obs} = Specific humidity of ambient air at test.

e = Transcendental constant (2.718)

T_{AMB} = Temperature of ambient air at test.

The compliance test report shall be submitted to the Department in accordance with Florida Administrative Code (F.A.C.) Rule 17-2.700(7).

February 08 , 1996

Mr. Al Linero
Director , Air Permitting
Department of Environmental Protection
Talahassee FL.

Dear Al ,

As per our telephone conversation of today . I am sending you information that addresses the concerns about our permited SO_2 limits. I have copied a letter from Air Consulting Engineering , our stack test team , and data from our CEM system on Unit 8 to show the calculated SO_2 values .There is a data sheet for system calculations for heat inputs from 550.620 through 611.168 MMBTU's . A copy of our permits that show our limits . Unit 7 data is similar to Unit 8 . Both are Oil and Gas units . Unit 8 is a 611 MMbtu unit and Unit 7 is a 470 MMbtu unit .Natural Gas is the Primary permited fuel with Oil as a emergency / standby backup .

Fort Pierce Utilities would also like to see the compliance testing part of our permit changed due to Natural Gas fireing of the units.We believe compliance testing for SO_2 and PM should not be required .

Fort Pierce Utilities Authority
Environmental Specialist

Jim Stevens

ACE
AIR CONSULTING
& ENGINEERING, INC.

2106 N.W. 67th Place • Suite 4 - Gainesville, Florida - 32606
(904) 335-1889 FAX (904) 335-1891

January 9, 1996

Ms. Raisa Neginsky
Compliance Engineer III
Florida Department of Environmental Protection
Post Office Box 15425
West Palm Beach, Florida 33416

RE: Your letter of January 4, 1995 concerning Units 8 & 9
Source Test Reports for Ft. Pierce Utility Authority

Dear Ms. Neginsky:

I wish to address the concerns expressed in the referenced letter. Let me begin with a general observation regarding the sulfur content of the natural gas supplied to Florida customers. According to Mr. Michael Campo of the Florida Gas Transmission Company, gas analyses are now available on their bulletin board on a weekly basis for their customers to access. In the very near future these analysis will be made available on a daily basis. Their current Florida contract limits delivered total sulfur content to 10 grains per 100 cubic feet of gas (10 gr/CCF). The actual delivered gas averages about 0.25 gr/CCF. This includes the background sulfur content plus the reduced sulfur compounds added for odor safety reasons. There is therefore no need to test for SO_2 emissions during natural gas firing. At 0.25 gr/CCF the SO_2 emissions are calculated as follows:

$$\left(\frac{0.25 \text{ grains sulfur}}{100 \text{ cubic feet gas}}\right)\left(\frac{\text{lbs}}{7000 \text{ grains}}\right)\left(\frac{64.07 \text{ molecular weight SO2}}{32.06 \text{ molecular weight S}}\right)$$

$$= 7.14 \times 10^{-7} \text{ lbs } SO_2/\text{CF natural gas at 14.73 psia and 60°F.}$$

For Unit 8 which averaged about 575,000 SCF per hour fuel (see Appendix E of report) at ≈1035 BTU/SCF (595.1 MMBTUH) we have:

$$(570{,}000 \text{ SCFH Gas})(7.14 \times 10^{-7} \text{ lbs } SO_2/\text{CF}) = 0.407 \text{ lbs/Hr } SO_2$$

As you will note, this is much greater than the current permit allowable rate of 0.192 lbs/Hr SO_2.

Two things are readily apparent from this analysis. Emission limits for SO_2 should be raised and there is no need to test for SO_2 emissions on any of the sources fired with natural gas. Agreement with these two points would preclude the necessity for further debate regarding test methodology or audit samples.

However, anticipating that the need will still exist, I shall continue.

Unit 9 - SO2

The permit for Unit 9 specifies EPA Method 20 as the $NO_x/SO_2/O_2$ test method. It further allows use of fuel analysis as proof of compliance with SO2 allowable emissions. That option is taken. Applicable calculations are:

Allowable emission is 0.015% by volume at 15% O_2 dry basis. Stack gas flows from the test report averaged 20751 SCFMD at 16.0% O_2. Flow corrected to 15% O_2 is:

$$(207551)\left(\frac{20.9 - 16.0}{20.9 - 15.0}\right) = 172{,}373 \text{ SCFMD}$$

SO_2 allowable is: 172,373 x 0.00015 x 60 min/Hr = 1551 cubic feet/Hr SO_2

The density of SO_2 is calculated as:

$$\left(\frac{64.07 \text{ gms SO2}}{22.4 \text{ liters}}\right)\left(\frac{492°R}{528 R}\right)\left(\frac{28.32 \text{ liters}}{SCF}\right)\left(\frac{\text{lbs}}{453.6 \text{ gms}}\right) = 0.166 \text{ lbs/SCF}$$

Allowable SO_2 emission is therefore: 0.166 lbs/SCF x 1551 CFH = 258.1 lbs/Hr SO_2

Using the attached fuel use data for September 26, 1995 between 1000 and 1600 hours, we have a natural gas usage rate of about 3.88 lbs/sec. The density for a typical analysis (attached) is calculated by (0.583)(0.076) = 0.0444 lbs/CF. The fuel flow is then calculated:

$$3.88 \text{ lbs/sec} \times \left(\frac{CF}{0.0444 \text{ lbs}}\right) \times 3600 \text{ sec/Hr} = 314{,}594 \text{ CFH}$$

The heat input at 1031 BTU/CF = 324.35 MMBTUH

The downstream sulfur content (after odor control) is 0.28 gr/100 CF.

The SO_2 content will be 64.07/32.06 x 0.28 gr or 0.56 gr/100 CF

The SO_2 emission rate is calculated as:

$$(314594 \text{ CFH})\left(\frac{0.56 \text{ grains}}{100 \text{ CF}}\right)\left(\frac{\text{lbs}}{7000 \text{ grains}}\right) = 0.252 \text{ lbs/Hr}$$

The allowable emission of 258.1 lbs/Hr SO2 (NSPS and permit) is much greater (1000 times) than actual. Testing for SO_2 is therefore a frivolous exercise and the permit should be amended.

Unit 8 - SO2

No SO_2 audit samples were requested or supplied by the FDEP within 30 days of the Unit 7 test. Audit samples were run for the unit 7 test of November 29, 1995 however and were deemed satisfactory by your office. The sample train used was the one allowed by option (1) of the attached excerpt from CFR Part 60, Appendix A, Method 6. The H_2O in the EPA Method 5 train is replaced with 3% peroxide and a non-reactive heated glass filter added at the probe exit. No isopropanol was used. This train is conservative in that all forms of gaseous sulfur emissions are reported as SO_2. SO_2 analysis is conducted consistent with EPA Method 8. Testing was performed correctly. The failure to obtain audit samples should not require a need to retest as we have already shown it is impossible to meet current emission restrictions. A retest that did indicate compliance emissions would be in error. The permitted allowable emissions for Units 7 and 8 should be revised and compliance should be dictated by a maximum fuel sulfur content. The emissions are really too low for accurate evaluation by EPA Method 6 or 8.

The correct SO_2 emission for the Unit 8 test should be the 0.353 lbs/Hr value. The 0.60 lbs/Hr value was erroneously calculated using the blank from Unit 9 (0.1 VTB) versus the Unit 8 blank (0.2 VTB). A sample calculation for Run 1 is as follows:

$$SO_2 \text{ lbs/SCF} = (7.065 \times 10\text{-}5)(VT\text{-}VTB)\left(\frac{VS}{VA}\right)(N) + VS =$$

$$(7.065 \times 10^{-5})(0.3 - 0.2)\left(\frac{400}{20}\right)(0.012987) + 41.309 = 4.40 \times 10^{-2} \text{ lbs/SCF}$$

lbs/Hr = lbs/SCF x SCFMD x 60 = $(4.40 \times 10^{-8})(151,987)(60) = 0.405$ lbs/Hr

Please contact me should you have additional questions regarding this matter.

Respectfully,

AIR CONSULTING AND ENGINEERING, INC.

Stephen L. Neck, P.E.

SLN/cvt

cc: Jim Stevens, Ft. Pierce Utility Authority

ACE File: 150 95 01

P.S. Please also note that PM testing for natural gas sources is an unnecessary exercise and can cause problems if a piece of boiler tube scale is captured.

*** PLANT USE ONLY ***

FT.Pierce
Utilities Authority
Henry D. King Power Plant
Ft. Pierce, Fl.

DAILY REPORT Server #1

24 Hour Report For :10/28/95

Printed On :10/30/95 At :12:49:37 PM

HOUR	NOx lbmmBTU 1-Hr	NOX PPM 1-Hr	CO2 % 1-Hr	SO2 lb/hr 1-Hr	Gas Flow SCFH 1-Hr	Oil Flow GPH 1-Hr	Turbine MWGE 1-Hr
0	0.088	53.90	7.60	0.213	341,600		31.00
1	0.104	61.00	7.30	0.189	303,400		27.00
2	0.160	92.80	7.20	0.190	304,400		27.00
3	0.159	89.50	7.00	0.177	283,900		25.00
4	0.145	81.90	7.00	0.160	257,000		22.00
5	0.130	75.50	7.20	0.155	248,200		22.00
6	0.082	46.10	7.00	0.107	171,500		15.00
7	0.064	36.90	7.20	0.096	154,600		13.00
8	0.102	59.90	7.30	0.146	234,300		20.00
9	0.147	86.50	7.30	0.203	325,800		29.00
10	0.143	85.40	7.40	0.205	328,500		29.00
11	0.127	78.90	7.70	0.329	527,200		46.00
12	0.116	71.70	7.70	0.307	491,300		43.00
13	0.140	87.90	7.80	0.329	527,400		46.00
14	0.168	104.30	7.70	0.339	543,400		48.00
15	0.167	105.10	7.80	0.339	543,200		48.00
16	0.170	106.80	7.80	0.339	542,700		48.00
17	0.168	105.50	7.80	0.339	543,200		48.00
18	0.165	103.90	7.80	0.340	545,400		48.00
19	0.168	105.70	7.80	0.338	541,500		48.00
20	0.174	109.10	7.80	0.336	537,800		48.00
21	0.148	91.90	7.70	0.256	410,800		37.00
22	0.144	89.00	7.70	0.246	394,000		35.00
23	0.126	78.30	7.70	0.222	355,000		32.00
DAILY AVERAGE	0.138	83.64	7.51	0.246	394,004	0.00	34.79

FACTORS	FORMULAS
Fuel Type = PIPELINE NATURAL GAS OR #6 FUEL OI	
Emissions Limits :	

STATUS CODES:

- I = Plant Down
- c = Calibration In Progress
- $ = Analyzer Out Of Control
- m = Maintenance Mode
- p = Probe Alarm
- & = Logged Off
- r = Analyzer Recovery
- i = Insufficient Data For Calculation

Gas Flows	Heat Input	SO_2	Gas Flows	Heat Input	SO_2	Gas Flows	Heat Input	SO_2
532000	550.620	0.330372	556000	575.460	0.345276	580000	600.300	0.360180
532500	551.138	0.330683	556500	575.978	0.345587	580500	600.818	0.360491
533000	551.655	0.330993	557000	576.495	0.345897	581000	601.335	0.360801
533500	552.173	0.331304	557500	577.013	0.346208	581500	601.853	0.361112
534000	552.690	0.331614	558000	577.530	0.346518	582000	602.370	0.361422
534500	553.208	0.331925	558500	578.048	0.346829	582500	602.888	0.361733
535000	553.725	0.332235	559000	578.565	0.347139	583000	603.405	0.362043
535500	554.243	0.332546	559500	579.083	0.347450	583500	603.923	0.362354
536000	554.760	0.332856	560000	579.600	0.347760	584000	604.440	0.362664
536500	555.278	0.333167	560500	580.118	0.348071	584500	604.958	0.362975
537000	555.795	0.333477	561000	580.635	0.348381	585000	605.475	0.363285
537500	556.313	0.333788	561500	581.153	0.348692	585500	605.993	0.363596
538000	556.830	0.334098	562000	581.670	0.349002	586000	606.510	0.363906
538500	557.348	0.334409	562500	582.188	0.349313	586500	607.028	0.364217
539000	557.865	0.334719	563000	582.705	0.349623	587000	607.545	0.364527
539500	558.383	0.335030	563500	583.223	0.349934	587500	608.063	0.364838
540000	558.900	0.335340	564000	583.740	0.350244	588000	608.580	0.365148
540500	559.418	0.335651	564500	584.258	0.350555	588500	609.098	0.365459
541000	559.935	0.335961	565000	584.775	0.350865	589000	609.615	0.365769
541500	560.453	0.336272	565500	585.293	0.351176	589500	610.133	0.366080
542000	560.970	0.336582	566000	585.810	0.351486	590000	610.650	0.366390
542500	561.488	0.336893	566500	586.328	0.351797	590500	611.168	0.366701
543000	562.005	0.337203	567000	586.845	0.352107	591000	611.685	0.367011
543500	562.523	0.337514	567500	587.363	0.352418	591500	612.203	0.367322
544000	563.040	0.337824	568000	587.880	0.352728	592000	612.720	0.367632
544500	563.558	0.338135	568500	588.398	0.353039	592500	613.238	0.367943
545000	564.075	0.338445	569000	588.915	0.353349	593000	613.755	0.368253
545500	564.593	0.338756	569500	589.433	0.353660	593500	614.273	0.368564
546000	565.110	0.339066	570000	589.950	0.353970	594000	614.790	0.368874
546500	565.628	0.339377	570500	590.468	0.354281	594500	615.308	0.369185
547000	566.145	0.339687	571000	590.985	0.354591	595000	615.825	0.369495
547500	566.663	0.339998	571500	591.503	0.354902	595500	616.343	0.369806
548000	567.180	0.340308	572000	592.020	0.355212	596000	616.860	0.370116
548500	567.698	0.340619	572500	592.538	0.355523	596500	617.378	0.370427
549000	568.215	0.340929	573000	593.055	0.355833	597000	617.895	0.370737
549500	568.733	0.341240	573500	593.573	0.356144	597500	618.413	0.371048
550000	569.250	0.341550	574000	594.090	0.356454	598000	618.930	0.371358
550500	569.768	0.341861	574500	594.608	0.356765	598500	619.448	0.371669
551000	570.285	0.342171	575000	595.125	0.357075	599000	619.965	0.371979
551500	570.803	0.342482	575500	595.643	0.357386	599500	620.483	0.372290
552000	571.320	0.342792	576000	596.160	0.357696	600000	621.000	0.372600
552500	571.838	0.343103	576500	596.678	0.358007	600500	621.518	0.372911
553000	572.355	0.343413	577000	597.195	0.358317	601000	622.035	0.373221
553500	572.873	0.343724	577500	597.713	0.358628	601500	622.553	0.373532
554000	573.390	0.344034	578000	598.230	0.358938	602000	623.070	0.373842
554500	573.908	0.344345	578500	598.748	0.359249	602500	623.588	0.374153
555000	574.425	0.344655	579000	599.265	0.359559	603000	624.105	0.374463
555500	574.943	0.344966	579500	599.783	0.359870	603500	624.623	0.374774

:RMITTEE:
:. H. P. Lamb
)rt Pierce Utilities Authority
)rt Pierce, Florida 34950

I.D. NUMBER: 50/WPB/56/0003
PERMIT/CERTIFICATION NUMBER: AO 56-190275
DATE OF ISSUE: MAY 7 - 1993
EXPIRATION DATE: February 28, 1996

'ECIFIC CONDITIONS:

. Compliance testing shall be conducted for the sources covered by this permit by September 1991 and annually thereafter in accordance with the methods specified below.

:. Emission limiting standards are as follow:

a) Units 6, 7, and 8

(1) Visible emissions shall not exceed 5% opacity while firing natural gas.

For Units 6 and 7, visible emissions shall not exceed 20% opacity when the unit is burning fuel oil, except for one two-minute period per hour during which opacity shall not exceed 40%.

For Unit 8 visible emissions shall not exceed 20% opacity when the unit is burning fuel oil, except for one six minute period per hour during which opacity shall not exceed 27%.

(2)

A) The emission limits for Units 6,7 and 8 shall not exceed the following rates:

Parameter	Unit 6 lb/hr.	Unit 7 lb/hr.	Unit 8 lb/hr.
PM	0.4	0.568	0.945
SOx	12.38	0.1199	0.1917
NOx	1.31	104.35	173.20
VOC	0.0236	0.266	0.441
CO	0.15	7.589	12.59

B) The total emissions from combined Units 6, 7, and 8 shall not exceed:

Parameter	Tons/Yr.
PM	16.0
SOx	101.6
NOx	622.0
VOC	2.3
CO	45.3

Total combined heat input for the Units 6, 7, and 8 shall not exceed 4,534,930 MBtu per year.

SPECIFIC CONDITIONS:

(3) Natural gas is the only permitted fuel for normal operation for Units 6, 7, and 8. Units 6, 7, and 8 are allowed to burn natural gas with a No. 6 fuel oil (0.8 lbs SOx/MBtu) as a standby fuel for up to a combined total of 400 hours per year, when necessary in order to avoid curtailing electric power service to its customers. FPUA must notify the DER within 24 hours after commencement of oil firing and furnish the following information:

a. Duration or projected duration of the event.

b. Quantity of fuel oil burned or projected to be burned.

c. A description of significant circumstances precipitating the event, which shall include:

i. Availability of power for purchase

ii. Availability of electric transmission capacity relating to power purchases.

iii. Availability of natural gas

iv. Availability of FPUA generation sources.

(4) When burning fuel oil in Units 6, 7, and 8, the emission rates set forth in Specific Condition 2(a)2.A above shall not apply and the following rates shall apply to Units 6, 7, and 8:

Parameter	Unit 6 lb/MBTU	Unit 7 lb/MBTU	Unit 8 lb/MBTU
SOx	0.80	0.80	0.80
PM	n/a	0.1	0.1
VOC	n/a	n/a	n/a

(5) Unit 8

1. Continuous emission monitors are required for nitrogen oxides and oxygen.

2. Quarterly excess emissions reports pursuant to 40CFR60 shall be submitted to the Southeast District Office postmarked no later than the 30th day following the end of each calendar quarter.

(6) Diesels 1 and 2

Visible emissions shall not exceed 20 percent opacity while using No. 2 fuel oil.

Fla.

I N T E R O F F I C E M E M O R A N D U M

Date: 08-Jul-1992 04:24pm EST
From: Patricia Comer TAL
COMER_P
Dept: Office General Counsel
Tel No: 904/488-9730
SUNCOM:

TO: Stephanie Brooks WPB (BROOKS_S)
TO: Preston Lewis TAL (LEWIS_P)

Subject: Fort Pierce Utilities

Rest easy folks! I signed the latest (June 26) stipulation to settle Fort Pierce Utilities, units 6, 7 ad nauseum. The only change I made was to page 2 of 4 on Attachment "A", the typo on VOC emissions. I changed it back to 0.0236 lb/hr. and called HBGS and told Perko. He will file the dismissal and we can put this away, **finally**!
Thanks for everything, especially for your patience.

HOPPING BOYD GREEN & SAMS
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OF COUNSEL
W. ROBERT FOKES

June 26, 1992

BY HAND-DELIVERY

Ms. Patricia E. Comer, Esquire
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Re: Fort Pierce Utilities Authority
DOAH Case No. 91-6989; OGC Case No. 1610

Dear Ms. Comer:

By this letter, we are submitting a proposed settlement agreement to resolve the pending administrative proceedings in accordance with in our telephone conversation of May 29, 1992.

As you recall, in exchange for FPUA's dismissal of the permit challenge, the Department has agreed to reissue the renewal permit for Units 6-8 with permit language discussed in the conference call of May 18, 1992. In essence, the Department has agreed to modify the annual SO_x, VOC, and PM emission limits expressed in Specific Condition 2(a)(2)(B) of the Department's latest proposal (dated December 18, 1991) to allow FPUA to burn low sulfur fuel oil (0.8 lbs/MBtu) in either Units 6, 7 or 8 for a combined total of 400 hours per year during emergency conditions. The permit language attached to the proposed settlement agreement incorporates this agreement by adding the annual emissions of SOx (100.8 tons/yr), VOC (0.7 tons/yr), and PM (12.6 tons/yr) associated with 400 hours of low sulfur oil-firing to the permit limits expressed in your latest proposal. (Of course, the annual limits for NOx and CO have not changed.)

In addition, FPUA has agreed to withdraw its request for separate permits for Units 6 through 8. However, FPUA does request that DER issue a separate permit for diesels 1 and 2.

I apologize for our delay in submitting the proposed settlement agreement. Due to scheduling conflicts and other administrative problems, we had some difficulty coordinating with FPUA's technical consultants to determine the appropriate permit limits. Nevertheless, FPUA remains anxious to resolve this matter. Accordingly, please give us a call as soon as you have had a chance to review the draft language.

Sincerely,

HOPPING BOYD GREEN & SAMS

By: _____
Peter C. Cunningham
Gary V. Perko

Attorneys for FORT PIERCE
UTILITIES AUTHORITY

Enclosures
gvp:ltrCOMER2

cc: Stephanie Brooks (DER)
Preston Lewis (DER)
Harry Lamb (FPUA)
Steve Day (B&V)

STATE OF FLORIDA
DIVISION OF ADMINISTRATIVE HEARINGS

FORT PIERCE UTILITIES AUTHORITY Petitioner, vs. STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL REGULATION Respondent.	DOAH Case No. 91-6989 OGC Case No. 91-1610

SETTLEMENT AGREEMENT

In order to resolve the pending administrative proceedings in the above case, the parties jointly agree to the following:

1. Fort Pierce Utilities Authority shall withdraw its Petition for Formal Administrative Proceedings on the Notice of Permit Issuance dated May 24, 1991 (Permit No. A0 56-190275).

2. The Department of Environmental Regulation shall issue an air operation permit for Units 6, 7 and 8 at the H.D. King facility in accordance with the terms of the Notice of Permit Issuance dated May 14, 1991, with the changes indicated in Exhibit "A", which is attached hereto and incorporated by reference.

ENTERED this ____ day of June, 1992.

DEPARTMENT OF ENVIRONMENTAL REGULATION

Patricia E. Comer
Twin Towers Office Bldg.
2600 Blair Stone Road
Tallahassee, FL 32399-2400
(904) 488-9730

Attorney for Respondent

HOPPING BOYD GREEN & SAMS

Peter C. Cunningham
Gary V. Perko
Post Office Box 6526
Tallahassee, FL 32314
(904) 222-7500

Attorneys for Petitioner

EXHIBIT "A"

I. Specific Condition 2:

FROM:

2. Emission limiting standards are as follows:

a) Units 6, 7, and 8

1. Visible emissions shall not exceed 5% opacity while firing natural gas.

2. The operating permits emission limits for this facility's existing boilers shall not exceed the following rates:

	Unit 6		Unit 7		Unit 8	
Parameter	lbs/hr	ton/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
Part.	0.4	0.0024	0.568	0.382	0.945	3.018
SOx	12.38	0.0743	0.1199	0.0806	0.1917	0.617
NOx	1.31	0.007854	104.35	70.126	173.20	552.860
VOC	0.0236	0.000142	0.266	0.179	0.441	1.407
CO	0.15	0.0009	7.589	5.100	12.59	40.2
hrs/yr	12		1344		6384	

The operating permits emission limits for these boilers (units No. 6, 7, and 8) shall be modified as stated above.

3. Natural gas is the only permitted fuel for normal operation for Units 7 and 8. Unit 6 is allowed to burn natural gas with a No. 6 fuel oil (0.76% sulfur content) as the standby fuel. If the gas supply is curtailed or an emergency is declared, the facility shall obtain an emergency order for Units 7 and 8 to burn fuel oil. Visible emissions shall not exceed 15% opacity while burning fuel oil. If fuel oil usage exceeds 15 days per calendar year, the Department shall be notified and provision made for emissions testing within 30 days.

TO:

2. Emission limiting standards are as follow:

a) Units 6, 7, and 8

1. Visible emissions shall not exceed 5% opacity while firing natural gas.

For Units 6 and 7, visible emissions shall not exceed 20% opacity when the unit is burning fuel oil, except for one two-minute period per hour during which opacity shall not exceed 40%.

For Unit 8 visible emissions shall not exceed 20% opacity when the unit is burning fuel oil, except for one six-minute period per hour during which opacity shall not exceed 27%.

2.

A) The emission limits for UNITS 6, 7, and 8 shall not exceed the following rates:

Parameter	UNIT 6 lb/hr	UNIT 7 lb/hr	UNIT 8 lb/hr
PM	0.4	0.568	0.945
SO_x	12.38	0.1199	0.1917
NO_x	1.31	104.35	173.20
VOC	0.236	0.266	0.441
CO	0.15	7.589	12.59

B) The total emissions from combined UNITS 6, 7, and 8 shall not exceed:

PARAMETER	TONS/YR
PM	16.0
SO_x	101.6
NO_x	622.0
VOC	2.3
CO	45.3

Total combined heat input for the Units 6, 7, and 8 shall not exceed 4,534,930 MBtu per year.

3. Natural gas is the only permitted fuel for normal operation for Units 6, 7, and 8. Units 6, 7, and 8 are allowed to burn natural gas with a No. 6 fuel oil (0.8 lbs/MBtu) as a standby fuel for up to a combined total of 400 hours per year, when necessary in order to avoid curtailing electric power service to its customers. FPUA must notify the DER within 24 hours after commencement of oil firing and furnish the following information:

a. Duration or projected duration of the event.

b. Quantity of fuel oil burned or projected to be burned.

c. A description of significant circumstances precipitating the event, which shall include;

i. Availability of power for purchase
ii. Availability of electric transmission capacity relating to power purchases.
iii. Availability of natural gas
iv. Availability of FPUA generation sources.

When burning fuel oil in Units 6, 7, and 8, the emission rates set forth in Specific Condition 2(a)2.A above shall not apply and the following rates shall apply to Units 6, 7, and 8:

PARAMETER	UNIT 6	UNIT 7	UNIT 8
	lb/MBTU	lb/MBTU	lb/MBTU
SOx	0.80	0.80	0.80
PM	n/a	0.1	0.1
VOC	n/a	n/a	n/a

II. Specific Condition 4:

FROM:

4. Testing of emissions should be conducted using the fuel and/or process input which are expected to result in the highest emissions and within ten percent (10%) of the rated capacity of the source, otherwise the Department may require the test to be repeated or require modification of the permit to reflect tested rates and/or fuels.

TO:

4. Testing of emissions should be conducted using the fuel and/or process input which are expected to result in the highest emissions and within ten percent (10%) of the rated capacity of the source, otherwise the Department may require the test to be repeated or require modification of the permit to reflect tested rates and/or fuels. However, testing on fuel oil in Units 6, 7, or 8 shall be required only if fuel oil usage for the units exceed 400 hours in any calendar year.

III. Specific Condition 7:

FROM:

7. Ambient monitoring for particulate and sulfur dioxide is required when fuel oil is used.

TO:

7. Ambient monitoring for particulate and sulfur dioxide is required if fuel oil usage exceeds 400 hours per calendar year.

IV. Specific Condition 10:

ADD:

10. The facility shall maintain unit logs reflecting the following information:

    a. Number of hours per day each unit burns gas
    b. Number of hours per day each unit burns fuel oil
    c. Amount of natural gas used per unit (MBTU/million cubic feet burned)
    d. Amount of fuel oil used per unit including sulfur and ash content and heat input rate (MBTU/1000 gallons).

GVP/FPUAterms

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OF COUNSEL
W. ROBERT FOKES

May 22, 1992

BY HAND-DELIVERY

Ms. Patricia Comer, Esquire
Office of General Counsel
Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road, Room 668
Tallahassee, FL 32399-2400

Re: Fort Pierce Utilities Authority - Units 6-8
DOAH Case No. 91-6989
OGC Case No. 1610

Dear Ms. Comer:

For you information, I have enclosed a copy of a conference memorandum drafted by Steve Day of Black & Veatch, summarizing the agreement reached in his conference call with Preston Lewis, Stephanie Brooks, and Harry Lamb on Monday, May 18, 1992.

Peter Cunningham and I would appreciate an opportunity to meet with you on Friday, May 29, 1992, to discuss any remaining issues. I will be out of town until Wednesday, May 28, but you can reach my secretary, Kim Messer, to let us know if you are available on the 29th. Both Peter and I can meet at any time on that date.

We appreciate your cooperation and hope to meet with you soon.

Sincerely,

Gary V. Perko

/kkm:Comer
Enclosure
cc: Preston Lewis
Stephanie Brooks
Steve Day
Harry Lamb

BLACK & VEATCH

TELEPHONE MEMORANDUM

Fort Pierce Utilities Authority
Air Relicensing Units 6, 7, and 8
Emission Limits for Emergency Oil Operation

B&V Project 16589.070
B&V File 32.0000
May 22, 1992
8:30 am

To: Preston Lewis, Stephanie Brooks, Harry Lamb
Company: FDER, FDER, FPUA
Phone No.: 904-488-1344; 407-433-2650; 407-464-5792

Recorded by: S. M. Day SMDay

A conference call was held on Monday, May 18 and completed on Tuesday May 19 to discuss the proposed air emission limits for the FPUA H.D. King Units 6, 7, and 8 during emergency operation on oil.

Steve Day began with a review of the history of the current licensing request to renew the operating permits for Units 6, 7, and 8. In the expired permits, the units were allowed to operate on oil during an interruption in the natural gas supply. If the units operate for more-than 400 hours per year on oil, then FPUA was required to undertake testing of the units and an ambient air monitoring program.

When Unit 9 was permitted on gas, it would have had significant emissions for CO and NO_x. However, FPUA chose to commit to a reduction in the operation of its Units 6, 7, and 8 to obtain sufficient air emission offsets so that there would be no significant air emission increases for these pollutants.

However, FPUA at that time, also provided DER with air emission estimates for VOC, PM, and SO_2 for Units 6, 7, and 8 based on the burning of natural gas in these units. Although Unit 9 had no significant emissions for these pollutants, the Unit 9 permit included limitations on the hourly and annual emission rates for all 5 pollutants, rather than just the two needed as credits for permitting Unit 9. It was not FPUA's intent to restrict Units 6, 7, and 8 from ever burning oil in these units under limited conditions, however through the mistake made at the time, the condition in the Unit 9 permit effectively prohibited all oil burning in these units.

The Unit 9 permit has been modified to provide relief on the limitations on VOC, PM and SO_2 on the Units 6, 7, and 8, during the emergency burning of oil but maintains the same limits on CO and NO_x to protect the prior authorized emission credits needed for the permitting of Unit 9 outside the PSD process. FPUA does not need any relaxation of the CO or NO_x limits in order to burn up to 400 hours per year of oil in Units 7, or 8.

BLACK & VEATCH

TELEPHONE MEMORANDUM

Fort Pierce Utilities Authority
Air Relicensing Units 6, 7, and 8
Emission Limits for Emergency Oil Operation

B&V Project 16589.070
May 22, 1992

The current FPUA request is to allow the Units 6, 7, and 8 permits to be reissued with the authorization for burning oil under emergency conditions, up to 400 hours per year in Units 7 or 8. FPUA has submitted dispersion modeling showing compliance with air quality standards when burning oil. FPUA has also committed to burning oil only under emergency conditions, which means that insufficient gas is available and that no electrical purchases are available from the electrical grid.

The DER staff pointed out that the requested 400 hours of oil would cause significant increases in potential SO_2 and VOC emissions if this were to be considered as a new authorization. The DER was particularly concerned about the potential for SO_2 emissions from 400 hours of operation of Unit 7 at 2.75 pounds per million Btu emission rate. DER also insisted that a combined 400 hour limitation would necessitate a combined air permit for the three units. The DER staff also recognized that a mistake in the prior permitting process could perhaps be corrected without triggering PSD review, but remained concerned about authorizing the 2.75 pounds per million Btu SO_2 emission rate from Unit 7.

After continued discussions, the DER staff said that they would support a permit renewal which authorized up to 400 combined hours of emergency oil operation as long as FPUA would agree to using only low sulfur fuel oil (0.8 pounds per million Btu) in any of the Units 6, 7, or 8 and to the issuance of a single permit for the three units. As a settlement offer, FPUA agreed to these conditions in return for the renewal of the operating permits with the ability to burn oil in the specified emergency conditions. DER staff agreed to support the renewals with these additional conditions without PSD review.

I N T E R O F F I C E M E M O R A N D U M

Date: 21-May-1992 12:00pm EST
From: Patricia Comer (TAL)
COMER_P
Dept: Office General Counsel
Tel No: 904/488-9730

TO: Preston Lewis (TAL) (LEWIS_P)
TO: Isidore Goldman (WPB) (GOLDMAN_I)

Subject: fort pierce utilities

ATTORNEY CLIENT PRIVILEGE INFORMATION/ NOT FOR DISCLOSURE
I talked to gary Perko today and he said you folks had talked to the consultants for FPU and resolved at least some issues about this case. There is one matter that I have to have addressed directly, however. And I don't have the file, the history knowledge or the technical expertise to do it. What I need to know is: How does PSD fit into this oil-burning-induced emissions limit raising? Are we looking at only those emissions limited when unit 9 came on or are we now looking at other operations changes that would trigger the review process? What are we looking at and what limits do we need to impose to avoid PSD? How far back are we going and what changes are being factored in? Please advise me ASAP of the result of your meeting and the the PSD problem.
Thanks

HOPPING BOYD GREEN & SAMS

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OF COUNSEL
W. ROBERT FOKES

RECEIVED

March 31, 1992 MAR 31 1992

Division of Air
Resources Management

BY HAND-DELIVERY

Ms. Patricia E. Comer, Esquire
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Re: Fort Pierce Utilities Authority - Units 6-8
DOAH Case No. 91-6989
OGC Case No. 1610

Dear Ms. Comer:

On behalf of Fort Pierce Utilities Authority ("FPUA"), I am writing to follow up on our meeting of Friday, March 23, 1992. As you recall, in that meeting the parties tentatively agreed to the permit language proposed in your letter of December 18, 1991, provided that the annual emission limits expressed in Specific Condition 2(a)(2)(B) of your proposal are modified to allow FPUA to burn up to 400 hours of fuel oil (subject to the conditions specified in Specific Condition 2(a)(3)).

In order to resolve the pending administrative proceedings, I have drafted the attached settlement agreement for your review. Exhibit "A" of the draft agreement implements the conceptual agreement reached last Friday, by simply adding the SOx, VOC and PM emissions associated with 400 hours of oil firing (at an emissions rate of 2.75 lbs/MBtu) to the annual emission limits specified in Specific Condition 2(a)(2)(B) of your latest proposal.

Please give me a call after you have had a chance to review the draft settlement agreement.

Sincerely,

HOPPING BOYD GREEN & SAMS

By: _____
Gary V. Perko

Attorneys for FORT PIERCE UTILITIES AUTHORITY

cc: Stephanie Brooks
Preston Lewis

STATE OF FLORIDA
DIVISION OF ADMINISTRATIVE HEARINGS

FORT PIERCE UTILITIES AUTHORITY Petitioner, vs. STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL REGULATION Respondent.	)	DOAH Case No. 91-6989 OGC Case No. 91-1610

SETTLEMENT AGREEMENT

In order to resolve the pending administrative proceedings in the above-styled action, the parties jointly agree to the following:

1. Fort Pierce Utilities Authority agrees to withdraw its Petition for Formal Administrative Proceedings on the Notice of Permit Issuance dated May 24, 1991 (Permit No. A0 56-190275).

2. The Department of Environmental Regulation agrees to issue separate air operation permits for Units 6, 7, and 8, and diesels 1 and 2, within one week of the date of the Hearing Officer's Recommended Order of Dismissal, or as soon thereafter as possible.

3. The separate air operation permits for Units 6, 7, and 8 shall be in accordance with the terms of the Notice of Permit Issuance dated May 14, 1991, with the changes indicated in Exhibit "A", which is attached hereto and incorporated by reference.

ENTERED this ____ day of March, 1992.

DEPARTMENT OF ENVIRONMENTAL REGULATION

Patricia E. Comer
Twin Towers Office Bldg.
2600 Blair Stone Road
Tallahassee, FL 32399-2400
(904) 488-9730

Attorney for Respondent

HOPPING BOYD GREEN & SAMS

Peter C. Cunningham
Gary V. Perko
Post Office Box 6526
Tallahassee, FL 32314
(904) 222-7500

Attorneys for Petitioner

EXHIBIT "A"

I. Specific Condition 2:

FROM:

2. Emission limiting standards are as follows:

a) Units 6, 7, and 8

1. Visible emissions shall not exceed 5% opacity while firing natural gas.

2. The operating permits emission limits for this facility's existing boilers shall not exceed the following rates:

	Unit 6		Unit 7		Unit 8	
Parameter	lbs/hr	ton/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
Part.	0.4	0.0024	0.568	0.382	0.945	3.018
SOx	12.38	0.0743	0.1199	0.0806	0.1917	0.617
NOx	1.31	0.007854	104.35	70.126	173.20	552.860
VOC	0.0236	0.000142	0.266	0.179	0.441	1.407
CO	0.15	0.0009	7.589	5.100	12.59	40.2
hrs/yr	12		1344		6384	

The operating permits emission limits for these boilers (units No. 6, 7, and 8) shall be modified as stated above.

3. Natural gas is the only permitted fuel for normal operation for Units 7 and 8. Unit 6 is allowed to burn natural gas with a No. 6 fuel oil (0.76% sulfur content) as the standby fuel. If the gas supply is curtailed or an emergency is declared, the facility shall obtain an emergency order for Units 7 and 8 to burn fuel oil. Visible emissions shall not exceed 15% opacity while burning fuel oil. If fuel oil usage exceeds 15 days per calendar year, the Department shall be notified and provision made for emissions testing within 30 days.

TO:

2. Emission limiting standards are as follow:

a) Units 6, 7, and 8

1. Visible emissions shall not exceed 5% opacity while firing natural gas.

For Units 6 and 7, visible emissions shall not exceed 20% opacity when the unit is burning fuel oil, except for one two-minute period per hour during which opacity shall not exceed 40%.

For Unit 8 visible emissions shall not exceed 20% opacity when the unit is burning fuel oil, except for one six-minute period per hour during which opacity shall not exceed 27%.

2.

A) The emission limits for UNITS 6, 7, and 8 shall not exceed the following rates:

Parameter	UNIT 6 lb/hr	UNIT 7 lb/hr	UNIT 8 lb/hr
PM	0.4	0.568	0.945
SO_x	12.38	0.1199	0.1917
NO_x	1.31	104.35	173.20
VOC	0.236	0.266	0.441
CO	0.15	7.589	12.59

B) The total emissions from combined UNITS 6, 7, and 8 shall not exceed:

PARAMETER	TONS/YR
PM	12.8
SO_x	259.3
NO_x	622.0
VOC	105.9
CO	45.3

Total combined heat input for the Units 6, 7, and 8 shall not exceed 4,534,930 MBtu per year.

3. Natural gas is the only permitted fuel for normal operation for Units 7, and 8. Unit 6 is allowed to burn natural gas with a No. 6 fuel oil (0.76% sulfur content) as a standby fuel. FPUA shall be permitted to burn residual fuel oil in Units 6, 7, and 8, when necessary in order to avoid curtailing electric power service to its customers. FPUA must notify the DER within 24 hours after commencement of oil firing and furnish the following information:

a. Duration or projected duration of the event.

b. Quantity of fuel oil burned or projected to be burned.

c. A description of significant circumstances precipitating the event, which shall include;

i. Availability of power for purchase
ii. Availability of electric transmission capacity relating to power purchases.

iii. Availability of natural gas
iv. Availability of FPUA generation sources.

When burning residual fuel oil in Units 6, 7, and 8, the sulfur oxide (SOx), particulate matter (PM), and volatile organic compound (VOC) emission limits set forth in Specific Condition 2(a)2.A above shall not apply and the following rates shall apply to Units 6, 7, and 8:

PARAMETER	UNIT 6	UNIT 7	UNIT 8
	lb/MBTU	lb/MBTU	lb/MBTU
SOx	0.80	2.75	0.80
PM	n/a	0.1	0.1
VOC	n/a	n/a	n/a

I. Specific Condition 4:

FROM:

4. Testing of emissions should be conducted using the fuel and/or process input which are expected to result in the highest emissions and within ten percent (10%) of the rated capacity of the source, otherwise the Department may require the test to be repeated or require modification of the permit to reflect tested rates and/or fuels.

TO:

4. Testing of emissions should be conducted using the fuel and/or process input which are expected to result in the highest emissions and within ten percent (10%) of the rated capacity of the source, otherwise the Department may require the test to be repeated or require modification of the permit to reflect tested rates and/or fuels. However, testing on fuel oil in Units 6, 7, or 8 shall be required only if fuel oil usage for that unit exceeds 400 hours in any calendar year.

III. Specific Condition 7:

FROM:

7. Ambient monitoring for particulate and sulfur dioxide is required when fuel oil is used.

TO:

7. Ambient monitoring for particulate and sulfur dioxide is required for a unit when fuel oil usage of that unit exceeds 400 hours per calendar year.

IV. Specific Condition 10:

ADD:

10. The facility shall maintain unit logs reflecting the following information:

    a. Number of hours per day each unit burns gas
    b. Number of hours per day each unit burns fuel oil
    c. Amount of natural gas used per unit (MBTU/million cubic feet burned)
    d. Amount of fuel oil used per unit including sulfur and ash content and heat input rate (MBTU/1000 gallons).

GVP/FPUAterms

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

For Routing To Other Than The Addressee

To: _____ Location: _____

To: _____ Location: _____

To: _____ Location: _____

From: _____ Date: _____

Interoffice Memorandum

RECEIVED

APR 8 1992

Division of Air
Resources Management

TO: Pat Comer, OGC
Preston Lewis, DAR Tallahassee

FROM: Stephanie Brooks, DER-SED Stephanie Brooks

DATE: April 6, 1992

SUBJECT: FPUA Units 6,7, and 8 terms

After review of Gary Perko's proposal, I have the following comments to offer.

1. The combined emission rate takes into account operating Unit 7 for 400 hrs on oil. The rate does not include emissions from Units 6 and 8 on anything other than natural gas. The cover letter to this proposal seems to indicate that they want to be able to operate all three units for up to 400 hours during emergency situations which would give an SO2 emission rate for just the 400 hours of 714.5 tpy.

2. Individual permits with a grouped emission limit like FPUA proposes are a compliance nightmare and constitute "bubbling" which EPA does not allow. If they want to have individual permits, they must accept individual annual and hourly emission limits.

FPUA's Proposal + UNIT 9

	6-8	9	TOTAL	(1984-1992) Inc	Sig, Inc	
PM	12.8	13.44	26.24	22.002	25	
SO_x	259.3	0.576	259.876	258.94	40	*
NO_x	622.0	172.5	794.5	18.74	40	
VOC	105.9	12.1	118	116.026	40	*
CO	45.3	110.4	155.7	99.29	40	*

1984 : UNITS 6-8 EMISSIONS ACTUAL

	6	7	8	TOTAL
PM	0.0061	0.781	3.451	4.238
SO_x	0.0743	0.16485	0.70002	0.93917
NO_x	0.007854	143.4134	632.338	775.76
VOC	0.000142	0.36507	1.6096	1.974
CO	0.0009	10.43	45.98	56.41

1992 400 hrs fuel oil included Units 6-8

	6	7	8	TOTAL	(1992 1984) Inc	Sig. Inc.
PM	0.0061	10.047	15.46	25.5331	21.2951	25
SO_x	35.0983	258.14	98.42	391.6583	390.719	40
NO_x	0.007854	143.4134	632.338	775.76	—	
VOC	0.000142	0.36507	1.6096	1.974	—	
CO	0.0009	10.43	45.98	56.41	—	

1992 UNITS 6-8 400 hrs fuel oil & Unit 9

	6-8	9	TOTAL	(1992-1984) Inc	Sig. Inc
PM	25.5331	13.44	38.97	34.74	25 *
SO_x	391.6583	0.576	392.23	391.295	40 *
NO_x	775.76	172.5	948.24	172.5	40 *
VOC	1.974	12.1	14.07	12.1	40
CO	56.41	110.4	166.81	110.4	40 *

Ft Pierce Utilities Authority

1984 Units 6, 7 & 8 Emissions

	Unit 6	Unit 7	Unit 8	Total
PM	0.0061	0.781	3.451	4.238
SO_x	0.0743	0.16485	0.70002	0.93917
NO_x	0.007854	143.4134	632.338	775.760
VOC	0.000142	0.36507	1.6096	1.974
CO	0.0009	10.43	45.98	56.41

Add Unit 9 to 1984 Emissions (No Reductions)

				Unit 9	Total	Increase	Sig
PM	0.0061	0.781	3.451	13.44	17.678	13.44	25
SO_x	0.0743	0.16485	0.70002	0.576	1.51517	0.576	40
* NO_x	0.007854	143.4134	632.338	172.5	948.260	172.5	40
VOC	0.000142	0.36507	1.6096	12.1	14.074	12.1	40
* CO	0.0009	10.43	45.98	110.4	146.81	110.4	10

1992

	Unit 6-8 Total	Unit 7 400 hrs on oil Proposed Emissions	Unit 9	Total	1992-1984 Inc	Sig
PM	12.8		13.44	26.24	8,562	2
* SO_x	259.3		0.576	259.876	258.36	4
NO_x	622		172.5	794.5	(153.76)	4
* VOC	105.9		12.1	118	103.926	4
CO	45.3		110.4	155.7	(11.11)	10

APR-10-'92 12:36 ID:DER WEST PALM TEL NO:407-964-1275 #548 P01

cc PAT COMER, OGC
Return to CPL

Florida Department of Environmental Regulation

Southeast District • 1900 S. Congress Ave., Suite A • West Palm Beach, Florida 33406

Lawton Chiles, Governor

Telephone: 407/433-2650
Fax: 407/433-2666

Carol M. Browner, Secretary

FAX TRANSMITTAL LETTER

DATE: 4-10-92 NUMBER OF PAGES: 3 1/2
(Including this Page)

TO: FAX TELEPHONE NUMBER: 904-922-6979

NAME: Preston Lewis

AGENCY: DER/DAR

FROM:
NAME: S Brooks

TRANSMITTAL ON A HITACHI HIFAX #35:
Number: 407/433-2666

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

SENDERS NAME: Brooks

COMMENTS:

F.P.U.A.,

Pls share w/Pat if you think she needs the info. Stephanie

Recycled Paper

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

June 28, 1991

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Harry Schindehette
Director of Utilities
Fort Pierce Utilities Authority
Post Office Box 3191
Fort Pierce, Florida 34948

Dear Mr. Schindehette:

Re: 1) AC 56-141460, 31.6 MW Combined Cycle Gas Turbine
2) Letter Dated 11/9/90 from Smallwood to Schindehette

The Department is in receipt of Hopping Boyd Green & Sam's letter dated June 11, 1991, requesting a permit modification to burn fuel oil in existing boilers Nos. 6, 7, and 8. The Department has reviewed your proposal and has determined, based on our discussions at the June 4, 1991, meeting, to amend Specific Condition No. 8 of your permit (AC 56-141460) as requested.

Specific Condition No. 8 is amended to further include the following:

Fort Pierce Utilities Authority (FPUA) shall be permitted to burn residual fuel oil in Units 6, 7, and 8 in order to avoid curtailing electric power service to its customers. FPUA must provide written notification to the Department's Southeast District office within 24 hours after the commencement of oil firing and furnish the following information:

a. Duration or projected duration of the event.

b. Quantity of fuel oil burned or projected to be burned.

c. A description of significant circumstances precipitating the event. The description shall include the following information:

1. Availability of power for purchase.
2. Availability of electric transmission capacity relating to power purchases.
3. Availability of natural gas.
4. Availability of FPUA's generation resources.

When burning residual fuel oil in Units 6, 7, and 8, the sulfur dioxide (SO_2), particulate matter (PM), and volatile organic compound (VOC) emission limits currently set forth in the permit shall not apply. In lieu of those emission limits, the following emission limits will apply to Units 6, 7, and 8:

	SO_2 (lb/MMBtu)	PM (lb/MMBtu)	VOC
Unit 6	0.80	n/a	n/a
Unit 7	2.75	0.1	n/a
Unit 8	0.80	0.1	n/a

Attachment to be Incorporated:

Hopping Boyd Green & Sam's letter dated June 11, 1991.

Sincerely,

STEVE SMALLWOOD, P.E.
Director
Division of Air Resources Management

SS/PL/plm

c: Stephanie Brooks, DER
Carol A. Forthman, OGC
Gary C. Smallridge, OGC
Peter Cunningham, HBGS
Gary V. Perko, HBGS

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

CARLOS ALVAREZ
JAMES S. ALVES
BRIAN H. BIBEAU
ELIZABETH C. BOWMAN
WILLIAM L. BOYD, IV
RICHARD S. BRIGHTMAN
PETER C. CUNNINGHAM
THOMAS M. DeROSE
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LAURA BOYD PEARCE
GARY V. PERKO
MICHAEL P. PETROVICH
DAVID L. POWELL
DOUGLAS S. ROBERTS
CECELIA C. SMITH

OF COUNSEL
W. ROBERT FOKES

June 11, 1991

1- ~~Fax to Stephanie Brooks.~~
2- Let's establish a conference call date & time if appropriate,

BY HAND DELIVERY

Ms. Patricia E. Comer, Esq.
Assitant General Counsel
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Re: Fort Pierce Utilities Authority
H. D. King Electric Generating Plant-Units 6, 7, 8
Permit No.: AC 56-141460

Dear Pat:

To follow up on our recent meeting, we are writing on behalf of the Fort Pierce Utilities Authority ("FPUA") to propose a permit modification that would allow FPUA to burn fuel oil in Units 6, 7, and 8 at the H. D. King plant in order to avoid curtailment of electric service in emergency circumstances. As discussed, a permit modification would provide the necessary authority while avoiding the need for the emergency order requested by FPUA on May 2, 1991.

We propose that the following language be added to the end of Specific Condition 8 of the original construction permit for Unit 9 (AC 56-141460), as amended by the attached letter from Steve Smallwood dated November 9, 1990:

> FPUA shall be permitted to burn residual fuel oil in Units 6, 7, and 8 in order to avoid curtailing electric power service to its customers. FPUA must notify the DER within 24 hours after the commencement of oil firing and furnish the following information:

a. Duration or projected duration of the event.

b. Quantity of fuel oil burned or projected to be burned.

c. A description of significant circumstances precipitating the event. The description shall include the following information:

1. Availability of power for purchase.

2. Availability of electric transmission capacity relating to power purchases.

3. Availability of natural gas.

4. Availability of FPUA generation resources.

When burning residual fuel oil in Units 6, 7, and 8, the sulfur dioxide ("SO_2"), particulate matter ("PM"), and volatile organic compound ("VOC") emission limits currently set forth in the permit shall not apply. In lieu of those emission limits, the following emission limits will apply to Units 6, 7, and 8:

	Sulfur Dioxide (lb/MBTu)	Particulate Matter (lb/MBTu)	VOC
Unit 6	0.80	n/a	n/a
Unit 7	2.75	0.1	n/a
Unit 8	0.80	0.1	n/a

How does this compare to the existing Air permit Conditions for Units 6-8?

Although we believe this language reflects the consensus reached at our recent meeting, we would be happy to meet with you to discuss any changes the Department feels appropriate. However, we cannot overemphasize FPUA's critical need for

authority to burn oil in emergency circumstances, which could arise at any time throughout the summer.

Thank you for the opportunity to meet with you and the other Department and Public Service Commission officials on Tuesday, June 4, 1991. We appreciate the Department's cooperation in this matter of great importance to FPUA.

Sincerely,

HOPPING BOYD GREEN & SAMS

By: _____
Peter C. Cunningham
Gary V. Perko

Attorneys for FORT PIERCE UTILITIES AUTHORITY

Attachment

cc: Carol A. Forthman, Esq.
Gary C. Smallridge, Esq.

GVP/ltrComer

Florida Department of Environmental Regulation

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

Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary

November 9, 1990

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Harry Schindehette
Director of Utilities
Ft. Pierce Utilities Authority
P. O. Box 3191
Ft. Pierce, Florida 34948

Dear Mr. Schindehette:

Re: 31.6 MW Combined Cycle Gas Turbine
AC 56-141460

The Department is in receipt of your letter dated August 3, 1990, requesting to delete the annual operating hours for existing boilers No. 6, No. 7, and No. 8 from the above mentioned permit's specific condition No. 8.

The Department has reviewed your proposal and has determined, based on our discussions at the July 24, 1990 meeting, to amend your permit (AC 56-141460) as requested. In order to allow flexibility in your facility's operation without increasing permitted emissions, we will be limiting the total annual emissions and the total annual heat input to the three boilers. Specific condition No. 8 will reflect this modification. Therefore, specific condition No. 8 of permit AC 56-141460 will be changed as follows:

FROM:

The operating permits emissions limits for this facility's existing boilers shall not exceed the following rates:

	Unit 6		Unit 7		Unit 8	
Parameter	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
Part.	0.4	0.0024	0.568	0.382	0.945	3.017
SOx	12.38	0.0743	0.1199	0.0806	0.1917	0.617
NOx	1.31	0.007854	104.35	70.126	173.20	552.86
VOC	0.0236	0.000142	0.266	0.179	0.441	1.407
CO	0.15	0.0009	7.589	5.100	12.59	40.20
hrs/yr	12		1344		6384	

TO:

The operating permits emissions limits for this facility's existing boilers (unit No. 6, unit No. 7, and unit No. 8) shall not exceed the following rates:

Parameter	lbs/hr	tons/yr
PM	1.9	3.4
SO_2	12.7	0.8
NO_x	278.9	622.0
VOC	0.7	1.6
CO	20.3	45.3

Total heat input for the three existing boilers (Nos. 6, 7, and 8) shall not exceed 4,534,930 MBtu per year.

The operating permit's emission limits for these boilers (Nos. 6, 7, and 8) shall be modified as stated above.

Attachment to be Incorporated:

- Mr. Harry Schindehette's letter dated August 3, 1990.

Sincerely,

STEVE SMALLWOOD, P.E.
Director
Division of Air Resources
Management

SS/TH/plm

c: Stephanie Brooks, DER

Florida Department of Environmental Regulation

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

Lawton Chiles, Governor — Carol M. Browner, Secretary

FAX TRANSMITTAL LETTER

DATE: 6/13/91

TO:

NAME: STEPHANIE BROOKS
AGENCY: DER - WEST PALM
TELEPHONE: ~~(904) 922-6979~~ (407) 433-2666
OF PAGES (INCLUDE COVER SHEET): ~~(407) 433-2666~~ 6

FROM:

NAME: Preston Lewis
AGENCY: DER - Tallahassee

IF ANY PAGES ARE NOT CLEARLY RECEIVED, PLEASE CALL IMMEDIATELY. PHONE NO. (904) 488-1344

SENDER'S NAME: PL

COMMENTS:

Please call me! Gary wants us to "solve" the problem.

P 832 539 856

Certified Mail Receipt
No Insurance Coverage Provided
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(See Reverse)

UNITED STATES POSTAL SERVICE

Sent to Mr. Harry Schindehette, Ft.	
Street & No. Pierce Utilities P. O. Box 3191	
P.O., State & ZIP Code Fort Pierce, FL 34949	
Postage	$
Certified Fee	
Special Delivery Fee	
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Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Address of Delivery	
TOTAL Postage & Fees	$
Postmark or Date Mailed: 6-28-91 Permit: AC 56-141460	

PS Form **3800**, June 1990

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece next to the article number.

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Mr. Harry Schindehette
Director of Utilities
Fort Pierce Utilities Authority
P. O. Box 3191
Fort Pierce, FL 34948

4a. Article Number
P 832 539 856

4b. Service Type
☐ Registered ☐ Insured
☐ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery
JUL 2 1991

8. Addressee's Address (Only if requested and fee is paid)

5. Signature (Addressee)

6. Signature (Agent)

PS Form **3811**, October 1990 *U.S. GPO: 1990—273-861

DOMESTIC RETURN RECEIPT

Florida Department of Environmental Regulation

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

Lawton Chiles, Governor

Carol M. Browner, Secretary

FAX TRANSMITTAL LETTER

DATE: 6/13/91

TO:

NAME: STEPHANIE BROOKS

AGENCY: DER - WEST PALM

TELEPHONE: ~~(904) 922-6979~~ (407) 433-2666

OF PAGES (INCLUDE COVER SHEET): ~~(407) 433-2666~~ 6

FROM:

NAME: Preston Lewis

AGENCY: DER - Tallahassee

IF ANY PAGES ARE NOT CLEARLY RECEIVED, PLEASE CALL IMMEDIATELY. PHONE NO. (904) 488-1344

SENDER'S NAME: PL

COMMENTS:

Please call me! Gary wants us to "solve" the problem.

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

2nd Draft 5/21/91

TO: Clair Fancy

FROM: Barry Andrews

SUBJ: Ft. Pierce Utilities Authority Emergency Order for Burning Oil in Units 6, 7, and 8
REFERENCE AIR PERMITS: Unit 5 AO 56-113534
Unit 7 AO 56-112679
Unit 8 AO 56-112678
Unit 9 AO 56-175955

REFERENCE: Memo Fancy to Smallridge 2/15/91

This memo is in response to the Ft. Pierce May 2, 1991 request letter to Steve Smallwood to burn fuel oil under emergency conditions.

In the 2/15/91 Memo above we stated that modeling of the above Ft. Pierce sources (Unit 6, 7, and 8) did not exceed the NAAQS and increments for SO_2 and PM when burning No. 6 fuel oil.

We have reviewed information submitted with Ft. Pierce's 5/2/91 request for another emergency order to relax the Units 6, 7, and 8 SO_2 and particulate limitations found in the existing Unit 9 permit.

FACTS:

1. Unit 9 construction permit which eliminates the service hour restrictions for units 6, 7, and 8 was sent to Ft. Pierce on April 15, 1991. To date Ft. Pierce has elected not to publish this "Intent to Issue". However, they have indicated concern over the BACT which requires the modification of Unit 9's Heat Recovery Steam Generator (HRSG) to accommodate Selective Catalytic Reduction (SCR) and a desire to meet with the Department.

2. Ft. Pierce Units 6, 7, and 8 are only permitted to burn natural gas. The use fuel oil in emergencies cannot be permitted. Fuel oil can only be burned if Department approves a request for test purposes and reasonable assurance of compliance with permit restrictions is provided by the utility.

3. Ft. Pierce has provided documents stating that their natural gas supplier may curtail fuel to them during the summer. A survey of other electric utilities indicated power cannot be purchased from the power pool.

4. The maximum use of fuel oil even in an emergency is restricted to 400 hours per year per source.

5. Ft. Pierce believes that they are now in an emergency situation. Natural gas is likely to be curtailed, purchased power is not likely to be available and they will be unable to provide customer electrical needs for lighting, refrigeration, air conditioning, or food preparation.

DEPARTMENT ALTERNATIVES:

1. Approve an emergency order similar to the 2/15/91 order to allow time to finalize the Unit 9 permit which removes restrictions on operating hours for Unit 6, 7, and 8.

2. Encourage Ft. Pierce to publish the "Intent to Issue" notice and finalize the permit on Unit 9.

RECOMMENDATION:

Alternative No. 2 is recommended. If Ft. Pierce is unable to generate power due to the lack of natural gas and unable to purchase power from the pool, Southeast District's Deputy Assistant Secretary, Scott Benyon or the Air Program Administrator, Isadore Goldman should be authorized by the Secretary to grant permission to use oil for short durations (not to exceed 400 hours per year per source).

Smallridge recommends the scheduling of a meeting with Schindehette, Day and others in the near furture because he thinks it is important to keep this case moving.

CC: G. Smallridge
P. Lewis

BLACK & VEATCH

8400 Ward Parkway, P.O. Box No. 8405, Kansas City, Missouri 64114, (913)339-2000

Fort Pierce Utility Authority
Ongoing Services

B&V Project 16589
B&V File 32.0203
Letter No. FP-134
June 10, 1991

FEDERAL EXPRESS

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

Subject: Renewal of Unit 6 Air Permit
No. AO-56113534
Additional Fuel Cost Information

Attention: Mr. C. H. Fancy, Chief

Gentlemen:

Mr. Preston Lewis recently requested additional fuel cost information from Mr. Steven M. Day (Black & Veatch) for the following fuels.

- No. 6 fuel oil with a 2.6 percent sulfur content.
- No. 6 fuel oil with a 0.76 percent sulfur content.
- No. 2 fuel oil with a 0.5 percent sulfur content.

It is our understanding that this information will be used to support the BACT analysis that was submitted for Unit 6 in December 1990. That submittal was based on winter residual fuel oil prices and resulted in No. 6 fuel oil with 0.76 percent sulfur being proposed as the BACT fuel.

We have summarized the additional fuel cost information in the attached Table 1. These fuel costs are based on May 1991 quotes and therefore do not reflect winter demand or "spot market" prices. Also, note that Fort Pierce Utilities Authority has the current capability to handle and store large volumes of only two types of fuel oil. The current fuel use includes low sulfur residual fuel for Unit 8 and high sulfur residual fuel oil for Units 6 and 7.

Table 1 also identifies the incremental costs associated with the lower sulfur residual and distillate fuel oils. Based on the current fuel costs, using the lower residual fuel oil would result in an incremental cost of about $700 per ton of SO_2 removed. In comparison, the

Bureau of Air Regulation
Mr. C. H. Fancy, Chief

B&V Project 16589
June 10, 1991

incremental cost for No. 2 fuel oil is nearly $8,400 per ton of SO_2 removed. This cost is considered excessive and does not include any costs for the handling and storage of a third fuel oil. Therefore, No. 6 fuel oil with 0.76 percent sulfur content is still considered as BACT for Unit 6.

If you need additional information or have other comments, please call Mr. Steven Day at (913) 339-2880, or Mr. Dan Nelson at (913) 339-2149.

Very truly yours,

BLACK & VEATCH

Daniel W. Nelson

For J. B. Miller, Jr.

dwn
Enclosure

cc: Stephanie Brooks, FDER-Southeast
Preston Lewis, FDER-Tallahassee
Steven M. Day, Black & Veatch
Harry Schindehette, FPUA
Harry Lamb, FPUA

FORT PIERCE UTILITIES AUTHORITY
Renewal of Unit 6 Air Permit (#AO-56-113534)

TABLE 1. COST COMPARISON OF ALTERNATIVE FUEL OILS

Type of Fuel	Heat Content	Density	Sulfur Content	Potential SO2 Emissions	May 1991 Fuel Cost	May 1991 Fuel Cost
	Btu/gal	lb/gal	percent	lb/gal		$/gal
No. 6	150,000	7.88	2.6	0.41	$15.75 bbl	0.38
No. 6	150,000	7.88	0.76	0.12	$19.96 bbl	0.48
No. 2	140,000	7.05	0.5	0.07	$4,573 for 7425 gal	0.62

UNIT 6 OPERATION

Type of Fuel	Sulfur Content	Heat Input	Fuel Consumption	Fuel Cost	Differential Fuel Cost	Potential SO2 Emissions	Differential SO2 Emissions	Incremental Costs	Incremental Costs
	percent	MBtu/h	gal/h	$/hour	$/hour	lb/h	lb/h	$/lb SO2	$/lb SO2
No. 6	2.6	219	1460	$548	Base	598	Base		
No. 6	0.76	219	1460	$694	146	175	423	0.35	691
No. 2	0.5	219	1564	$963	270	110	65	4.17	8347

FT PIERCE MEETING
JUNE 4, 1991

NAME	REPRESENTING	TELEPHONE
PRESTON LEWIS	DER TALLAHASSEE	(904) 488-1344
BARRY ANDREWS	" "	"
Tom Richards	Ft Pierce Utilities Auth.	(407) 464-5600
Steve Day	Black & Veatch	913-339-2880
Carol Forthman	DER - OGC	904/488-9730
PAT COMER	DER OGC	904/488-9730
PETER CUNNINGHAM	FT. PIERCE UTILITIES AUTH.	904/222-7500
Jack Miller	Black & Veatch	(913) 339-7199
GARY PERKO	Ft. Pierce Util Auth	904/222-7500
H. LAMB	FT P UTIL AUTH	407-464-5792
G. SMALLRIDGE	DER/OGC	(904) 488-9730
Joe McCormick	PSC - Gas Regulation	904 488-8501
Bob Jopp	PSC - Electric & Gas Div.	904 4888501

* STEPHANIE BROOKS ON TELECONFERENCE PHONE

Ft Pierce

Concerns / utility

1. What needs to allow #6, #7 and #8 to burn oil under some circumstances.

2. Concern about the

Background of Ft Pierce

23000 Customers

interconnected FPL and Vero Beach

Unit 6 16 MW oil & gas

7 33 MW " "

8 56 MW

9 31 MW Frame 5 Combined Cycle

10 MW St Lucie

20 MW

Contract 4 MW FP&L

Peak - 100 MW winter 89 110 MW

Per Stephanie Brooks

Ft Pierce gave up burning of oil to burn only gas ~~and~~ for two main reasons:

a) They did not want to do ambient monitoring

b) They did not want to go through a full NSPS review when #9 application for operating permit was received.

Carol Jenkins

Emergency situations - Contracted gas and backup from Colorado for gas and purchase power

Gas Contract request does only partially fulfill and was not Ft Pierce's responsibility.

DEP appears to be willing to modify the #6, 7 and 8 Permit to allow the burning of fuel oil when gas is curtailed and purchased power is unavailable.

#9	Const.	Permit	old
#9	Operating	Permit	old
#6	"	"	New
#6, 7 8	oper.	permit	New

Florida Department of Environmental Regulation

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

Lawton Chiles, Governor — Carol M. Browner, Secretary

FAX TRANSMITTAL LETTER

DATE: 5/9/91

TO:

NAME: STEPHANIE BROOKS

AGENCY: DER - SOUTHEAST DISTRICT

TELEPHONE: ~~(305) 785-4109 964-6775~~ (407) 433-2666

OF PAGES (INCLUDE COVER SHEET): 7

FROM:

NAME: PRESTON LEWIS

AGENCY: DER - TALLAHASSEE

IF ANY PAGES ARE NOT CLEARLY RECEIVED, PLEASE CALL IMMEDIATELY. PHONE NO. (904) 488-1344

SENDER'S NAME: Preston Lewis

COMMENTS:

CAN YOU GIVE ME COMMENTS?

a Telephone Call

Preston — 8-9730 5/7 — Clair

What do you & Gary Guldridge think of this now?

How is permit coming, so maybe we don't have to do this?

Clair

Fuji + handling

Judy

5/7/91

5-22-91
8:55am

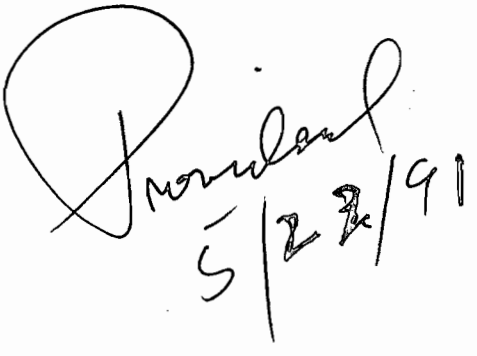
Barry,

Carol Forthman called.

RE: Request for emergency Order for Fort Pierce Oil.

She would like for you to send her a copy of it.
ASAP.

Pat



5/22/91

Stephanie Comments

20% opacity Except for one 6 minute Per hour during which opacity shall not exceed 27% - agrees with the terms

DRAFT

To: Clair Fancy

Thru: Barry Andrews

From: Preston Lewis

Subj: Emergency Order For Burning Fuel Oil at FT Pierce

The May 2 letter and petition from Ft. Pierce Utilities Authority requesting permission to burn oil is likely to be only one many Florida utility request as demand for power increases compared to the generating capacity.

In order to lighten the burden upon the Secretary, the following procedure is proposed:

1. Delegate the authorization for emergency orders to use alternate fuels to the DER ~~District~~ Deputy ~~Director~~ ASSISTANT → Assistant Secretary. The District is in a much better position to determine not only the need but also the impact upon air quality. The District is more familiar with the utility and the specifics of the emergency request.

2. The request should be accompanied by a certified statement (possibly a fax) from the natural gas supplier stating the specifics of the requesting utility curtailment and the expected duration.

3. The request should also be accompanied by a certified statement (possibly a fax) from the power pool stating that purchased power is unavailable for the requesting utility.

4. The requesting utility should also provide a clear statement of the need, the expected number of hours using fuel oil and the sulfur content of the fuel. Include also an year to date history of fuel oil usage by unit, providing the dates, sulfur content of the fuel.

5. Each source should be limited to a maximum of 400 hours per year using the lowest sulfur fuel available.

Robert L.
~~Bob~~ Tropp,
Public Service Commission
101 E. Gaines St.
Tall 32399-0868

In response to your Conversation with Carol Fourthman 066, day Sending a copy of Ft Pierce's request for an emergency order to burn oil. I am including all other documents on Ft Pierce.

We are attempting to Confirm Ft Pierce's inability to purchase power from the Power Pool in the ~~effect~~ EVENT of Natural Gas curtailment.

Please provide an expedient response and should you have questions, call

Sincerely,

[signature] , PE

CC

Teresa's Copy

Florida Department of Environmental Regulation

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

Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary

April 18, 1990

Mr. Harry Schindehette
Director of Utilities
Ft. Pierce Utilities Authority
P. O. Box 3191
Ft. Pierce, Florida 33440

Dear Mr. Schindehette:

Re: 31.6 MW Combined Cycle Gas Turbine

As per Ms. Stephanie Brooks' request, your permit AC 56-141460 will be modified as follows:

Specific Condition No. 1

FROM:

1. The maximum emission rates for the 31.6 MW combined cycle gas turbine during natural gas firing shall not exceed the limits required by 40 CFR 60, Subpart GG, Standards of Performance for Stationary Gas Turbines, as follows:

Nitrogen oxides NSPS Standards = $0.0075 \left(\frac{14.4}{Y}\right) + F$

or

= 84 ppm NOx

and

Sulfur dioxide NSPS Standard = 0.015% by volume at 15% oxygen on a dry basis

Visible Emission Not to exceed 15% opacity

Fuel Oil No. 2 Not to exceed 0.5% sulfur content by weight

TO:

1. The maximum emission rates for the 31.6 MW combined cycle gas turbine during natural gas firing shall not exceed the limits required by 40 CFR 60, Subpart GG, Standards of Performance for Stationary Gas Turbines, as follows:

Nitrogen oxides NSPS Standards = $0.0075 \left(\frac{14.4}{Y}\right) + F$

or

= 84 ppm NOx

and

Sulfur dioxide NSPS Standard = 0.015% by volume at 15% oxygen on a dry basis

Visible Emission — Not to exceed 15% opacity.

Fuel Oil No. 2 — Not to exceed 0.5% sulfur content by weight

Carbon Monoxide — Not to exceed 32.85 lbs/hr and 110.4 tons/yr

Specific Condition No. 8

FROM:

The operating permits for this facility shall be modified as follows:

	Unit 6		Unit 7		Unit 8	
Parameter	lbs/hr	ton/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
Part.	0.04	0.0024	0.568	0.382	0.945	3.017
SOx	12.38	0.0743	0.1199	0.0806	0.1917	0.617
NOx	1.31	0.007854	104.35	70.126	173.20	552.86
VOC	0.0236	0.000142	0.266	0.179	0.441	1.407
CO	0.15	0.0009	7.589	5.100	12.59	40.20
hrs/yr	12		1344		6384	

TO:

The operating permits emission limits for this facility's existing boilers shall not exceed the following rates:

	Unit 6		Unit 7		Unit 8	
Parameter	lbs/hr	ton/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
Part.	0.4	0.0024	0.568	0.382	0.945	3.017
SOx	12.38	0.0743	0.1199	0.0806	0.1917	0.617
NOx	1.31	0.007854	104.35	70.126	173.20	552.86
VOC	0.0236	0.000142	0.266	0.179	0.441	1.407
CO	0.15	0.0009	7.589	5.100	12.59	40.20
hrs/yr	12		1344		6384	

The operating permits emission limits for these boilers (units No. 6, 7, and 8) shall be modified as stated above.

Attachment to be Incorporated

Ms. Stephanie Brooks' request

This letter must be attached to the above mentioned permit and shall become a part of the permit.

Sincerely,

STEVE SMALLWOOD, P.E.
Director
Division of Air Resources
Management

SS/TH/plm

For Routing To Other Than The Addressee

To: _____ Location: _____

To: _____ Location: _____

To: _____ Location: _____

From: _____ Date: _____

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

TO: Stephanie Brooks

FROM: Clair Fancy

DATE: April 23, 1990

SUBJ: 31.6 MW Combined Cycle Gas Turbine
AC 56-141460

In response to your telephone conversation with Mr. Jim Pennington on April 2, 1990, we are modifying permit AC 56-141460.

An emission limit will be included as a specific condition for the CO pollutant. The Bureau will modify specific condition No. 1 by adding the following sentence:

Carbon monoxide emissions shall not exceed 32.85 lbs/hr and 110.4 tons/yr when burning natural gas.

This limit for CO was the basis for the rule applicability and it is the same emission limit that the company proposed.

In addition, you also requested we clarify condition No. 8. This condition calls for modification of the permit for units No. 6, 7, and 8. You indicated this condition does not give emission limits.

The Bureau's intent was to make emissions from boilers No. 6, 7, and 8 federally enforceable since the reduction of emissions from these boilers (net emission change) were credited to the combined cycle gas turbine (unit No. 9) project. The new emission limits are as stated in specific condition No. 8 (units are lbs/hr, tons/yr and hrs/yr) of permit AC 56-141460.

It should also be noted that particulate emissions from unit No. 6 need to be changed from 0.04 lbs/hr to 0.4 lbs/hr (this appears to be a typographical error).

The existing boilers' compliance schedule, specific conditions, and operating limitations (excepting the new emission limits) should remain the same as stated in the current operating permits.

CHF/TH/plm

10.5 A 100K
on Roberts Rd

~~Environmental Testing and Technology~~

Ft Pierce 1/21/91

Cleve H. has reviewed and is satisfied with the modeling information provided by the City of Ft Pierce. We can issue an OK to Barry Smallridge to allow burning of #6 fuel w/ .80 LBS $SO_2/10^6$ BTU (.75% Sulfur) on units #6 and #8. #7 Unit uses Higher SULFUR FUEL 2.75 LBS/10^6 BTU (POSSIBLY 2.5%)

Preston & BARRY X (3) – Need to issue Permit unit #9

X (2) – Revise Permits for #6, #7 and #8 request for extended oper. HRS
#6 BACT only one Done

Cindy will do ✱ (1) – Emergency oil use on #6, #7, #8 limited # HRS/YR and specifying sulfur content of fuel

use Dame format -
TROPICANA
5000 CT
ORLANDO UTIL
write up the permit
for #9 unit

Department of Environmental Regulation

Routing and Transmittal Slip

To: (Name, Office, Location)

1. BILL THOMAS
2. TERESA HERON
3.
4.

Remarks:

STEPHANIE BROOKS CALLED ABOUT THE FT. PIERCE UTILITIES CONSTRUCTION PERMIT AC 56-141460. SHE SAID THAT CONDITION 3 5). REQUIRES TESTING FOR CO WITH METHOD 10, BUT THERE IS NO CO STANDARD FOR UNIT 9. SHE ALSO SAID THAT CONDITION 8. DOES NOT GIVE EMISSION LIMITS [redacted] FOR UNITS 6, 7 & 8, BUT RATHER MODIFIES THE PERMIT, ONLY. PLEASE REVIEW AND DSCUSS WITH STEPHANIE. THANKS,

From: Jim P.

Date: 4/2/90

Phone: 44

~~Spoke to~~ 1/16/91

Barry and Clare on Ft Pierce

Don Nelson, B&V, informed me that Cleve H. had received modeling data last week, requested in Clair's December 90 and Jan 91 letters for Ft Pierce 6, 7, 8 on oil and #9 Natural Gas.

I was not aware of any info from B&V on this visit other than the item you gave me (minutes of 11/19/90 meeting). I asked them if they could ~~Can you~~ copy me for cover letters on the info so I can stay up on the Project?

Thanks
Proctor

GPL Called
1/16/91 DAN NELSON, LICENSING COOR
(913) 339-2149
B+V Kansas City
FM Prime licensing

WATER GAS
ELECTRIC SEWER

FORT PIERCE UTILITIES AUTHORITY

206 S. SIXTH STREET * P. O. BOX 3191 * FORT PIERCE, FLORIDA 34948 * PHONE (407) 464-5600

January 4, 1991

RECEIVED
JAN 8 1991
DER-BAQM

Florida Department of Environmental Regulation
2600 Blairstone Road
Tallahassee, Florida 32399

Attention: Mr. C. H. Fancy, P.E.

SUBJECT: Emergency Order for Burning Oil in Units 6, 7 and 8

REFERENCE AIR PERMITS: Unit 6 - AO-56-113534
Unit 7 - AO-56-112679
Unit 8 - AO-56-112678
Unit 9 - AO-56-175955

We have received your letter of December 26, 1990 responding to our letter of December 10, 1990 regarding the subject.

The responses to your questions and requests for additional information are as follows.

Question 1. **What grade fuel will be burned in the Units? What is the maximum sulfur content of the fuel? What is the maximum ash content?**

Response: No. 6 fuel oil will be fired in Units 6, 7, and 8 during emergency conditions.

Currently, two separate supplies of No. 6 fuel oil are being stored onsite with maximum sulfur contents corresponding to 2.75 and 0.80 lb SO_2/MBtu. These compliance fuels satisfy the Florida Administrative Code (FAC) SO_2 emission rates for Units 7 and 8, respectively.

The FAC does not specify an SO_2 limit for boilers the size of Unit 6. Instead the FAC states that the limit must be established by a Best Available Control Technology (BACT) determination. The BACT analysis for Unit 6 was recently submitted to the FDER and concluded that the lower sulfur No. 6 fuel oil represented BACT. Consequently, Units 6 and 8 will burn the 0.80 lb SO_2/MBtu No. 6 fuel oil and Unit 7 will burn the 2.75 lb SO_2/MBtu fuel oil.

Florida Department of Environmental
Regulation
Mr. C. H. Fancy, P.E.

The ash content of the fuel oil is not monitored by FPUA. Therefore, in responding to the question, it is necessary to approximate the expected particulate emission rates for the three units. The emission particulate rates for Units 6, 7, and 8 are estimated to be approximately 0.1 lb/MBtu.

Question 2. To ensure compliance with ambient air quality standards, please submit modeling of sulfur dioxide and particulate emissions for all sources at the facility, assuming the units are firing the type fuel which will be used during a natural gas curtailment.

Response: Refer to attached modeling results (Attachment A).

Question 3. Is it possible for Fort Pierce Utilities Authority to purchase power from another utility during a natural gas curtailment?

Response: In the event of a natural gas curtailment to the Fort Pierce Utilities Authority generators, replacement power from another utility would be sought. If that effort is unsuccessful, fuel oil would be burned as a last resort to meet the needs of our customers.

Weather related peak demands for power and natural gas generally coincide, and so the availability of surplus power during a weather related gas curtailment, is less likely than at other times.

Question 4. Why do you expect the supply of natural gas to be curtailed this winter? Would you burn fuel oil less than 400 hours during the year?

Response: Historically, there is a correlation between the occurrence of low temperature extremes and the unavailability of natural gas for generating electricity, particularly in a steam boiler. There is no way to predict with certainty whether cold weather of that severity will occur in South Florida this winter; however, we do expect that if extremely cold weather is experienced, we will also be subjected to an accompanying curtailment of natural gas.

Based on past experience, we would expect to burn oil less than 400 hours per year.

Florida Department of Environmental
Regulation
Mr. C. H. Fancy, P.E.

If you need additional information or have any other comments, please call me at (407) 464-5600, Steve Day at (913) 339-2080 or Jack Miller at (913) 339-7199.

Very truly yours,

Harry Schindehette, P.E.
Director of Utilities

lts

cc: S. Day
B. Andrews

FORT PIERCE UTILITIES AUTHORITY

ATTACHMENT A

RESPONSE TO FDER QUESTION 2

1.0 INTRODUCTION

As requested by the Florida Department of Environmental Regulation (FDER) in a December 26, 1990 letter (Question 2), this attachment summarizes the air dispersion modeling for the Fort Pierce Utilities Authority H. D. King Units 6, 7, and 8. In accordance with FDER's request, the modeling analysis examined sulfur dioxide (SO_2) and particulate matter (PM) impacts. Units 6, 7, and 8 were modeled with No. 6 fuel oil, as operated during a natural gas curtailment.

This document outlines the source parameters, modeling options, and analysis results. The results show that the combined impacts from Units 6, 7, and 8, when firing No. 6 fuel oil, do not exceed the applicable Florida Ambient Air Quality Standards (FAAQS) for SO_2 and PM.

2.0 SOURCE PARAMETERS

The modeling analysis considered the potential air quality impacts associated with Units 6, 7, and 8 when firing No. 6 fuel oil. Table 2-1 shows the operating parameters and emission rates for the three sources. Unit 9 was not considered in the analysis since Unit 9 will only be permitted to operate when firing natural gas. The stack exhaust flows and temperatures were obtained from engineering estimates related to the boiler characteristics and fuel properties. Emission rate assumptions were previously outlined in the response to Question 1 of FDER's December 26, 1990 letter.

TABLE 2-1. SOURCE CHARACTERISTICS

Emission Source:	Unit 6	Unit 7	Unit 8
X-Coordinate* (m):	-18.6	6.7	-68.0
Y-Coordinate* (m):	36.3	33.8	18.3
Exhaust Flow (acfm):	64,440	138,300	190,290
Stack Exit Diameter (ft):	5.0 1.52	7.1 2.16	8.0 2.44
Stack Exit Velocity (fpm):	3,282 16.67 ms^{-1}	3,493 17.74 ms^{-1}	3,786 19.23 ms^{-1}
Stack Height (ft):	148 45.11 m	148 45.11m	150 45.72 m
Stack Exit Temperature (F):	300 421°K	300 421°K	295 419°K
Building Height (ft):	68 20.7m	68 20.7m	68 20.7m
Maximum Projected Width (ft):	148.6 45.3m	148.6 45.3m	148.6 45.3
Fuel Type:	No. 6	No. 6	No. 6
Max. Heat Input (MBtu/h):	219	470	611
SO_2 Emission Rate (lb/MBtu):	0.8 ✓ OK	2.75 ✓ OK	0.8 ✓ OK
(lb/h):	175.2 22.075 gs^{-1}	1,292.5 162.85 gs^{-1}	488.8 61.58 gs^{-1}
PM Emission Rate (lb/MBtu):	0.1	0.1	0.1
(lb/h):	21.9 OK 2.76	47.0 OK 5.92	61.1 OK 7.70

*Coordinates relative to Unit 9 stack.

% S in #6, 8 = .75 % S in 7 is 2.5

Unit 6 16.5MW
7 33MW
8 53MW

3.0 MODELING ASSUMPTIONS

The following list outlines the assumptions used to perform the dispersion modeling analysis.

- The EPA approved ISCST model was used for all modeling.
- Five years (1982 - 1986) of surface and upper air meteorological data from West Palm Beach were used with the ISCST model.
- Receptors were placed along the 36 standard directions surrounding the Unit 9 stack at the following downwind distances: 100-meter intervals from 100 to 1,000 meters, 250-meter intervals from 1,250 to 3000 meters, and 1,000-meter intervals from 4,000 to 10,000 meters. Discrete receptors were placed at the boundary that restricts public access along the 36 radial directions.
- The rural modeling option was considered representative of the site.
- All EPA default modeling options were selected.
- The modeled highest concentration was selected for annual averaging periods and the highest, second-highest concentration was selected for 3- and 24-hour averaging periods.
- A GEP analysis showed that the Huber-Snyder building downwash algorithm was appropriate for all wind directions.

4.0 DISPERSION MODELING RESULTS

Table 4-1 shows the maximum modeled SO_2 and TSP impacts for each modeled year. These concentrations are the combined maximum from Units 6,

TABLE 4-1. MODELED SO2 AND TSP IMPACTS FROM UNITS 6, 7, AND 8

Year	SO2 Conc. ug/m3	Location Dist. km	Location Dir. deg	Day	TSP Conc. ug/m3	Location Dist. km	Location Dir. deg	Day
ANNUAL (Highest)								
1982	14.7*	1.5	310	-	1.0*	1.5	310	-
1983	11.9	1.5	310	-	0.8	1.5	310	-
1984	13.1	2.0	260	-	0.9	2.0	260	-
1985	12.6	1.75	270	-	0.9	1.75	270	-
1986	14.3	1.75	270	-	1.0	1.75	270	-
24-HOUR (Second Highest)								
1982	131.5	0.2	250	291	7.3	1.25	310	208
1983	163.2	0.2	270	58	10.6*	0.3	270	58
1984	175.9*	0.2	270	23	9.2	0.2	270	23
1985	138.0	0.2	260	66	7.8	0.2	260	66
1986	104.1	2.5	270	17	6.9	2.5	270	17
3-HOUR (Second Highest)								
1982	432.6	0.2	250	88	-	-	-	-
1983	619.6*	0.3	270	20	-	-	-	-
1984	397.9	0.2	80	59	-	-	-	-
1985	490.6	0.2	260	323	-	-	-	-
1986	421.0	0.2	270	8	-	-	-	-

*Maximum impact.

Increment Estimated SO_2 Ann 3.7 / 20 ~~T5fAnn~~
24-hr 43.9/91
3-hr 154.9/512

TABLE 4-2. IMPACT COMPARISON TO FLORIDA AMBIENT AIR QUALITY STANDARDS

Averaging Period	SO2		Percent of	PM		Percent of
	Conc. ug/m3	FAAQS ug/m3	Standard %	Conc. ug/m3	FAAQS ug/m3	Standard %
Annual	14.7	60	25	1.0	50	2
24-Hour	175.9	260	68	10.6	150	7
3-Hour	619.6	1300	48	-	-	-

Florida Department of Environmental Regulation

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

Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary

December 26, 1990

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Harry Schindehette, P.E.
Director of Utilities
Fort Pierce Utilities Authority
P.O. Box 3191
Fort Pierce, FL 34948

Re: Emergency Order for Burning Fuel Oil in Units 6, 7 and 8
Permit Nos. AO56-113534, 112679, 112678, and 175955

Dear Mr. Schindehette:

The Department has received your petition requesting permission to burn fuel oil in Units 6, 7, and 8 under emergency conditions. The following additional information is needed in order to process this request:

1. What grade fuel will be burned in the units? What is the maximum sulfur content of the fuel? What is the maximum ash content?

2. To ensure compliance with ambient air quality standards, please submit modeling of sulfur dioxide and particulate emissions for all sources at the facility, assuming the units are firing the type fuel which will be used during a natural gas curtailment.

3. Is it possible for Fort Pierce Utilities Authority to purchase power from another utility during a natural gas curtailment?

4. Why do you expect the supply of natural gas to be curtailed this winter? Would you burn fuel oil less than 400 hours during the year?

Please supply this information as soon as possible.

Sincerely,

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

c: I. Goldman, SED
C. Forthman, OGC
S. Day, Black & Veatch

Technical Evaluation
and
Preliminary Determination

Ft. Pierce Utilities Authority
Ft. Pierce, St. Lucie County, Florida

Original

Permit No. AC 56-141460

31.6 MW Combined Cycle Gas Turbine

APIS No. 50WPB56000309

Bureau of Air Quality Management
Central Air Permitting
New Source Review Section

February 12, 1988

I. NAME AND ADDRESS OF APPLICANT

Ft. Pierce Utilities Authority
Post Office Box 3191
Ft. Pierce, Florida 33448

II. REVIEWING AND PROCESS SCHEDULE

Date of Receipt of Application: November 2, 1987

Completeness Review (30 days): Department's letter of December 1, 1987

Response to Request for Additional Information:

Ft. Pierce Utilities Authority's letter of December 17, 1987

Application Completeness Date: December 18, 1987

III. FACILITY INFORMATION

III.1 Facility Location

The proposed source is located on 311 North Indian river Drive in Ft. Pierce, St. Lucie County, Florida. The UTM coordinates are 566.8 East and 3063.3 North.

III.2 Standard Industrial Classification Code (SIC)

This facility is classified as follows:

Major Group No. - 49 ELECTRIC, GAS, AND SANITARY SERVICES

Group No. - 491 ELECTRIC SERVICES

Industry No. - 4911 ELECTRIC SERVICES

III.3 Facility Category

Ft. Pierce Electric Utility is a major facility for nitrogen oxides (NOx) and carbon monoxide (CO).

The proposed project will increase the overall NOx and CO emissions by 19.7 TPY and 99.2 TPY, respectively.

III.3.1 Background Information

A revision of the current existing permits at the Ft. Pierce facility was conducted by Environmental Science and Engineering Inc.

It was concluded that the contemporaneous emissions calculations, as presented, are creditable in accordance with Rule 17-2.500(2)(e)4, Creditable Emissions Changes. The current operating rate for all boilers (Unit 6, Unit 7, and Unit 8) are less than the permitted rates (hours per year) listed on the operating permits. These permitted rates (hours/year) will be decreased as a result of the operation of the new combined cycle turbine (see Table 2). The current operating permits will be modified as follows:

	Unit 6		Unit 7		Unit 8	
Parameter	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
Part.	0.04	0.0024	0.568	0.382	0.945	3.017
SOx	12.38	0.0743	0.1199	0.0806	0.1917	0.612
NOx	1.31	0.007854	104.35	70.126	173.20	552.86
VOC	0.0236	0.000142	0.266	0.179	0.441	1.407
CO	0.15	0.0009	7.589	5.100	12.59	40.20
hrs/yr	12		1344		6384	

IV. PROJECT DESCRIPTION

The new source at Ft. Pierce Utility Authority will consist of a combustion turbine-generator, a heat recovery steam generator (HRSG), cooling tower, and a steam turbine-generator.

Electrical energy will be produced directly from the combustion turbine generator (23.4 MW). A significant portion of the waste heat from the products of combustion will be captured by passing the hot gas steam through a heat recovery steam generator (boiler). The steam produced will drive a smaller (8.2 MW) condensing turbine-generator.

Power produced by the facility will be transferred to the authority's transmission system via step-up transformers and the existing 69 KV substation at the power plant.

The combined cycle unit will provide baseload power to the Ft. Pierce community and the regional grid. The new unit will use natural gas as the primary fuel and No. 2 fuel oil as an emergency secondary fuel.

Emissions control will be provided by steam injection into the turbine, which will reduce NOx emissions by 65%.

V. RULE APPLICABILITY

The proposed project is subject to preconstruction review under the provisions of Chapter 403, Florida Statutes, and Chapter 17-2, Florida Administrative Code, (FAC).

The facility site is in an area, St. Lucie County, designated attainment for all pollutants in accordance with Rule 17-2.420, Florida Administrative Code (FAC).

Ft. Pierce Electric Utilities Authority is classified as a major facility. Emissions of nitrogen oxides are in the order of 776 tons per year.

This source, combined cycle gas turbine, is exempt from the New Source Review Requirements of the Prevention of Significant Deterioration, Rule 17-2.500 because the net emissions increases of NOx and CO are below the significance levels, Rule 17-2.500(2)(e)4., FAC.

This project shall be permitted under Rule 17-2.520 Sources Not Subject to Prevention of Significant Deterioration or Nonattainment Requirements. The proposed source shall comply with Rule 17-2.660 Standards of Performance for New Stationary Sources (NSPS). Specifically, Subpart GG, NSPS for Gas Turbines, Rule 17-2.610, General Particulate Emissions Limiting Standards and Rule 17-2.700 Stationary Point Sources Emissions Test Procedures.

For a future modification, this facility may be subject to a Prevention of Significant Deterioration Review, Rule 17-2.500, if the net increase of emissions of any criteria pollutant is equal to or greater than the significant emission rates listed in Table 500-2, FAC.

VI. EMISSIONS SUMMARY

The operation of the combined cycle gas turbine will produce emissions of nitrogen oxides (NOx), sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter (PM), and volatile organic compounds (VOC) to the atmosphere.

Table 1 summarizes the potential to emit all pollutants regulated under the ACT which are affected by the proposed project. These permitted emissions are in compliance with all applicable requirements of Chapter 17-2, FAC.

Table 2 shows a summary of the existing and proposed emissions for this facility.

VI.1 Air Quality Analysis

From a technical review of the application, the department has determined that the installation and operation of this source will not have a detrimental impact on Florida's ambient air quality standards.

VI.2 Air Toxics Information

Currently, the Department is developing acceptable ambient concentrations for toxic substances. Specifically, sources classified as Category A (carcinogens and highly toxic substances) and Category B (moderately toxic substances).

In the event toxics emission limits are set during the term of this permit or any subsequent permit, the Department may seek modification pursuant to Rule 17-4.08, FAC.

VII. CONCLUSION

Based on the review of the data submitted by Ft. Pierce Electric Authority, the Florida Department of Environmental Regulation (FDER) concludes that compliance with all applicable state air quality regulations will be achieved provided certain specific conditions are met. The impact of installing and operating the combined cycle gas turbine at the Ft. Pierce facility will not cause or contribute to a violation of any ambient air quality standards.

Table 1
Allowable Emission Limits
31.6 MW Combined Cycle Gas Turbine

Pollutant	Standard	Gas Turbine ([1])	Waste Heat Boiler
NOx	$0.0075 \frac{14.4}{Y} + F$([2])	84 ppm (gas); 172.5 TPY 134 ppm (No. 2 oil)	
SO_2	0.8% by weight 0.015% by volume at 15% oxygen on a dry basis	0.17 lb/hr 0.576 TPY (gas)	
PM		15% opacity	15% opacity
CO	---	32.85 lbs/hr (gas) 110.4 TPY (gas)	

([1]) The combined cycle gas turbine will be operating mostly with natural gas. Diesel fuel No. 2 will be used for emergency back-up. The NOx allowance for oil burning is 50 ppm. The maximum sulfur content in the oil shall not exceed 0.5% by weight.

([2]) F = 0 (NOx emission allowance for fuel-bound nitrogen). Natural gas has virtually no fuel-bound nitrogen.

Table 2

SUMMARY OF EMISSIONS
(tons per year)

PRESENT ACTUAL EMISSIONS

Pollutant	No. 6 12 hrs (0.07 wks)	No. 7 2748.6 hrs (16.3 wks)	No. 8 7262.9 hrs (43.2 wks)	6,7,8 10023.5 hrs TOTAL
Part	0.0061	0.781	3.451	4.238
SOx	0.0743	0.16485	0.70002	0.93917
NOx	0.007854	143.4134	632.338	775.760
VOC	0.000142	0.36507	1.6096	1.974
CO	0.0009	10.43	45.98	56.41

PROJECTED EMISSIONS

Pollutant	No. 6 12 hrs (0.07 wks)	No. 7 1344 hrs (8 wks)	No. 8 6384 hrs (38 wks)	No. 9 6720 hrs (40 wks)	6,7,8,9 144460 hrs TOTAL	Net Emissions Increase	Significant Emission Rate
Part	0.0024	0.382	3.017	13.44	16.841	12.607	25
SOx	0.0743	0.0806	0.612	0.567	1.334	0.395	40
NOx	0.007854	70.126	552.86	172.52	795.51	19.75	40
VOC	0.000142	0.179	1.407	12.10	13.69	11.72	40
CO	0.0009	5.100	40.20	110.4	155.7	99.29	100

H.D. KING ELECTRIC GENERATING PLANT
311 North Indian River Drive (34950)
Post Office Box 1298 (34954)
Fort Pierce, Florida
(407) 464-5792

RECEIVED
MAY 20 1991
Division of Air
Resources Management

May 16, 1991

Florida Department of Environmental Regulation
2600 Blair Stone Road, Rm 338
Tallahassee, FL 32399-2400

Attn: Preston Lewis

SUBJECT: EMERGENCY ORDER FOR BURNING FUEL OIL IN UNITS 6, 7, and 8

REFERENCE AIR PERMITS: UNIT 6 - AO-56-113534
UNIT 7 - AO-56-112679
UNIT 8 - AO-56-112678
UNIT 9 - AO-56-175955

Dear Mr. Lewis:

In mid-April the Orlando Director of Systems Operations was contacted and he agreed that Orlando could furnish FPUA 35 megawatts of firm power on a round-the-clock, monthly contract. FP&L Manager of Interchange Dispatch was immediately contacted and we were informed that FP&L could not wheel this or any other firm energy to Fort Pierce due to continuing problems with the FP&L transmission system. The Lake Worth Utilities Superintendent of Systems Operation was then contacted to determine if they had any excess capacity. He stated that they had fuel problems--no firm gas. He did have 15 megawatts of oil-fired generation available, but could not sell it on firm basis.

Tampa Electric was then contacted; however, FP&L's Director of Systems Operation again advised that due to systems condition and security, they could not wheel firm power. FP&L did agree they would make every effort possible to sell us Schedule X power when they had it available. We have been living with this day-to-day, hour-to-hour, purchasing since no other options are available.

On May 15 the FP&L Assistant Manager of Interchange Dispatch was again contacted and he advised us they did not, at that time, have the transmission capacity to wheel any power from any location to Fort Pierce.

We believe we have made a sincere and determined effort to purchase power on a firm basis. However, the transmission system in South Florida is stretched to the limits; and FP&L simply will not commit to any additional firm transmission agreement. Again, we respectfully request a quick disposition of this emergency relief order so that we can either prepare our customers for impending rolling blackouts, or be allowed to burn oil as necessary to meet our customers' load requirements.

Sincerely,

Harry Lamb, Supt.
Power Resources

HL/s

cc: Harry Schindehette
Thomas Richards
Steve Treece
Tony Vincik
Jack Miller, Black & Veatch
Alan Roth, Spiegel & McDiarmid
Shuler Massey, Vero Beach Power Plant
Peter C. Cunningham, Hopping Boyd Green & Sams

ATTACHMENT
BEST AVAILABLE CONTROL TECHNOLOGY (BACT) DETERMINATION
FORT PIERCE UTILITIES AUTHORITY - UNIT 6

INTRODUCTION

Fort Pierce Utilities Authority (FPUA) is currently renewing the air permits for H. D. King Units 6, 7, and 8. As part of this renewal process, the Florida Department of Environmental Regulations (FDER) has requested a sulfur dioxide (SO_2) and particulate Best Available Control Technology (BACT) determination be provided for Unit 6. This request is pursuant to Florida Administrative Code (FAC) 17.2.600(6).

Unit 6 is a Babcock & Wilcox boiler with a maximum heat input of about 219 MBtu/h. This unit is currently on cold standby. It would be used for peaking purposes if power supply shortages develop and would fire natural gas as the primary fuel. Unit 6's operating permit allows the use of No. 6 fuel oil during temporary curtailment of the natural gas supply or emergency situations; if notification is given to the FDER within 24 hours.

Historically, Unit 6 has been operated infrequently and has not fired oil for the past several years. FPUA wants to retain the unit's operating flexibility for oil firing. Therefore, this BACT determination is being submitted as part of the permit renewal.

All of the supporting BACT calculations are included in the appendix of this attachment. Note that the fuel oil heat content and density assumptions are based on data contained in EPA's document entitled "Compilation of Air Pollutant Emission Factors (AP-42)".

BACT DETERMINATION

Unit 6 will typically fire natural gas which will result in minimal SO_2 and particulate emissions. Therefore, this BACT determination considers the impact of firing fuel oil. Sulfur dioxide is the primary pollutant of concern since the sulfur in the fuel is converted to SO_2 and released to the atmosphere. The extent of air quality impact will be dependent on the source characteristics, sulfur content of the fuel, and meteorological conditions.

Particulate emissions and the resulting air quality impacts are typically minimal for oil firing. Therefore, particulate emissions will not be addressed further in this BACT determination.

Fuel Considerations

This BACT compares the fuel cost associated with varying the sulfur content of the fuel. Currently, the FAC states that the SO_2 emission limit for sources similar to Unit 6 are to be established by a BACT determination. In comparison, FPUA has two larger units that have the capability to fire No. 6 fuel oil: Units 7 and 8. The FAC has designated SO_2 emission rates for these units of 2.75 and 0.8 lb SO_2/MBtu of heat input, respectively. This limit is equivalent to a No. 6 fuel oil with sulfur contents of about 2.6 and 0.76 percent, respectively. Both of these fuels are currently stored at the H. D. King facility.

There is a considerable difference in the current price of these fuels. The higher sulfur fuel oil can be purchased for $24.95 per barrel compared to $33.35 per barrel for the lower sulfur fuel. These costs result in a differential of $8.40 per barrel or 20 cents per gallon.

Sulfur Dioxide Emissions

Unit 6 has a rated heat input of about 219 MBtu per hour. This translates into a fuel burn rate of about 1,460 gallons per hour of No. 6 fuel oil (150,000 Btu/gal). Firing the higher sulfur fuel in Unit 6 will result in an SO_2 emission rate of about 602 lb/h. The SO_2 emission rate will be reduced to about 175 lb/h of SO_2 for the lower sulfur fuel. This is a potential SO_2 reduction of approximately 427 lb/h.

The cost of this SO_2 reduction is an increase of $292 per hour of oil firing. The associated incremental cost is about 68 cents per pound of SO_2 removed ($1,368 per ton). This incremental cost is less than EPA's guideline of $2,000 per ton.

BACT CONCLUSION

Utilizing a 0.76 percent sulfur No. 6 fuel oil for Unit 6 will result in an incremental cost of about $1,368 per ton removed. While this is an increase in fuel cost, it is not considered to be excessive in comparison to EPA's guideline of $2,000 per ton. Therefore, firing natural gas as the primary fuel and No. 6 fuel oil with 0.76 percent sulfur during natural gas supply interruptions or emergency situations are considered to represent BACT for Unit 6.

BLACK & VEATCH ENGINEERS ARCHITECTS

Owner: Fort Pierce Utilities Authority — Computed By: D. Nelson
From: H.D. King — Unit: 6 — Date: 12/11 19 90
Project No: 16583.002 — Fax No: — Checked By: DR Murphey
Title: Supporting Calculations for Unit 6 BACT Analysis — Date: 12-12- 19 90
Page: 1 of 2

DO NOT WRITE IN THIS SPACE

No 6 Fuel 0:1 Characteristics

Density = 7.88 lb/gal (AP-42)

Heat Content = 150,000 Btu/gal (AP-42)

Fuel Burn Rate

Unit 6 = $(219\ MBtu/h)\left(10^6\ Btu/MBtu\right)\left(\frac{gal}{150{,}000\ Btu}\right) = \boxed{1460\ gal/h}$

SO_2 Emission Limits

Unit 6 SO_2 emission limit set by BACT [FAC 17.2.600(6)]

Unit 7 SO_2 emission limit is 2.75 lb SO_2/MBtu

Unit 8 SO_2 emission limit is 0.8 lb SO_2/MBtu

Equivalent Sulfur Content for No. 6 fuel 0.1

- 2.75 lb SO_2/MBtu

$$\text{Percent S} = \frac{\text{lb S}}{\text{lb oil}} \times 2.75\ \frac{\text{lb SO}_2}{\text{MBtu}} \times 150{,}000\ \frac{\text{Btu}}{\text{gal}} \times \frac{\text{MBtu}}{10^6\ \text{Btu}} \times \frac{\text{gal}}{7.88\ \text{lb oil}} \times \frac{2\ \text{lb S}}{2\ \text{lb SO}_2} \times 100$$

Percent S ≈ 2.6

- 0.8 lb SO_2/MBtu

$$\text{Percent S} = \frac{\text{lb S}}{\text{lb oil}} = 0.8\ \frac{\text{lb SO}_2}{\text{MBtu}} \times 150{,}000\ \frac{\text{Btu}}{\text{gal}} \times \frac{\text{MBtu}}{10^6\ \text{Btu}} \times \frac{\text{gal}}{7.88\ \text{lb oil}} \times \frac{1\ \text{lb S}}{2\ \text{lb SO}_2} \times 100$$

Percent S ≈ 0.76

BLACK & VEATCH ENGINEERS ARCHITECTS

Owner: Fort Pierce Utilities — Computed By: D. Nelson
From: H.D. King — Unit: — Date: 12/13 19 90
Project No: 16583.002 — Fax No: — Checked By: DRM
Title: Supporting Calculations for BACT Analysis — Date: 12/13/ 19 90
Page: 2 of 2

DO NOT WRITE IN THIS SPACE

Unit 6 SO_2 Emissions for the two fuels

$219\ MBtu/h \times 2.75\ \frac{lb\ SO_2}{MBtu} = \boxed{602.3\ \frac{lb\ SO_2}{h}}$

$219\ MBtu/h \times 0.8\ \frac{lb\ SO_2}{MBtu} = \boxed{175.2\ \frac{lb\ SO_2}{h}}$

Approx. Different: $\boxed{427\ \frac{lb\ SO_2}{h}}$

Differential Fuel Cost

0.76 percent sulfur No 6 Fuel 0.1 ... $93.35 Barrel

2.6 percent sulfur No. 6 Fuel 0.1 $94.95 Barrel

$\boxed{\$8.40\ Barrel}$

$\left(\$8.40/Barrel\right)\left(\frac{Barrel}{42\ gal}\right) = \boxed{\$0.20/gal}$

Operating Cost Differential

$\left(1460\ gal/h\right)\left(\$0.20/gal\right) = \boxed{\$292\ per\ hour\ of\ 0:1\ fuel}$

Incremental Cost

$\left(\frac{\$292/hour}{427\ lb\ SO_2\ Removed/h}\right) = \boxed{\$0.68/lb\ SO_2\ Removed}$

$\boxed{\$1368/ton\ SO_2\ Removed}$

FAX TRANSMITTAL LETTER

DATE:MAY 14, 1991 MODULE 2051

TO:
NAME: PRESTON LEWIS

AGENCY:FDER-BAR

FAX TELEPHONE NUMBER:904-922-6979

NUMBER OF PAGES (INCLUDING THIS PAGE) 3

FROM:STEPHANIE S. BROOKS

AGENCY: FDER-SED

TRANSMITTAL ON A HITACHI HIFAX #35, NUMBER 407/433-2666

IF ANY OF THESE PAGES ARE NOT CLEARLY RECEIVED, PLEASE CALL 407/433-2650

SENDERS NAME: S. BROOKS
PRESTON, This was sent late Dec or early Jan by my notes. Had't heard about a BACT Determination for this. Thought it might have gotten lost. I need to know by next week at the latest. (Figure BACT for all small boilers is the same - natural gas or No. 2 fuel oil and am writing the permit that way.)
COMMENTS:

H.D. KING ELECTRIC GENERATING PLANT
311 North Indian River Drive (34950)
Post Office Box 1298 (34954)
Fort Pierce, Florida
(407) 464-5792

FACSIMILE TRANSMITTAL

DATE: 5-16-91

TO: Preston Lewis
Florida Department of Environmental Regulation FAX NUMBER: 904/922-6979

FROM: H. Lamb, Supt./Power Resources FAX NUMBER: (407) 489-5362

PAGES TRANSMITTED: 3 (Includes cover page)

IF ALL PAGES ARE NOT RECEIVED, PLEASE TELEPHONE (407) 464-4333.

H.D. KING ELECTRIC GENERATING PLANT
311 North Indian River Drive (34950)
Post Office Box 1298 (34954)
Fort Pierce, Florida
(407) 464-5792

May 16, 1991

Florida Department of Environmental Regulation
2600 Blair Stone Road, Rm 338
Tallahassee, FL 32399-2400

Attn: Preston Lewis

SUBJECT: EMERGENCY ORDER FOR BURNING FUEL OIL IN UNITS 6, 7, and 8

REFERENCE AIR PERMITS: UNIT 6 - AO-56-113534
UNIT 7 - AO-56-112679
UNIT 8 - AO-56-112678
UNIT 9 - AO-56-175955

Dear Mr. Lewis:

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FORT PIERCE UTILITIES AUTHORITY

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Sincerely,

Harry Lamb, Supt.
Power Resources

mjs

cc: Harry Schindehette
Thomas Richards
Steve Treece
Tony Vincik
Jack Miller, Black & Veatch
Alan Roth, Spiegel & McDiarmid
Shuler Massey, Vero Beach Power Plant
Peter C. Cunningham, Hopping Boyd Green & Sams

H.D. KING ELECTRIC GENERATING PLANT

311 North Indian River Drive (34950)
Post Office Box 1298 (34954)
Fort Pierce, Florida
(407) 464-5792

May 9, 1991

Florida Department of Environmental Regulation
2600 Blair Stone Road, Rm 338
Tallahassee, FL 32399-2400

Attn: Preston Lewis

SUBJECT: EMERGENCY ORDER FOR BURNING FUEL OIL IN UNITS 6, 7 and 8

REFERENCE AIR PERMITS: UNIT 6 - AO-56-113534
UNIT 7 - AO-56-112679
UNIT 8 - AO-56-112678
UNIT 9 - AO-56-175955

Dear Mr. Lewis:

Attached Page 1 is a copy of our nomination for preferred direct interruptible gas purchases from Florida Gas Transmission Company, dated May 2nd. As you can see, our firm gas delivery is 8,521 MMBtu/Day and our nomination of preferred direct interruptible is 7,000 MMBtu/Day during weekdays and 6,000 MMBtu/Day on weekends. Page 2 shows we were scheduled back to 1,376 MMBtu/Day on May 2nd. Page 3 shows that on May 3rd this was reduced to 1,209 MMBtu/Day, and Page 4, dated May 4th shows a further reduction to 1,108 MMBtu/Day. Page 5, dated May 6th, again shows a reduction to 1,103 MMBtu/Day, and later on May 6th **all** preferred direct interruptible gas was curtailed (see Attached Page 6).

As stated in the May 2nd letter by Harry Schindehette to Mr. Steve Smallwood on this subject, the Fort Pierce Utilities Authority is faced with either obtaining an emergency order from the Florida Department of Environmental Regulation for permission to burn fuel oil in Units 6, 7 and 8 under these emergency conditions, or initiating power blackouts due to the inability to meet customer loads.

05/09/91 13:19 ☎ FPUA DISPATCH ☑001

ACTIVITY REPORT

TRANSMISSION OK

TRANSACTION #	2764
CONNECTION TEL	19049226979
CONNECTION ID	G3
START TIME	05/09 13:13
USAGE TIME	06' 12
PAGES	9

If you have any questions, please call me or the following at telephone number (407) 464-5600: Harry Schindehette, Thomas Richards or Steve Day, Black & Veatch, at (913) 339-2880.

Sincerely,

Harry Lamb, Supt.
Power Resources

HL:m

Attachments

cc: Harry Schindehette
Thomas Richards
Steve Treece
Tony Vincik
Jack Miller, Blk & Veatch
Alan Roth, Spiegel & McDiarmid

FLORIDA GAS TRANSMISSION COMPANY
ESTIMATE OF SALES SERVICE

MONTH May 2

CUSTOMER Ft. Pierce - Generating

DIVISION/LOCATION St. Lucie Co. PREPARED BY Tony Vincik

TELEPHONE# 407 - 464 - 4333 TELECOPY# 407 - 489 - 5362

DAY	TYPE (1) DF	PD		TOTAL
	(INDICATE TYPE OF SERVICE ABOVE)			
1	8521	7000		15521
2		7000		15521
3		7000		15521
4		6000		14521
5		6000		14521
6		7000		15521
7		7000		15521
8		7000		15521
9		7000		15521
10		7000		15521
11		6000		14521
12		6000		14521
13		7000		15521
14		7000		15521
15		7000		15521
16		7000		15521
17		7000		15521
18		6000		14521
19		6000		14521
20		7000		15521
21		7000		15521
22		7000		15521
23		7000		15521
24		7000		15521
25		6000		14521
26		6000		14521
27		7000		15521
28		7000		15521
29		7000		15521
30		7000		15521
31	8521	7000		15521
TOTAL	264,151	209,000		473,151

(1) TYPE OF SERVICE: GENERAL SERVICE (G); SMALL GENERAL SERVICE (SGS); RESALE PREFERRED (I); DIRECT FIRM (DF); PREFERRED DIRECT (PD)

SEND TO: FLORIDA GAS TRANSMISSION COMPANY
GAS MANAGEMENT DEPARTMENT
P.O. BOX 1188 HOUSTON TX 77251-1188
TELECOPY# 713-853-6756

ATTACHMENT 1

FLORIDA GAS TRANSMISSION COMPANY

NOTIFICATION OF SCHEDULED PREFERRED SALES

AND PREFERRED TRANSPORTATION SERVICE

CUSTOMER: Ft. Pierce Utilities Authority (Generating)

ATTN: Tony Vincik

TELECOPY: 407-489-5362

TELEPHONE: 407-464-4333

Effective Date: 05 / 02 / 91

TYPE OF SERVICE *	CUSTOMER ESTIMATE/ NOMINATION MMBtu/D	SERVICE SCHEDULED BY FGT MMBtu/D
PD	7000	1376

*PD = Preferred Direct; I = Resale Preferred;
PTS = Preferred Transportation Service,

Comments:

The above stated scheduled volume(s) have been determined in accordance with Section 9B of the General Terms and Conditions of FGT's FERC Gas Tariff.

If you have any questions please contact your FGT Marketing representative:

John Long	(407) 875-5843
Bill Manuel	(407) 875-5841
Dan Swanson	(407) 875-5839
David Terlip	(407) 875-5854

FLORIDA GAS TRANSMISSION COMPANY

NOTIFICATION OF SCHEDULED PREFERRED SALES AND PREFERRED TRANSPORTATION SERVICE

CUSTOMER: Ft. Pierce Utilities Authority (Generating)

ATTN: Tony Vincik

TELECOPY: 407-489-5362

TELEPHONE: 407-464-4333

Effective Date: 05 / 03 / 91

TYPE OF SERVICE *	CUSTOMER ESTIMATE/ NOMINATION MMBtu/D	SERVICE SCHEDULED BY FGT MMBtu/D
PD	7,000	7209

*PD = Preferred Direct; I = Resale Preferred;
PTS = Preferred Transportation Service

Comments:

The above stated scheduled volume(s) have been determined in accordance with Section 9B of the General Terms and Conditions of FGT's FERC Gas Tariff.

If you have any questions please contact your FGT Marketing representative:

John Long	(407) 875-5843
Bill Manuel	(407) 875-5841
Dan Swanson	(407) 875-5839
David Terlip	(407) 875-5854

ATTACHMENT 3

AP119.FOR

FLORIDA GAS TRANSMISSION COMPANY

NOTIFICATION OF SCHEDULED PREFERRED SALES AND PREFERRED TRANSPORTATION SERVICE

CUSTOMER: Ft. Pierce Utilities Authority (Generating)

ATTN: Tony Vincik

TELECOPY: 407-489-5362

TELEPHONE: 407-464-4333

Effective Date: 5/4/91
5/5/91

TYPE OF SERVICE *	CUSTOMER ESTIMATE/ NOMINATION MMBtu/D	SERVICE SCHEDULED BY FGT MMBtu/D
PD	6,000	1,108
I	~~3,200~~	~~541~~

*PD = Preferred Direct; I = Resale Preferred;
PTS = Preferred Transportation Service

Comments:

The above stated scheduled volume(s) have been determined in accordance with Section 9B of the General Terms and Conditions of FGT's FERC Gas Tariff.

If you have any questions please contact your FGT Marketing representative:

John Long	(407) 875-5843
Bill Manuel	(407) 875-5841
Dan Swanson	(407) 875-5839
David Terlip	(407) 875-5854

FLORIDA GAS TRANSMISSION COMPANY

NOTIFICATION OF SCHEDULED PREFERRED SALES AND PREFERRED TRANSPORTATION SERVICE

CUSTOMER: Ft. Pierce Utilities Authority (Generating)

ATTN: Tony Vincik

TELECOPY: 407-489-5362

TELEPHONE: 407-464-4333

Effective Date: 5 / 6 / 91

TYPE OF SERVICE *	CUSTOMER ESTIMATE/ NOMINATION MMBtu/D	SERVICE SCHEDULED BY FGT MMBtu/D
PD	7,000	1,103
I	~~7,200~~	~~1,135~~

*PD = Preferred Direct; I = Resale Preferred;
PTS = Preferred Transportation Service

Comments:

The above stated scheduled volume(s) have been determined in accordance with Section 9B of the General Terms and Conditions of FGT's FERC Gas Tariff.

If you have any questions please contact your FGT Marketing representative:

John Long	(407) 875-5843
Bill Manuel	(407) 875-5841
Dan Swanson	(407) 875-5839
David Terlip	(407) 875-5854

FLORIDA GAS TRANSMISSION COMPANY
CAPACITY GAS ALLOCATION REQUEST

CUSTOMER: **DATE:** May 6, 1991

Fort Pierce Utilities Authority
ATTN: F. A. Brock
P. O. Box 1298
Fort Pierce, Fl 34954

FROM: 100% **TO:** -0-%

CATEGORY OF GAS SERVICE: 3

PRIORITY OF GAS SERVICE: 8

REQUEST MADE: 8:50 AM CDT **DATE:** 5/06/91

EEFECTIVE: 10:00 AM EDT **DATE:** 5/06/91

REQUEST GIVEN TO: Steve Treece

REQUEST MADE BY: Dale Harden

REMARKS: Curtailment is due to customers taking more than their scheduled volumes.

* Previous faxed copy was in error on request and effective *
* date. *

FLORIDA GAS TRANSMISSION COMPANY
GAS CONTROL DEPARTMENT, RM 4237
P.O. BOX 1188
HOUSTON, TX 77251

ATTACHMENT 6

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

To TONY	From DALE
Co. F.P.U.A.	Co. F.G.T.
Dept.	Phone #
Fax # 407 489 5362	Fax #

Florida Department of Environmental Regulation
Southeast District • 1900 S. Congress Ave., Suite A • West Palm Beach, Florida 33406 • 407-964-9668
Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary
Scott Benyon, Deputy Assistant Secretary

FAX TRANSMITTAL LETTER

DATE: 5-9-91 Module #

TO:

NAME: Preston Lewis

AGENCY: DER

FAX TELEPHONE NUMBER: 904-922-6979

NUMBER OF PAGES (INCLUDING THIS PAGE) 2

FROM: S. Brooks

AGENCY: DER

TRANSMITTAL ON A HITACHI HITAX #35, NUMBER: 407/433 2666

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

SENDERS NAME: S Brooks

COMMENTS:

BEST AVAILABLE COPY

H. D. KING ELECTRIC GENERATING PLANT
311 North Indian River Drive (34950)
Post Office Box 1233 (34954)
Fort Pierce, Florida
(407) 464-5733

FACSIMILE TRANSMITTAL

DATE: May 9, 1991

TO: Preston Lewis, Florida Dept. of Environmental Regulation, Room 338 FAX NUMBER: (904) 922-6979

FROM: Harry Lamb, Supt., Power Resources FAX NUMBER: (407) [illegible]

PAGES TRANSMITTED: 9 (Includes cover page)

IF ALL PAGES ARE NOT RECEIVED, PLEASE TELEPHONE (407) 464-[illegible].

SUBJECT: EMERGENCY ORDER FOR BURNING FUEL OIL IN UNITS 6, 7 & 8

H.D. KING ELECTRIC GENERATING PLANT

311 North Indian River Drive (34950)
Post Office Box 1298 (34954)
Fort Pierce, Florida
(407) 464-5792

May 9, 1991

Florida Department of Environmental Regulation
2600 Blair Stone Road, Rm 338
Tallahassee, FL 32399-2400

Attn: Preston Lewis

SUBJECT: EMERGENCY ORDER FOR BURNING FUEL OIL IN UNITS 6, 7 and 8

REFERENCE AIR PERMITS: UNIT 6 - AO-56-113534
UNIT 7 - AO-56-112679
UNIT 8 - AO-56-112678
UNIT 9 - AO-56-175955

Dear Mr. Lewis:

Attached Page 1 is a copy of our nomination for preferred direct interruptible gas purchases from Florida Gas Transmission Company, dated May 2nd. As you can see, our firm gas delivery is 8,521 MMBtu/Day and our nomination of preferred direct interruptible is 7,000 MMBtu/Day during weekdays and 6,000 MMBtu/Day on weekends. Page 2 shows we were scheduled back to 1,376 MMBtu/Day on May 2nd. Page 3 shows that on May 3rd this was reduced to 1,209 MMBtu/Day, and Page 4, dated May 4th shows a further reduction to 1,106 MMBtu/Day. Page 5, dated May 6th, again shows a reduction to 1,103 MMBtu/Day, and later on May 6th **all** preferred direct interruptible gas was curtailed (see Attached Page 6).

As stated in the May 2nd letter by Harry Schindehette to Mr. Steve Smallwood on this subject, the Fort Pierce Utilities Authority is faced with either obtaining an emergency order from the Florida Department of Environmental Regulation for permission to burn fuel oil in Units 6, 7 and 8 under these emergency conditions, or initiating power blackouts due to the inability to meet customer loads.

FORT PIERCE UTILITIES AUTHORITY

If you have any questions, please call me or the following at telephone number (407) 464-5600: Harry Schindehette, Thomas Richards or Steve Day, Black & Veatch, at (913) 339-2880.

Sincerely,

Harry Lamb, Supt.
Power Resources

HL:m

Attachments

cc: Harry Schindehette
Thomas Richards
Steve Treece
Tony Vincik
Jack Miller, Blk & Veatch
Alan Roth, Spiegel & McDiarmid

FLORIDA GAS TRANSMISSION COMPANY
ESTIMATE OF SALES SERVICE

MONTH May 2

CUSTOMER Ft. Pierce - Generating

DIVISION/LOCATION St. Lucie Co. PREPARED BY Tony Vinik

TELEPHONE# 407 - 464 - 4333 TELECOPY# 407 - 489 - 5362

TYPE (1)	DF	PD		TOTAL
	(INDICATE TYPE OF SERVICE ABOVE)			
DAY				
1	8521	7000		15521
2		7000		15521
3		7000		15521
4		6000		14521
5		6000		14521
6		7000		15521
7		7000		15521
8		7000		15521
9		7000		15521
10		7000		15521
11		6000		14521
12		6000		14521
13		7000		15521
14		7000		15521
15		7000		15521
16		7000		15521
17		7000		15521
18		6000		14521
19		6000		14521
20		7000		15521
21		7000		15521
22		7000		15521
23		7000		15521
24		7000		15521
25		6000		14521
26		6000		14521
27		7000		15521
28		7000		15521
29		7000		15521
30		7000		15521
31	8521	7000		15521
TOTAL	264,151	209,000		473,151

(1) TYPE OF SERVICE: GENERAL SERVICE (G); SMALL GENERAL SERVICE (SGS); RESALE PREFERRED (I); DIRECT FIRM (DF); PREFERRED DIRECT (PD)

SEND TO: FLORIDA GAS TRANSMISSION COMPANY
GAS MANAGEMENT DEPARTMENT
P.O. BOX 1188 HOUSTON TX 77251-1188
TELECOPY# 713-853-6756

ATTACHMENT 1

FLORIDA GAS TRANSMISSION COMPANY

NOTIFICATION OF SCHEDULED PREFERRED SALES

AND PREFERRED TRANSPORTATION SERVICE

CUSTOMER: Ft. Pierce Utilities Authority (Generating)

ATTN: Tony Vincik

TELECOPY: 407-489-5362

TELEPHONE: 407-464-4333

Effective Date: 05 / 02 / 91

TYPE OF SERVICE *	CUSTOMER ESTIMATE/ NOMINATION MMBtu/D	SERVICE SCHEDULED BY FGT MMBtu/D
PD	7000	13760

*PD = Preferred Direct; I = Resale Preferred;
PTS = Preferred Transportation Service

Comments:

The above stated scheduled volume(s) have been determined in accordance with Section 9B of the General Terms and Conditions of FGT's FERC Gas Tariff.

If you have any questions please contact your FGT Marketing representative:

John Long	(407) 875-5843
Bill Manuel	(407) 875-5841
Dan Swanson	(407) 875-5839
David Terlip	(407) 875-5854

FLORIDA GAS TRANSMISSION COMPANY

NOTIFICATION OF SCHEDULED PREFERRED SALES AND PREFERRED TRANSPORTATION SERVICE

CUSTOMER: Ft. Pierce Utilities Authority (Generating)

ATTN: Tony Vincik

TELECOPY: 407-489-5362

TELEPHONE: 407-464-4333

Effective Date: 05 / 03 / 91

TYPE OF SERVICE *	CUSTOMER ESTIMATE/ NOMINATION MMBtu/D	SERVICE SCHEDULED BY FGT MMBtu/D
PD	7,000	1209

*PD = Preferred Direct; I = Resale Preferred;
PTS = Preferred Transportation Service

Comments:

The above stated scheduled volume(s) have been determined in accordance with Section 9B of the General Terms and Conditions of FGT's FERC Gas Tariff.

If you have any questions please contact your FGT Marketing representative:

John Long	(407) 875-5843
Bill Manuel	(407) 875-5841
Dan Swanson	(407) 875-5839
David Terlip	(407) 875-5854

ATTACHMENT 3

AP119.FOR

FLORIDA GAS TRANSMISSION COMPANY

NOTIFICATION OF SCHEDULED PREFERRED SALES

AND PREFERRED TRANSPORTATION SERVICE

CUSTOMER: Ft. Pierce Utilities Authority (Generating)

ATTN: Tony Vincik

TELECOPY: 407-489-5362

TELEPHONE: 407-464-4333

Effective Date: 5, 4, 91
5/5/91

TYPE OF SERVICE *	CUSTOMER ESTIMATE/ NOMINATION MMBtu/D	SERVICE SCHEDULED BY FGT MMBtu/D
PD	6,000	1,108
I	~~3,200~~	~~591~~

*PD = Preferred Direct; I = Resale Preferred;
PTS = Preferred Transportation Service

Comments:

The above stated scheduled volume(s) have been determined in accordance with Section 9B of the General Terms and Conditions of FGT's FERC Gas Tariff.

If you have any questions please contact your FGT Marketing representative:

John Long	(407) 875-5843
Bill Manuel	(407) 875-5841
Dan Swanson	(407) 875-5839
David Terlip	(407) 875-5854

FLORIDA GAS TRANSMISSION COMPANY

NOTIFICATION OF SCHEDULED PREFERRED SALES

AND PREFERRED TRANSPORTATION SERVICE

CUSTOMER: Ft. Pierce Utilities Authority (Generating)

ATTN: Tony Vincik

TELECOPY: 407-489-5362

TELEPHONE: 407-464-4333

Effective Date: 5 / 6 / 91

TYPE OF SERVICE *	CUSTOMER ESTIMATE/ NOMINATION MMBtu/D	SERVICE SCHEDULED BY FGT MMBtu/D
PD	7,000	1,103
I	~~7,200~~	~~1,135~~

*PD = Preferred Direct; I = Resale Preferred;
PTS = Preferred Transportation Service

Comments:

The above stated scheduled volume(s) have been determined in accordance with Section 9B of the General Terms and Conditions of FGT's FERC Gas Tariff.

If you have any questions please contact your FGT Marketing representative:

John Long	(407) 875-5843
Bill Manuel	(407) 875-5841
Dan Swanson	(407) 875-5839
David Terlip	(407) 875-5854

FLORIDA GAS TRANSMISSION COMPANY
CAPACITY GAS ALLOCATION REQUEST

CUSTOMER: **DATE:** May 6, 1991

Fort Pierce Utilities Authority
ATTN: F. A. Brock
P. O. Box 1298
Fort Pierce, Fl 34954

FROM: 100% **TO:** -0-%

CATEGORY OF GAS SERVICE: 3

PRIORITY OF GAS SERVICE: 8

REQUEST MADE: 8:50 AM CDT **DATE:** 5/06/91

EFFECTIVE: 10:00 AM EDT **DATE:** 5/06/91

REQUEST GIVEN TO: Steve Treece

REQUEST MADE BY: Dale Harden

REMARKS: Curtailment is due to customers taking more than their scheduled volumes.

* Previous faxed copy was in error on request and effective *
* date. *

FLORIDA GAS TRANSMISSION COMPANY
GAS CONTROL DEPARTMENT, RM 4237
P.O. BOX 1188
HOUSTON, TX 77251

ATTACHMENT 6

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

To TONY	From DALE
Co. F.P.U.A.	Co. FGT
Dept.	Phone #
Fax # 407 489 5362	Fax #

WATER ELECTRIC GAS SEWER

FORT PIERCE UTILITIES AUTHORITY

206 S. SIXTH STREET * P.O. BOX 3191 * FORT PIERCE, FLORIDA 34948 * PHONE (407) 464-5600

THURSDAY, MAY 2, 1991

FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION
2600 BLAIRSTONE ROAD
TALLAHASSEE, FLORIDA 32399

ATTENTION: MR. STEVE SMALLWOOD

SUBJECT: EMERGENCY ORDER FOR BURNING FUEL OIL IN UNITS 6, 7 AND 8

REFERENCE AIR PERMITS:
UNIT 6 - AO-56-113534
UNIT 7 - AO-56-112679
UNIT 8 - AO-56-112678
UNIT 9 - AO-56-175955

GENTLEMEN:

PURSUANT TO DISCUSSIONS WITH MR. GARY SMALLRIDGE OF THE DER, WE HAVE PREPARED AND ARE SUBMITTING HEREWITH A PETITION REQUESTING PERMISSION TO BURN FUEL OIL IN UNITS 6, 7 AND 8 UNDER EMERGENCY CONDITIONS.

PROVISIONS OF THE UNIT 9 PERMIT IN EFFECT PRECLUDE BURNING OF OIL IN UNITS 6, 7 AND 8 UNDER ANY CIRCUMSTANCES. SINCE THE STATE'S ELECTRIC POWER SUPPLY AND DELIVERY SYSTEMS, AND THE NATURAL GAS DELIVERY SYSTEMS HAVE CHANGED SUBSTANTIALLY SINCE UNIT 9 WAS INITIALLY PERMITTED, WE ARE IN THE PROCESS OF REVISING OUR PERMIT FOR UNIT 9 PRECISELY SO THAT ALL CONSTRAINTS TO THE OPERATION OF UNIT 6, 7 AND 8, CONTAINED IN THE UNIT 9 PERMIT, WILL BE REMOVED. FPUA IS VULNERABLE TO A NATURAL GAS CURTAILMENT THAT WOULD PRECLUDE GENERATING POWER WITH NATURAL GAS, THE PRIMARY FUEL. IF PURCHASE POWER IS UNAVAILABLE DURING A NATURAL GAS SUPPLY INTERRUPTION, WITHOUT THE ABILITY TO BURN OIL AS AN EMERGENCY BACKUP, FPUA WILL BE FORCED TO CURTAIL ITS ELECTRIC CUSTOMERS.

THE ATTACHED PETITION FOR EMERGENCY ORDER SETS FORTH THE FACTS REGARDING THIS SITUATION, AND REQUESTS ISSUANCE OF AN EMERGENCY ORDER FOR USE OF FUEL OIL UNDER EMERGENCY CONDITIONS.

WE HAVE BEEN TRYING TO RESOLVE THIS SITUATION SINCE LATE AUGUST 1990. WE HAVE REQUESTED AND RECEIVED AN EMERGENCY ORDER TO BURN OIL IN UNITS 6, 7 AND 8 DURING THE WINTER COLD PERIOD (EMERGENCY ORDER VALID FEBRUARY 15, 1991 THROUGH

FDER
TALLAHASSEE, FLORIDA

THURSDAY, MAY 2, 1991

FEBRUARY 18, 1991). A PROPOSED PSD PERMIT WAS ISSUED BY YOUR STAFF ON APRIL 15, 1991, BUT WILL NOT BE VALID UNTIL AFTER ALL ADMINISTRATIVE PROVISIONS HAVE BEEN COMPLETED. SINCE THIS PERMIT MAY GO TO ADMINISTRATIVE HEARING, IT IS POSSIBLE THAT THE PERMIT WILL NOT BE FINALIZED FOR SEVERAL MONTHS.

IN THE MEANTIME, WE RECEIVED NOTIFICATION FROM FLORIDA GAS TRANSMISSION THAT ALL OUR INTERRUPTIBLE GAS HAS BEEN TERMINATED EFFECTIVE MAY 1, 1991 UNTIL FURTHER NOTICE. THE DEMANDS FROM FIRM NATURAL GAS SUPPLY CUSTOMERS HAVE INCREASED WITH THE HOT WEATHER. FPUA IS AGAIN FACED WITH EITHER OBTAINING AN EMERGENCY ORDER FROM THE DER OR INITIATING POWER BLACKOUTS.

IF YOU HAVE ANY QUESTIONS, PLEASE CALL ME AT (407) 464-5600 OR STEVE DAY, BLACK & VEATCH, AT (913) 339-2880.

SINCERELY,

HARRY M. SCHINDEHETTE, P.E.
DIRECTOR OF UTILITIES

HMS:JM
ENCLOSURE

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

IN RE: FORT PIERCE UTILITIES AUTHORITY)

ISSUANCE OF AN EMERGENCY ORDER)
TO PERMIT BURNING OF OIL IN)
H. D. KING UNITS 6, 7 AND 8 UNDER)
EMERGENCY CONDITIONS)
)

PETITION FOR EMERGENCY ORDER TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

(A) NAME OF PETITIONER: FORT PIERCE UTILITIES AUTHORITY

(B) ADDRESS OF PETITIONER: 206 SOUTH SIXTH STREET
POST OFFICE BOX 3191
FORT PIERCE, FLORIDA 34948-3191

(C) STATUTORY PROVISION UNDER WHICH EMERGENCY ORDER IS SOUGHT:

SUBSECTION 120.59(3), FLORIDA STATUTES (F.S.)

(D) THE PRECISE FACTUAL CIRCUMSTANCES GIVING RISE TO THE PETITION:

THE FORT PIERCE UTILITIES AUTHORITY (FPUA) PRESENTLY OPERATES THE H. D. KING GENERATING STATION COMPRISING THREE STEAM-ELECTRIC UNITS (UNITS 6, 7 AND 8), ONE COMBINED CYCLE UNIT (UNIT 9 COMBUSTION TURBINE GENERATOR AND HEAT RECOVERY STEAM GENERATOR [HRSG] IN COMBINED CYCLE WITH UNIT 5 STEAM-ELECTRIC UNIT) AND TWO DIESEL ELECTRIC UNITS.

THE PERMIT FOR UNIT 9, PERMIT/CERTIFICATION NUMBER AO-56-175955, CONTAINS PROVISIONS THAT IMPOSE OPERATIONAL CONSTRAINTS ON UNITS 6, 7 AND 8. THOSE CONSTRAINTS APPLY TO HOURS OF OPERATION OF THE UNITS AS WELL AS EMISSIONS (BOTH THE HOURLY RATE AND MAXIMUM ANNUAL TOTAL). IN EFFECT, THE EMISSIONS CONSTRAINTS NOW PRECLUDE THE BURNING OF FUEL OIL IN UNITS 6, 7

AND 8 UNDER ANY CIRCUMSTANCES, WHEREAS, PRIOR TO THE UNIT 9 PROVISIONS, THOSE UNITS WERE PERMITTED TO BURN FUEL OIL UNDER THE CIRCUMSTANCES OF AN EMERGENCY OR A TEMPORARY NATURAL GAS CURTAILMENT. THE PERMIT NUMBERS FOR UNITS 6, 7 AND 8 ARE AO-56-32954, AO-56-32948, AND AO-56-41413, RESPECTIVELY.

ONGOING TRENDS IN THE STATE'S ELECTRIC POWER SUPPLY AND DELIVERY SYSTEM, AS WELL AS THE NATURAL GAS DELIVERY SYSTEM, HAVE SUBSTANTIALLY CHANGED THE OPERATIONAL REQUIREMENTS FOR UNITS 6, 7 AND 8 SINCE UNIT 9 WAS INITIALLY PERMITTED. AS A RESULT, FPUA IS CURRENTLY IN THE PROCESS OF REVISING THE PERMIT FOR UNIT 9 SO AS TO REMOVE ANY CONSTRAINTS APPLICABLE TO UNITS 6, 7 AND 8. THE REVISED PERMIT HAS NOT BEEN ISSUED PRIOR TO EXPERIENCING NATURAL GAS CURTAILMENTS IMPOSED BY THE 1991 SUMMER CONDITIONS.

THE REQUESTED EMERGENCY ORDER WILL PERMIT USE OF FUEL OIL TO MEET ELECTRICAL DEMAND ONLY UNDER EMERGENCY CIRCUMSTANCES, UNTIL SUCH TIME AS THE NEW PERMIT IS ISSUED FOR UNIT 9, AND THE CURRENT CONSTRAINTS ARE REMOVED FROM UNITS 6, 7 AND 8. WITHOUT THE RELIEF PROVIDED BY THE REQUESTED EMERGENCY ORDER, ELECTRIC POWER MAY HAVE TO BE CURTAILED TO FPUA CUSTOMERS, IN ORDER NOT TO VIOLATE THE EXISTING PERMITS.

(E) POINTS UPON WHICH THIS PETITION IS BASED.

IF THE FPUA MUST CURTAIL ELECTRIC POWER SUPPLY TO ITS CUSTOMERS IN ORDER TO COMPLY WITH ITS CURRENT PERMITS, IT WILL POSE AN IMMEDIATE THREAT TO PUBLIC HEALTH, SAFETY AND WELFARE. SUCH ACTION WOULD LEAVE THE AFFECTED CUSTOMERS WITHOUT LIGHTS OR REFRIGERATION AND MANY WITHOUT AIR CONDITIONING OR MEANS FOR PREPARING FOOD.

HOSPITALS AND OTHER VITAL SERVICES COULD BE WITHOUT POWER TEMPORARILY, DEPENDING ON WHETHER OR NOT THEIR EMERGENCY BACKUP SYSTEMS FUNCTION PROPERLY. INDUSTRIAL, COMMERCIAL, OFFICE AND RETAIL FACILITIES WOULD BE ADVERSELY AFFECTED AND WOULD SUFFER ECONOMIC HARDSHIP. TRAFFIC SIGNALS WOULD BE OUT OF SERVICE, ADVERSELY AFFECTING TRAFFIC SAFETY. THE LOSS OF STREET AND SECURITY LIGHTING ALSO WOULD ADVERSELY AFFECT PUBLIC SAFETY.

SUBSECTION 120.59(3), F.S., PROVIDES FOR ISSUANCE OF AN IMMEDIATE FINAL ORDER IF MATTERS OF PUBLIC, HEALTH, SAFETY OR WELFARE ARE INVOLVED.

IT IS HEREBY REQUESTED THAT AN EMERGENCY ORDER BE ISSUED TO FORT PIERCE UTILITIES AUTHORITY AUTHORIZING THE BURNING OF FUEL OIL IN UNITS 6, 7 AND 8, UNDER CIRCUMSTANCES THAT WOULD RESULT IN THE FORT PIERCE UTILITIES AUTHORITY'S INABILITY TO SUPPLY ELECTRICAL POWER TO ITS CUSTOMERS, ALL OR IN PART, WERE THE BURNING OF FUEL OIL IN THOSE UNITS NOT ALLOWED.

DATED THIS 2ND DAY OF MAY, 1991.

HARRY M. SCHINDEHETTE
DIRECTOR OF UTILITIES
FORT PIERCE UTILITIES AUTHORITY

CONSULTING ENGINEER:

BLACK & VEATCH, ENGINEERS-ARCHITECTS
ATTN: MR. STEVE DAY
11401 LAMAR
OVERLAND PARK, KANSAS 66211
(913) 339-2880

Florida Department of Environmental Regulation

Southeast District • 1900 S. Congress Ave., Suite A • West Palm Beach, Florida 33406

Lawton Chiles, Governor

Carol M. Browner, Secretary

February 19, 1991

Mr. H. P. Lamb
Superintendent/Power Resources
Fort Pierce Utilities Authority
311 North Indian River Drive
Fort Pierce, Florida 34950

St. Lucie County
AP - Fort Pierce Utilities Authority
Units 6, 7, 8 and diesels 1 and 2

Dear Mr. Lamb:

This is to acknowledge receipt of your application, file number AO 56-190275 for a permit to operate air pollution sources.

[ ] This letter constitutes notice that a permit will be required for your project pursuant to Chapter(s) _____, Florida Statutes.

[ ] Your application for permit is complete as of _____ and processing has begun. You are advised that the department under Chapter 120, Florida Statutes, must take final action on your application within ninety (90) days unless the time is tolled by administrative hearing.

[ ] Your application for permit is incomplete. Please provide the information listed on the attached sheet promptly. Evaluation of your proposed project will be delayed until all requested information has been received.

[X] The additional information received on January 28, 1991 and January 31, 1991 was reviewed, however, the items listed on the attached sheet remain incomplete. Evaluation of your proposed project will continue to be delayed until we receive all requested information.

[ ] At this time no permit is required for your project by this Department. Any modifications in your plans should be submitted for review, as changes may result in permits being required. This letter does not relieve you from the need to obtain any other permits (local, state or federal) which may be required.

If you have any questions, please contact Stephanie S. Brooks, P.E., of this office at (407)433-2650 . When referring to this project, please use the file number indicated.

Sincerely,

I. Goldman

I. Goldman, P.E.
District Air Programs Administrator

IG:SB/k/17

cc: Harry Schindehette
Preston Lewis, FDER, Tallahassee

Attachment

DER Form 17-1.201(4)
Effective November 30, 1982

Florida Department of Environmental Regulation

Southeast District • 1900 S. Congress Ave., Suite A • West Palm Beach, Florida 33406

Lawton Chiles, Governor — Carol M. Browner, Secretary

February 19, 1991

COMPLETENESS SUMMARY AIR POLLUTION SOURCES

SOURCE NAME: Ft. Pierce Utilities Authority — Date Received 12/14/90

APPLICANT NAME: H. P. Lamb — Date Reviewed: 02/18/91

APPLICANT ADDRESS: 311 North Indian River Drive — Reviewed By: S. Brooks

Ft. Pierce, Florida 34950

Your application for a permit to construct/operate this referenced project has been received, and reviewed for completeness. The following checked items are needed to complete your application.

[ ] Application fee of _____. Make check payable to the Department of Environmental Regulation.

[ ] Letter authorizing applicant to represent owner.

[ ] 8 1/2" x 11" diagram of flow process.

[ ] 8 1/2" x 11" location map.

[ ] 8 1/2" x 11" plant layout sketch showing emission points. (Actual plant)

[ ] Test results showing compliance with emission limitations of the department.

[X] Air diffusion modeling results showing compliance with ambient air standards and PSD increment.

Results in Tallahassee are part of that review. Provide a copy to this office for our review.

[ ] Engineer's report pursuant to Florida Administrative Code Rule 17-4.21(1)(c).

[ ] See comments on application, copy attached.

[ ] Other: (Any section of the application which is incomplete or lacks sufficient information to be evaluated).

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

For Routing To Other Than The Addressee

To: _____ Location: _____
To: _____ Location: _____
To: _____ Location: _____
From: _____ Date: _____

Interoffice Memorandum

TO: Gary Smallridge

FROM: Clair Fancy CHF

DATE: February 15, 1991

SUBJ: Emergency Order for Burning Oil in Units 6, 7, and 8
Ft. Pierce Utilities Authority
REFERENCE AIR PERMITS: Unit 6 AO-56-113534
Unit 7 AO 56-112679
Unit 8 AO 56-112678
Unit 9 AO 56-175955

We have reviewed information submitted with Ft. Pierce's request for an emergency order to relax the Units 6, 7, and 8 SO_2 and particulate limitations found in the existing Unit 9 permit. Included in this information are the results of modeling we requested. The modeling results show that the combined impacts from Units 6, 7, and 8 when firing No. 6 fuel oil, do not exceed the applicable Florida and National Ambient Air Quality Standards and increments for SO_2 and PM. The modeling results were based on Units 6 and 8 burning 0.80 lb SO_2/MBtu No. 6 fuel oil and Unit 7 burning 2.75 lb SO_2/MBtu fuel oil. Based on the information Ft. Pierce has given us, we recommend that you draft an emergency order to be used in the event of a natural gas curtailment which will allow the emergency burning of No. 6 fuel oil in Units 6, 7, and 8 for a period not to exceed three days.

CHF/CH/t

cc: Barry Andrews
Preston Lewis
Cleve Holladay

WATER GAS
ELECTRIC SEWER

FORT PIERCE UTILITIES AUTHORITY

206 S. SIXTH STREET * P. O. BOX 3191 * FORT PIERCE, FLORIDA 34948 * PHONE (407) 464-5600

January 24, 1991

Florida Department of Environmental Regulation
1900 S. Congress Avenue
Suite A
West Palm Beach, FL 33406

Attention: Mr. I. Goldman, P.E.
District Air Programs Administrator

SUBJECT: Permit Renewal for Units 6, 7, and 8
Diesels 1 and 2

REFERENCE AIR PERMITS: Unit 6 - AO-56-113534
Unit 7 - AO-56-112679
Unit 8 - AO-56-112678
Diesels 1 and 2 AO-56-113533

This letter is in response to your January 10, 1991 determination for the renewal of air permits for Units 6, 7, 8 and diesels 1 & 2. The letter stated that the renewal application was considered incomplete. The following two items were mentioned as being necessary to complete the application. We have provided responses for each item.

ITEM 1. Test results showing compliance with emission limitations of the department.

RESPONSE: FPUA has not received the compliance test results for these units. We will provide the information to FDER when it becomes available from the testing contractor.

ITEM 2. Air diffusion modeling results showing compliance with ambient air standards and PSD increments.

RESPONSE: Mr. C. H. Fancy requested this information as Item 2 in his December 26, 1990 letter regarding the emergency order for burning oil in Units 6, 7, and 8. On January 4, 1991 FPUA transmitted to Mr. Fancy a response letter and copies of air

Florida Department of Environmental Regulation
Mr. I. Goldman, P.E.

January 24, 1991

quality modeling information. Mr. Cleve Holladay (FDER-Tallahassee) is currently reviewing the modeling results.

A similar modeling request was made in Mr. C. H. Fancy's letter dated January 4, 1991 in regards to the Unit 9 PSD permit application. FPUA responded in a January 15, 1991 letter which stated that the modeling provided with FPUA's January 4, 1991 transmittal letter would also satisfy the Unit 9 request.

The same modeling information is also applicable to FDER-Southeast District's request dated January 10, 1991 and is available at the FDER-Tallahassee office.

If you need additional information or have any other comments, please call me at (407) 464-5600, Steve Day at (913) 339-2080 or Jack Miller at (913) 339-7199.

Very truly yours,

Harry Schindehette, P.E.
Director of Utilities

lts

cc: S. Brooks, FDER-Southeast
C. H. Fancy, FDER - Tallahassee
P. Lewis, FDER - Tallahassee
S. Day

WATER GAS
ELECTRIC SEWER

FORT PIERCE UTILITIES AUTHORITY

206 S. SIXTH STREET * P. O. BOX 3191 * FORT PIERCE, FLORIDA 34948 * PHONE (407) 464-5600

January 4, 1991

RECEIVED
JAN 8 1991
DER-BAQM

Florida Department of Environmental Regulation
2600 Blairstone Road
Tallahassee, Florida 32399

Attention: Mr. C. H. Fancy, P.E.

SUBJECT: Emergency Order for Burning Oil in Units 6, 7 and 8

REFERENCE AIR PERMITS: Unit 6 - AO-56-113534
Unit 7 - AO-56-112679
Unit 8 - AO-56-112678
Unit 9 - AO-56-175955

We have received your letter of December 26, 1990 responding to our letter of December 10, 1990 regarding the subject.

The responses to your questions and requests for additional information are as follows.

Question 1. **What grade fuel will be burned in the Units? What is the maximum sulfur content of the fuel? What is the maximum ash content?**

Response: No. 6 fuel oil will be fired in Units 6, 7, and 8 during emergency conditions.

Currently, two separate supplies of No. 6 fuel oil are being stored onsite with maximum sulfur contents corresponding to 2.75 and 0.80 lb SO_2/MBtu. These compliance fuels satisfy the Florida Administrative Code (FAC) SO_2 emission rates for Units 7 and 8, respectively.

The FAC does not specify an SO_2 limit for boilers the size of Unit 6. Instead the FAC states that the limit must be established by a Best Available Control Technology (BACT) determination. The BACT analysis for Unit 6 was recently submitted to the FDER and concluded that the lower sulfur No. 6 fuel oil represented BACT. Consequently, Units 6 and 8 will burn the 0.80 lb SO_2/MBtu No. 6 fuel oil and Unit 7 will burn the 2.75 lb SO_2/MBtu fuel oil.

The ash content of the fuel oil is not monitored by FPUA. Therefore, in responding to the question, it is necessary to approximate the expected particulate emission rates for the three units. The emission particulate rates for Units 6, 7, and 8 are estimated to be approximately 0.1 lb/MBtu.

Question 2. **To ensure compliance with ambient air quality standards, please submit modeling of sulfur dioxide and particulate emissions for all sources at the facility, assuming the units are firing the type fuel which will be used during a natural gas curtailment.**

Response: Refer to attached modeling results (Attachment A).

Question 3. **Is it possible for Fort Pierce Utilities Authority to purchase power from another utility during a natural gas curtailment?**

Response: In the event of a natural gas curtailment to the Fort Pierce Utilities Authority generators, replacement power from another utility would be sought. If that effort is unsuccessful, fuel oil would be burned as a last resort to meet the needs of our customers.

Weather related peak demands for power and natural gas generally coincide, and so the availability of surplus power during a weather related gas curtailment, is less likely than at other times.

Question 4. **Why do you expect the supply of natural gas to be curtailed this winter? Would you burn fuel oil less than 400 hours during the year?**

Response: Historically, there is a correlation between the occurrence of low temperature extremes and the unavailability of natural gas for generating electricity, particularly in a steam boiler. There is no way to predict with certainty whether cold weather of that severity will occur in South Florida this winter; however, we do expect that if extremely cold weather is experienced, we will also be subjected to an accompanying curtailment of natural gas.

Based on past experience, we would expect to burn oil less than 400 hours per year.

Florida Department of Environmental
Regulation
Mr. C. H. Fancy, P.E.

If you need additional information or have any other comments, please call me at (407) 464-5600, Steve Day at (913) 339-2080 or Jack Miller at (913) 339-7199.

Very truly yours,

Harry Schindehette, P.E.
Director of Utilities

lts

cc: S. Day
B. Andrews

FORT PIERCE UTILITIES AUTHORITY

ATTACHMENT A

RESPONSE TO FDER QUESTION 2

1.0 INTRODUCTION

As requested by the Florida Department of Environmental Regulation (FDER) in a December 26, 1990 letter (Question 2), this attachment summarizes the air dispersion modeling for the Fort Pierce Utilities Authority H. D. King Units 6, 7, and 8. In accordance with FDER's request, the modeling analysis examined sulfur dioxide (SO_2) and particulate matter (PM) impacts. Units 6, 7, and 8 were modeled with No. 6 fuel oil, as operated during a natural gas curtailment.

This document outlines the source parameters, modeling options, and analysis results. The results show that the combined impacts from Units 6, 7, and 8, when firing No. 6 fuel oil, do not exceed the applicable Florida Ambient Air Quality Standards (FAAQS) for SO_2 and PM.

2.0 SOURCE PARAMETERS

The modeling analysis considered the potential air quality impacts associated with Units 6, 7, and 8 when firing No. 6 fuel oil. Table 2-1 shows the operating parameters and emission rates for the three sources. Unit 9 was not considered in the analysis since Unit 9 will only be permitted to operate when firing natural gas. The stack exhaust flows and temperatures were obtained from engineering estimates related to the boiler characteristics and fuel properties. Emission rate assumptions were previously outlined in the response to Question 1 of FDER's December 26, 1990 letter.

TABLE 2-1. SOURCE CHARACTERISTICS

Emission Source:	Unit 6	Unit 7	Unit 8
X-Coordinate* (m):	-18.6	6.7	-68.0
Y-Coordinate* (m):	36.3	33.8	18.3
Exhaust Flow (acfm):	64,440	138,300	190,290
Stack Exit Diameter (ft):	5.0	7.1	8.0
Stack Exit Velocity (fpm):	3,282	3,493	3,786
Stack Height (ft):	148	148	150
Stack Exit Temperature (F):	300	300	295
Building Height (ft):	68	68	68
Maximum Projected Width (ft):	148.6	148.6	148.6
Fuel Type:	No. 6	No. 6	No. 6
Max. Heat Input (MBtu/h):	219	470	611
SO_2 Emission Rate (lb/MBtu):	0.8	2.75	0.8
(lb/h):	175.2	1,292.5	488.8
PM Emission Rate (lb/MBtu):	0.1	0.1	0.1
(lb/h):	21.9	47.0	61.1

*Coordinates relative to Unit 9 stack.

3.0 MODELING ASSUMPTIONS

The following list outlines the assumptions used to perform the dispersion modeling analysis.

- The EPA approved ISCST model was used for all modeling.
- Five years (1982 - 1986) of surface and upper air meteorological data from West Palm Beach were used with the ISCST model.
- Receptors were placed along the 36 standard directions surrounding the Unit 9 stack at the following downwind distances: 100-meter intervals from 100 to 1,000 meters, 250-meter intervals from 1,250 to 3000 meters, and 1,000-meter intervals from 4,000 to 10,000 meters. Discrete receptors were placed at the boundary that restricts public access along the 36 radial directions.
- The rural modeling option was considered representative of the site.
- All EPA default modeling options were selected.
- The modeled highest concentration was selected for annual averaging periods and the highest, second-highest concentration was selected for 3- and 24-hour averaging periods.
- A GEP analysis showed that the Huber-Snyder building downwash algorithm was appropriate for all wind directions.

4.0 DISPERSION MODELING RESULTS

Table 4-1 shows the maximum modeled SO_2 and TSP impacts for each modeled year. These concentrations are the combined maximum from Units 6,

TABLE 4-1. MODELED SO2 AND TSP IMPACTS FROM UNITS 6, 7, AND 8

Year	SO2 Conc. ug/m3	Location Dist. km	Location Dir. deg	Day	TSP Conc. ug/m3	Location Dist. km	Location Dir. deg	Day
ANNUAL (Highest)								
1982	14.7*	1.5	310	-	1.0*	1.5	310	-
1983	11.9	1.5	310	-	0.8	1.5	310	-
1984	13.1	2.0	260	-	0.9	2.0	260	-
1985	12.6	1.75	270	-	0.9	1.75	270	-
1986	14.3	1.75	270	-	1.0	1.75	270	-
24-HOUR (Second Highest)								
1982	131.5	0.2	250	291	7.3	1.25	310	208
1983	163.2	0.2	270	58	10.6*	0.3	270	58
1984	175.9*	0.2	270	23	9.2	0.2	270	23
1985	138.0	0.2	260	66	7.8	0.2	260	66
1986	104.1	2.5	270	17	6.9	2.5	270	17
3-HOUR (Second Highest)								
1982	432.6	0.2	250	88	-	-	-	-
1983	619.6*	0.3	270	20	-	-	-	-
1984	397.9	0.2	80	59	-	-	-	-
1985	490.6	0.2	260	323	-	-	-	-
1986	421.0	0.2	270	8	-	-	-	-

*Maximum impact.

7, and 8 when burning No. 6 fuel oil. Table 4-2 shows the overall maximum SO_2 and PM impact for each averaging period, as well as the representative FAAQS. Note that the impacts from Units 6, 7, and 8 are well below the FAAQS. The 24-hour SO_2 impact is the most restrictive, at 68 percent of the standard. A hard copy of the modeling output files is attached.

5.0 CONCLUSION

Ambient air quality dispersion modeling showed that the combined impacts from H. D. King Units 6, 7, and 8 were well below the ambient air quality standards when burning No. 6 fuel oil. This demonstrates that the H. D. King facility will be in compliance with FAAQS when operated during a natural gas curtailment.

TABLE 4-2. IMPACT COMPARISON TO FLORIDA AMBIENT AIR QUALITY STANDARDS

Averaging Period	SO2 Conc. ug/m3	SO2 FAAQS ug/m3	Percent of Standard %	PM Conc. ug/m3	PM FAAQS ug/m3	Percent of Standard %
Annual	14.7	60	25	1.0	50	2
24-Hour	175.9	260	68	10.6	150	7
3-Hour	619.6	1300	48	-	-	-

WATER GAS
ELECTRIC SEWER

FORT PIERCE UTILITIES AUTHORITY

206 S. SIXTH STREET • P. O. BOX 3191 • FORT PIERCE, FLORIDA 34948 • PHONE (407) 464-5600

RECEIVED
JAN 8 1991
DER-BAQM

January 4, 1991

Florida Department of Environmental Regulation
2600 Blairstone Road
Tallahassee, Florida 32399

Attention: Mr. C. H. Fancy, P.E.

SUBJECT: Emergency Order for Burning Oil in Units 6, 7 and 8

REFERENCE AIR PERMITS: Unit 6 - AO-56-113534
Unit 7 - AO-56-112679
Unit 8 - AO-56-112678
Unit 9 - AO-56-175955

We have received your letter of December 26, 1990 responding to our letter of December 10, 1990 regarding the subject.

The responses to your questions and requests for additional information are as follows.

Question 1. **What grade fuel will be burned in the Units? What is the maximum sulfur content of the fuel? What is the maximum ash content?**

Response: No. 6 fuel oil will be fired in Units 6, 7, and 8 during emergency conditions.

Currently, two separate supplies of No. 6 fuel oil are being stored onsite with maximum sulfur contents corresponding to 2.75 and 0.80 lb SO_2/MBtu. These compliance fuels satisfy the Florida Administrative Code (FAC) SO_2 emission rates for Units 7 and 8, respectively.

The FAC does not specify an SO_2 limit for boilers the size of Unit 6. Instead the FAC states that the limit must be established by a Best Available Control Technology (BACT) determination. The BACT analysis for Unit 6 was recently submitted to the FDER and concluded that the lower sulfur No. 6 fuel oil represented BACT. Consequently, Units 6 and 8 will burn the 0.80 lb SO_2/MBtu No. 6 fuel oil and Unit 7 will burn the 2.75 lb SO_2/MBtu fuel oil.

The ash content of the fuel oil is not monitored by FPUA. Therefore, in responding to the question, it is necessary to approximate the expected particulate emission rates for the three units. The emission particulate rates for Units 6, 7, and 8 are estimated to be approximately 0.1 lb/MBtu.

Question 2. To ensure compliance with ambient air quality standards, please submit modeling of sulfur dioxide and particulate emissions for all sources at the facility, assuming the units are firing the type fuel which will be used during a natural gas curtailment.

Response: Refer to attached modeling results (Attachment A).

Question 3. Is it possible for Fort Pierce Utilities Authority to purchase power from another utility during a natural gas curtailment?

Response: In the event of a natural gas curtailment to the Fort Pierce Utilities Authority generators, replacement power from another utility would be sought. If that effort is unsuccessful, fuel oil would be burned as a last resort to meet the needs of our customers.

Weather related peak demands for power and natural gas generally coincide, and so the availability of surplus power during a weather related gas curtailment, is less likely than at other times.

Question 4. Why do you expect the supply of natural gas to be curtailed this winter? Would you burn fuel oil less than 400 hours during the year?

Response: Historically, there is a correlation between the occurrence of low temperature extremes and the unavailability of natural gas for generating electricity, particularly in a steam boiler. There is no way to predict with certainty whether cold weather of that severity will occur in South Florida this winter; however, we do expect that if extremely cold weather is experienced, we will also be subjected to an accompanying curtailment of natural gas.

Based on past experience, we would expect to burn oil less than 400 hours per year.

Florida Department of Environmental
Regulation
Mr. C. H. Fancy, P.E.

If you need additional information or have any other comments, please call me at (407) 464-5600, Steve Day at (913) 339-2080 or Jack Miller at (913) 339-7199.

Very truly yours,

Harry Schindehette, P.E.
Director of Utilities

lts

cc: S. Day
B. Andrews

FORT PIERCE UTILITIES AUTHORITY

ATTACHMENT A

RESPONSE TO FDER QUESTION 2

1.0 INTRODUCTION

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This document outlines the source parameters, modeling options, and analysis results. The results show that the combined impacts from Units 6, 7, and 8, when firing No. 6 fuel oil, do not exceed the applicable Florida Ambient Air Quality Standards (FAAQS) for SO_2 and PM.

2.0 SOURCE PARAMETERS

The modeling analysis considered the potential air quality impacts associated with Units 6, 7, and 8 when firing No. 6 fuel oil. Table 2-1 shows the operating parameters and emission rates for the three sources. Unit 9 was not considered in the analysis since Unit 9 will only be permitted to operate when firing natural gas. The stack exhaust flows and temperatures were obtained from engineering estimates related to the boiler characteristics and fuel properties. Emission rate assumptions were previously outlined in the response to Question 1 of FDER's December 26, 1990 letter.

TABLE 2-1. SOURCE CHARACTERISTICS

Emission Source:	Unit 6	Unit 7	Unit 8
X-Coordinate* (m):	-18.6	6.7	-68.0
Y-Coordinate* (m):	36.3	33.8	18.3
Exhaust Flow (acfm):	64,440	138,300	190,290
Stack Exit Diameter (ft):	5.0 1.52	7.1 2.16	8.0 2.44
Stack Exit Velocity (fpm):	3,282 16.67 m/s	3,493 17.74 m/s	3,786 19.23 m/s
Stack Height (ft):	148 45.11 m	148 45.11 m	150 45.72 m
Stack Exit Temperature (F):	300 421°K	300 421°K	295 419°K
Building Height (ft):	68 20.7 m	68 20.7 m	68 20.7 m
Maximum Projected Width (ft):	148.6 45.3 m	148.6 45.3 m	148.6 45.3
Fuel Type:	No. 6	No. 6	No. 6
Max. Heat Input (MBtu/h):	219	470	611
SO_2 Emission Rate (lb/MBtu):	0.8 ✓ OK	2.75 ✓ OK	0.8 ✓ OK
(lb/h):	175.2 22.075 g s^{-1}	1,292.5 162.85 g s^{-1}	488.8 ✓ 61.59 g s^{-1}
PM Emission Rate (lb/MBtu):	0.1	0.1	0.1
(lb/h):	21.9 OK 2.76	47.0 OK 5.92	61.1 OK 7.70

*Coordinates relative to Unit 9 stack.

% S in #6, 8 = .75 % S in 7 is 2.5

Unit 6 16.5MW
7 33MW
8 53MW

3.0 MODELING ASSUMPTIONS

The following list outlines the assumptions used to perform the dispersion modeling analysis.

- The EPA approved ISCST model was used for all modeling.
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- Receptors were placed along the 36 standard directions surrounding the Unit 9 stack at the following downwind distances: 100-meter intervals from 100 to 1,000 meters, 250-meter intervals from 1,250 to 3000 meters, and 1,000-meter intervals from 4,000 to 10,000 meters. Discrete receptors were placed at the boundary that restricts public access along the 36 radial directions.
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- The modeled highest concentration was selected for annual averaging periods and the highest, second-highest concentration was selected for 3- and 24-hour averaging periods.
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1984	13.1	2.0	260	-	0.9	2.0	260	-
1985	12.6	1.75	270	-	0.9	1.75	270	-
1986	14.3	1.75	270	-	1.0	1.75	270	-
24-HOUR (Second Highest)								
1982	131.5	0.2	250	291	7.3	1.25	310	208
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1984	175.9*	0.2	270	23	9.2	0.2	270	23
1985	138.0	0.2	260	66	7.8	0.2	260	66
1986	104.1	2.5	270	17	6.9	2.5	270	17
3-HOUR (Second Highest)								
1982	432.6	0.2	250	88	-	-	-	-
1983	619.6*	0.3	270	20	-	-	-	-
1984	397.9	0.2	80	59	-	-	-	-
1985	490.6	0.2	260	323	-	-	-	-
1986	421.0	0.2	270	8	-	-	-	-

*Maximum impact.

Increment Estimated SO_2 Ann 3.7 / 20 ~~7.5 Ann~~.
24-hr 43.9/91
3-hr 154.9/512

7, and 8 when burning No. 6 fuel oil. Table 4-2 shows the overall maximum SO_2 and PM impact for each averaging period, as well as the representative FAAQS. Note that the impacts from Units 6, 7, and 8 are well below the FAAQS. The 24-hour SO_2 impact is the most restrictive, at 68 percent of the standard. A hard copy of the modeling output files is attached.

5.0 CONCLUSION

Ambient air quality dispersion modeling showed that the combined impacts from H. D. King Units 6, 7, and 8 were well below the ambient air quality standards when burning No. 6 fuel oil. This demonstrates that the H. D. King facility will be in compliance with FAAQS when operated during a natural gas curtailment.

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5.0 CONCLUSION

Ambient air quality dispersion modeling showed that the combined impacts from H. D. King Units 6, 7, and 8 were well below the ambient air quality standards when burning No. 6 fuel oil. This demonstrates that the H. D. King facility will be in compliance with FAAQS when operated during a natural gas curtailment.

TABLE 4-2. IMPACT COMPARISON TO FLORIDA AMBIENT AIR QUALITY STANDARDS

Averaging Period	SO2		Percent of	PM		Percent of
	Conc. ug/m3	FAAQS ug/m3	Standard %	Conc. ug/m3	FAAQS ug/m3	Standard %
Annual	14.7	60	25	1.0	50	2
24-Hour	175.9	260	68	10.6	150	7
3-Hour	619.6	1300	48	-	-	-

Plan

WATER GAS
ELECTRIC SEWER

FORT PIERCE UTILITIES AUTHORITY

206 S. SIXTH STREET * P. O. BOX 3191 * FORT PIERCE, FLORIDA 34948 * PHONE (407) 464-5600

DER GC
notified applicant

RECEIVED
DEC 13 1990
DER - BAQM

December 10, 1990

Florida Department of Environmental Regulation
2600 Blairstone Road
Tallahassee, Florida 32399

Attention: Mr. Steve Smallwood

SUBJECT: Emergency Order for Burning Fuel oil in Units 6, 7 and 8

REFERENCE AIR PERMITS: Unit 6 - AO-56-113534
Unit 7 - AO-56-112679
Unit 8 - AO-56-112678
Unit 9 - AO-56-175955

Pursuant to discussions with Mr. Dan Thompson of the DER, we have prepared and are submitting herewith a petition requesting permission to burn fuel oil in Units 6, 7 and 8 under emergency conditions.

Provisions of the Unit 9 permit, in effect preclude burning of oil in Units 6, 7 and 8 under any circumstances. We are in the process of revising our permit for Unit 9 precisely so that all constraints to the operation of Units 6, 7 and 8, contained in the Unit 9 permit, will be removed. FPUA is vulnerable to a natural gas curtailment that would preclude generating power with natural gas, the primary fuel. If purchase power is unavailable during a natural gas supply interruption, without the ability to burn oil as an emergency backup, FPUA will be forced to curtail its electric customers.

The attached petition for Emergency Order sets forth the facts regarding this situation, and requests issuance of an Emergency Order for use of fuel oil under emergency conditions.

We have been trying to resolve this situation since late August 1990. Now as the winter season is immediately upon us, the probability of needing emergency provisions to burn oil in order to avoid curtailing our customers, is high. Your expeditious attention to this matter is appreciated.

Fort Pierce Utilities Authority
Mr. Harry Schindehette

December 10, 1990

If you have any questions, please call me at (407) 464-5600 or Steve Day at (913) 339-2880.

Sincerely,

Harry Schindehette, P.E.
Director of Utilities

lts
Enclosure

cc: S. Day
D. Thompson
C. Fancy
B. Andrews

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

IN RE: FORT PIERCE UTILITIES AUTHORITY)
)
Issuance of An Emergency Order)
To Permit Burning of Oil In)
H. D. King Units 6, 7 and 8 Under)
Emergency Conditions)
)

PETITION FOR EMERGENCY ORDER TO
THE FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

(a) Name of Petitioner: Fort Pierce Utilities Authority

(b) Address of Petitioner: 206 South Sixth Street
P.O. Box 3191
Fort Pierce, Florida 34948

(c) Statutory provision under which Emergency Order is sought:

Subsection 120.59(3), Florida Statutes (F.S.)

(d) The precise factual circumstances giving rise to the petition:

The Fort Pierce Utilities Authority (FPUA) presently operates the H. D. King Generating Station comprising three steam-electric units (Units 6, 7 and 8), one combined cycle unit (Unit 9 Combustion Turbine Generator and Heat Recovery Steam Generator (HRSG) in Combined Cycle with Unit 5 Steam-electric unit) and two diesel electric units.

The permit for Unit 9, Permit/Certification Number AO-56-175955, contains provisions that impose operational constraints on Units 6, 7 and 8. Those constraints apply to hours of operation of the units as well as emissions, (both the hourly rate and maximum annual total). In effect, the emissions constraints now preclude the burning of fuel oil in units 6, 7 and 8 under any

circumstances, whereas, prior to the unit 9 provisions, those units were permitted to burn fuel oil under the circumstances of an emergency or a temporary natural gas curtailment. The permit No.s for Units 6, 7 and 8 are AO-56-32954, AO-56-32948 and AO-56-41413, respectively.

Ongoing trends in the State's electric power supply and delivery system, as well as the natural gas delivery system, have substantially changed the operational requirements for Units 6, 7 and 8. As a result, FPUA is currently in the process of revising the Permit for Unit 9 so as to remove any constraints applicable to Units 6, 7 and 8. It now appears that the revised permit will not be issued prior to experiencing the peak demands imposed by the 1990-91 winter conditions.

The requested Emergency Order will permit use of fuel oil to meet electrical demand under emergency circumstances, until such time as the new permit is issued for Unit 9, and the current constraints are removed from Units 6, 7 and 8. Without the relief provided by the requested Emergency Order, electric power may have to be curtailed to FPUA customers, in order not to violate the existing permits.

(e) Points upon which this petition is based.

If the FPUA must curtail electric power supply to its customers, in order to comply with its current permits, it will pose an immediate threat to public health, safety and welfare. Such action would leave the affected customers without lights and many without heat or means for preparing food. Hospitals and

other vital services could be without power temporarily, depending on whether or not their emergency backup systems function properly. Industrial, commercial, office and retail facilities would be adversely affected and would suffer economic hardship. Traffic signals would be out of service adversely affecting traffic safety. The loss of street and security lighting also would adversely affect public safety.

Subsection 120.59(3), F.S., provides for issuance of an immediate final order if matters of public health, safety or welfare are involved.

It is hereby requested that an Emergency Order be issued to FPUA authorizing the burning of fuel oil in units 6, 7 and 8, under circumstances that would result in the FPUA's inability to supply electrical power to its customers, all or in part, were the burning of fuel oil in those units, not allowed.

Dated this 10th day of December 1990.

Harry Schindehette
Utility Director
Fort Pierce Utilities Authority

Consulting Engineer
Black & Veatch
c/o Steve Day
11401 Lamar
Overland Park, Kansas 66211
(913) 339-2880

Florida Department of Environmental Regulation

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

Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary

November 9, 1990

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Harry Schindehette
Director of Utilities
Ft. Pierce Utilities Authority
P. O. Box 3191
Ft. Pierce, Florida 34948

Dear Mr. Schindehette:

Re: 31.6 MW Combined Cycle Gas Turbine
AC 56-141460

The Department is in receipt of your letter dated August 3, 1990, requesting to delete the annual operating hours for existing boilers No. 6, No. 7, and No. 8 from the above mentioned permit's specific condition No. 8.

The Department has reviewed your proposal and has determined, based on our discussions at the July 24, 1990 meeting, to amend your permit (AC 56-141460) as requested. In order to allow flexibility in your facility's operation without increasing permitted emissions, we will be limiting the total annual emissions and the total annual heat input to the three boilers. Specific condition No. 8 will reflect this modification. Therefore, specific condition No. 8 of permit AC 56-141460 will be changed as follows:

FROM:

The operating permits emissions limits for this facility's existing boilers shall not exceed the following rates:

	Unit 6		Unit 7		Unit 8	
Parameter	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
Part.	0.4	0.0024	0.568	0.382	0.945	3.017
SOx	12.38	0.0743	0.1199	0.0806	0.1917	0.617
NOx	1.31	0.007854	104.35	70.126	173.20	552.86
VOC	0.0236	0.000142	0.266	0.179	0.441	1.407
CO	0.15	0.0009	7.589	5.100	12.59	40.20
hrs/yr	12		1344		6384	

TO:

The operating permits emissions limits for this facility's existing boilers (unit No. 6, unit No. 7, and unit No. 8) shall not exceed the following rates:

Parameter	lbs/hr	tons/yr
PM	1.9	3.4
SO_2	12.7	0.8
NO_x	278.9	622.0
VOC	0.7	1.6
CO	20.3	45.3

Total heat input for the three existing boilers (Nos. 6, 7, and 8) shall not exceed 4,534,930 MBtu per year.

The operating permit's emission limits for these boilers (Nos. 6, 7, and 8) shall be modified as stated above.

Attachment to be Incorporated:

- Mr. Harry Schindehette's letter dated August 3, 1990.

Sincerely,

STEVE SMALLWOOD, P.E.
Director
Division of Air Resources
Management

SS/TH/plm

c: Stephanie Brooks, DER

Barry's Copy

WATER GAS
ELECTRIC SEWER

FORT PIERCE UTILITIES AUTHORITY

206 S. SIXTH STREET * P. O. BOX 3191 * FORT PIERCE, FLORIDA 34948 * PHONE (407) 464-5600

August 3, 1990

Florida Department of Environmental Regulation
2600 Blairstone Road
Tallahassee, Florida 32399

Attention: Mr. Barry Andrews

Dear Mr. Andrews:

REFERENCE AIR PERMITS: Unit #6 - AO-56-113534
Unit #7 - AO-56-112679
Unit #8 - AO-56-112678
Unit #9 - AO-56-175955

Thank you for meeting with us on July 24, 1990 to discuss the permit revisions Fort Pierce Utilities Authority is requesting for our H. D. King Electric Generating Station. As we discussed, the current limitations (restricting the annual operation of Units 6, 7, and 8) of the Unit 9 operating permit may impede our ability to meet our anticipated electric generation requirements. Accordingly, we have authorized our consultant, Black & Veatch, to prepare a Prevention of Significant Deterioration (PSD) permit application for Unit 9 to relieve the limitations.

Currently, Units 6, 7, and 8 are restricted to 12, 1344 and 6384 annual operating hours, respectively. These requirements are a result of Unit 9 construction permit application assumptions for creditable emissions. Subsequently, these restrictions were included as specific conditions in the Unit 9 operating permit.

Due to transmission line restrictions beyond our control and limited availability of purchased power, there is a chance that Unit 8 will exceed 6384 hours of operation this year. Based on the current projected requirements for Unit 8, it is likely that the 6384 hour requirement would be exceeded in mid to late November, 1990. Considering the time required to process a PSD application, we are uncertain that a new Unit 9 permit would be available in time to avoid difficulties with Unit 8 operations this year. Therefore, we proposed a Unit 9 permit amendment that would allow flexibility in our station's operation without violating the essence of existing permit requirements.

The proposed amendment would restrict operation of Units 6, 7, and 8 to a total heat input restriction. The heat inputs (fuel burn rates) for Units 6, 7, and 8 are 218.8 MBtu/h, 470 MBtu/h, and 611 MBtu/h, respectively. Multiplying those heat inputs by

the allowable annual hours of operation results in a total allowable heat input for the three units of 4,534,930 MBtu per year. This permit amendment would not affect the creditable emissions analysis that we the basis of the Unit 9 construction permit application.

This permit amendment would allow Fort Pierce Utilities Authority additional flexibility this year to provide electric power to our customers without comprising the restrictions delineated in the Unit 9 operating permit.

We would like to implement this permit amendment as soon as possible to avoid this potentially difficult situation. If you would like to discuss this proposed amendment in more detail, please feel free to cal Mr. Steve Day of Black & Veatch at (913) 339-2880.

Sincerely,

Harry Schindehette, P.E.
Director of Utilities

HS:kh

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

For Routing To Other Than The Addressee

To: _____ Location: _____

To: _____ Location: _____

To: _____ Location: _____

From: _____ Date: _____

Interoffice Memorandum

TO: Steve Smallwood

FROM: Clair Fancy

DATE: November 9, 1990

SUBJ: Amendment to Construction Permit No. AC 56-141460

Attached for your approval and signature is a letter amending Specific Condition No. 8 for the above referenced construction permit.

The Bureau recommends approval of this amendment.

CF/TH/plm

Attachment

FILE

Florida Department of Environmental Regulation

Southeast District • 1900 S. Congress Ave., Suite A • West Palm Beach, Florida 33406 • 407-964-9668

Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary
Scott Benyon, Deputy Assistant Secretary

November 7, 1990

Mr. Harry Schindehette, P.E.
Director of Utilities
Ft. Pierce Utilities Authority
P.O. Box 3191
Ft. Pierce, FL 34948

Dear Mr. Schindehette:

RE: Renewal Requirements for Units 6, 7, and 8

The Department is in receipt of your October 23, 1990 letter. Tom Tittle and I have reviewed your request for fuel oil use in Units 6, 7, and 8 under emergency conditions. Under the Specific Conditions for Unit 9, the use of fuel oil is allowed for Units 6, 7, and 8 if compliance is demonstrated or reasonable assurances provided. Your letter states that Units 6, 7, and 8 cannot comply with the restrictions for particulates and sulfur dioxides, therefore, the use of oil even in emergencies cannot be permitted. Fuel oil may be burned under the following conditions:

a) The Department's permission is received and the burn is for testing purposes;

b) Reasonable assurances are provided to the Department that the Units will comply with the permit restrictions; or,

c) Unit 9's permit is modified to allow the use of fuel oil.

Permits for Units 6, 7, and 8 will be renewed without allowing the use of fuel oil under the present circumstances.

Should you have any questions, call me at (407) 433 - 2650.

Sincerely,

Stephanie S. Brooks, P.E.
Stephanie S. Brooks, P.E.
Professional Engineer II
Senior Air Permitting Engineer

cc: Dan Nelson

Department of Environmental Regulation

Routing and Transmittal Slip

To: (Name, Office, Location)

1. Preston Heirs
2.
3.
4.

Remarks:

RECEIVED
MAY 13 1991
Division of Air
Resources Management

From:	Date
S. Brooks	5-10-92
	Phone 232-2650

P 256 396 240

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to Harry Schindehett	
Street and No. Ft. Pierce Utilities Auth.	
P.O., State and ZIP Code Ft. Pierce, Fl	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date 11-19-90 AC 56-141460	

PS Form 3800, June 1985 ☆U.S.G.P.O. 1989-234-555

SENDER: Complete items 1, and 2 when additional services are desired, and complete items 3 and 4.

Put your address in the "RETURN TO". Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.

1. ☐ Show to whom delivered, date, and addressee's address. *(Extra charge)*
2. ☐ Restricted Delivery *(Extra charge)*

3. Article Addressed to:
Harry Schindehett
Ft. Pierce Utilities Auth.
P.O. Box 3191
Ft. Pierce, Fl 34948

4. Article Number
P 256 396 240

Type of Service:
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Addressee
X

6. Signature — Agent
X

7. Date of Delivery
11/21/90

8. Addressee's Address *(ONLY if requested and fee paid)*

PS Form 3811, Apr. 1989 * U.S.G.P.O. 1989-238-815 **DOMESTIC RETURN RECEIPT**

WATER GAS
ELECTRIC SEWER

FORT PIERCE UTILITIES AUTHORITY

206 S. SIXTH STREET * P. O. BOX 3191 * FORT PIERCE, FLORIDA 34948 * PHONE (407) 464-5600

August 28, 1990

Florida Department of Environmental Regulation
2600 Blairstone Road
Tallahassee, Florida 32399

Attention: Mr. Barry Andrews

Dear Mr. Andrews:

REFERENCE AIR PERMITS: Unit #6 - AO-56-113534
Unit #7 - AO-56-112679
Unit #8 - AO-56-112678
Unit #9 - AO-56-175955

In accordance with our meeting with you on July 24, 1990 and subsequent discussions, we are submitting six(6) copies of the Prevention of Significant Deterioration (PSD) Application for our H. D. King Unit 9. We have also enclosed one paper copy and one disk copy of the computer modeling runs.

A check in the amount of $5,000 is enclosed for the required application fee.

If you have any questions regarding the application or supporting data, please feel free to call Mr. Steve Day of Black & Veatch at (913) 339-2880.

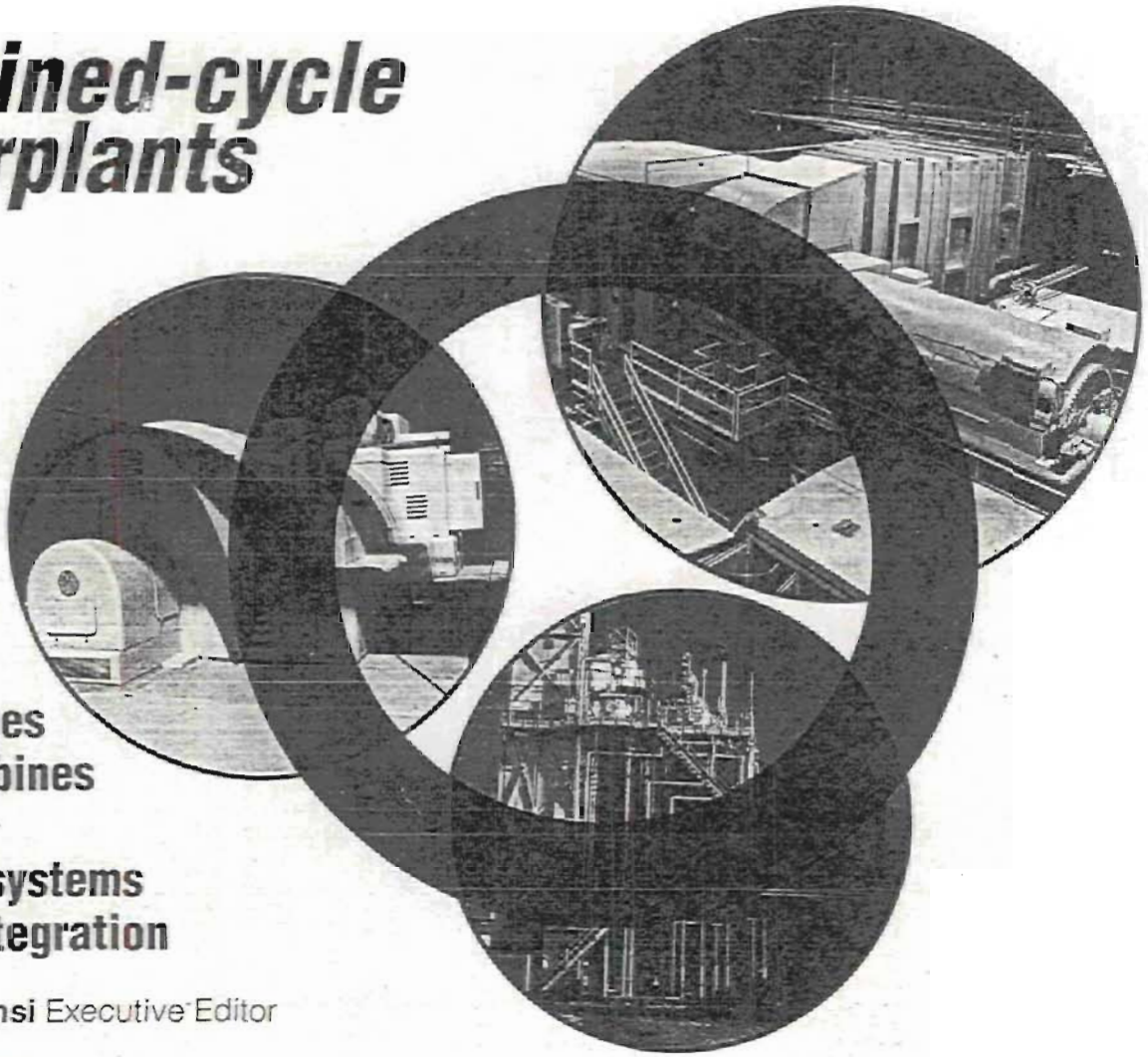
Sincerely,

Harry Schindehette, P.E.
Director of Utilities

jbm
Enclosure

cc: Jack Miller
Steve Day
Harry Lamb
M. Harley
C. Halladay
D. Andrews ✓
G. Harper, EPA
L. Brooks, SE Dist

Combined-cycle powerplants



- **Gas turbines**
- **Steam turbines**
- **HRSGs**
- **Auxiliary systems**
- **System integration**

By **Jason Makansi** Executive Editor

It's not hard to understand why the worldwide demand for combined-cycle powerplants is growing dramatically, with some experts forecasting explosive growth over the next decade. By most yardsticks, the combined-cycle powerplant—in its basic form a gas turbine exhausting into a heat-recovery steam generator (HRSG) that supplies a steam-turbine cycle—is the most efficient system for generating steam and/or electric power commercially available today. It also exhibits capital costs significantly lower than competing nuclear and conventional fossil-fired steam/electric stations. And its low air emissions and water consumption, reduced space requirements, and modular nature allowing phased-in construction are other traditional advantages long held by the combined cycle (Figs 1, 2).

To these must be added several advantages that have appeared more recently. Gas-turbine technology has spurted ahead, thanks to defense and aircraft R&D programs that have moved forward as similar programs for boilers and steam turbines either stagnated, reverted to government sponsorship, or focused on problems with existing units. One result: Even in a simple-cycle configuration, gas turbines now exhibit efficiencies of between 30 and 35%, comparable to state-of-the-art fossil-fired power stations.

Unlike conventional steam turbines, gas turbines come in specific sizes. But the range of sizes has expanded—at both ends—in the last few years. Units nominally rated at 150 MW are available today, 200 MW in 50-Hz applications. Thus, the largest machines can deliver 40% more power today than they could only five years ago. These high-output units are expected to better serve the needs of utilities and independent power producers. Strong interest in cogeneration prompted turbine manufacturers also to focus on the 500-kW to 10-MW market, the segment traditionally served by engine/generators.

The application range of combined cycles has also expanded. Cogeneration, especially projects based largely on the sale of electric power to utilities, is a good match for combined cycles because it can offer maximum power generation at the expense of thermal output. Several aircraft-derivative-type gas turbines in the 10-60-MW range and heavy-duty types previously popular for industrial applications, such as for offshore platforms, anchored many of the cogeneration plants built in the 1980s (see box, p 110).

Combined cycles also can be retrofitted to existing powerplants (see box, p 122). Adding an HRSG and steam turbine converts a peaking gas turbine into a unit more suitable for intermediate- or base-load duty, or just into a more efficient system. Adding a gas turbine to a fossil-fired boiler in place of the forced-draft fan, also called a turbocharged boiler scheme, can improve efficiency and raise capacity. This scheme is not yet popular in the US, although it has been applied at several sites in Europe.

Existing steam turbines can also be re-

powered by adding a new gas turbine and HRSG, and retiring the boiler. Finally, at least one unfinished nuclear powerplant was successfully converted to a combined cycle (Fig 3) and several others are under consideration.

However, the primary driving force behind the combined-cycle market has little to do with technology or applications: The presence of the so-called worldwide "gas bubble" deflated prices from their late 1970s levels concurrent with a similar supply/demand/price scenario for petroleum. But most industry observers think that the era of inexpensive premium fuels has about had its day.

Thus, solid-fuel compatibility, perhaps more than anything else, has led to the great expectations for combined cycles in the coming years; indeed, the specter of surges in premium-fuel prices has always been held over the head of the potential combined-cycle user. For one thing, the possibility of making gas turbines compatible with coal helped convince bureaucrats in Washington to essentially repeal the 1978 Fuel Use Act in 1987.

Even though technologies such as coal gasification and pressurized fluidized-bed combustion (see box, p 118) are just now being commercially demonstrated, plant owners gain more confidence in the long-term economics knowing that a premium-fuel-fired gas turbine can later be converted to a coal-based combined cycle if needed. Of course, a simple-cycle gas turbine can be converted to combined cycle without coal.

Gas turbines

The combined cycle is anchored by the gas turbine. In fact, for the most part, advances in gas-turbine technology are responsible for performance gains with combined cycles.

Gas turbines are fundamentally classified as light or aircraft-derivative and industrial. Distinctions are blurring as each borrows technology from the other. To illustrate: Designers of aeroderivative units for cogeneration service have borrowed industrial features. Meanwhile, many of the performance gains achieved by heavy-duty units can be attributed to materials and design advances with the aeros.

Higher firing temperatures in both boost efficiency without appreciably increasing their size. The new class of 150-MW machines (Figs 4, 5) exhibit turbine inlet temperatures of around 2300F. Combined-cycle plants based on these units are expected to show heat rates below 7000 Btu/kWh and fuel-to-power efficiencies of 50% and above when firing premium fuels.

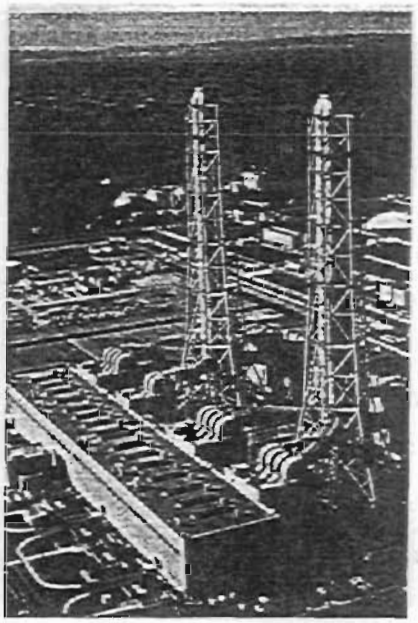
Such high temperatures can be accommodated only by extensive design changes to the conventional hot-gas path. The first several stages of blading are generally constructed of high-strength alloys and/or are coated with special materials for corrosion and oxidation resistance. Internal and external air-cooling circuits also are required for the first few stages of blades and for stationary nozzles. Cooling air is typically drawn from the compressor discharge or from individual compressor stages. In some cases, an intercooler is used if the temperature of the compressor discharge is too high to provide effective cooling of the blading and hot-gas-path components.

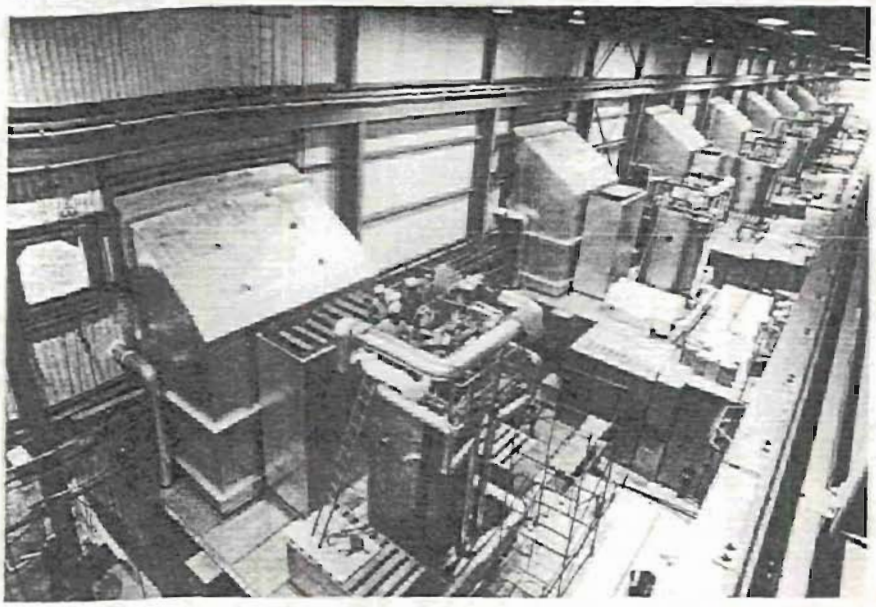
Another basic gas-turbine descriptor, like the turbine inlet temperature, is the pressure ratio. The pressure ratio at which the gas-turbine thermal efficiency is greatest is different from that at which the specific power output (a term denoting output in megawatts divided by mass flow through the unit) is greatest. Therefore, for a given turbine inlet temperature, the combined-cycle thermal efficiency must be optimized around the pressure ratio where the specific power output of the gas turbine is greatest. This presents a dilemma for turbine designers because it is not easy to change the pressure ratio for a given machine model. Pressure ratios for today's large machines are around 14:1.

An obvious consequence of the higher firing temperature is a correspondingly higher turbine exhaust temperature—typically 950F to 1050F. This adds to the options available for combined cycles. For one, steam bottoning cycles with reheat make more sense. For another, supplementary firing of the exhaust can be avoid-

1. Largest gas turbine in US repowers steam turbine at powerplant in Virginia (left)

2. World's largest facility, in Japan, includes 14 gas turbine/HRSG modules





3. **Largest combined cycle for cogeneration** service features 12 85-MW gas-turbine/HRSG modules supplying steam to one 365-MW steam turbine

ed. Similarly, the high compression ratios lead to higher temperatures in the compressor discharge, a source of heat for such steam-side duties as preheating feedwater should it be desirable to further integrate the gas and steam cycles.

On the other hand, high firing temperatures confound efforts to limit NO_x and CO emissions from the gas turbine. Water/steam injection is a popular way to minimize NO_x emissions. Recall that adding water or steam in the combustion zone lowers the flame and gas temperature, and suppresses NO_x formation by up to 70%. Steam injection appears to be favored today, especially for combined-cycle installations. Though it takes 50% more steam on a mass basis to obtain equivalent reduction, it is thought by some to pose lower potential for damage to critical turbine components and does not penalize the heat rate as much to make up for the heat of vaporization lost when water is injected.

To continue reducing emissions in the face of higher firing temperatures, virtually all of the major vendors have or are developing some form of multiple combustor arrangement employing staged combustion (Fig 6). Key factors are adequate premixing of air and fuel upstream of the combustor and stable control of fuel and air as the system transfers from one burner stage to another.

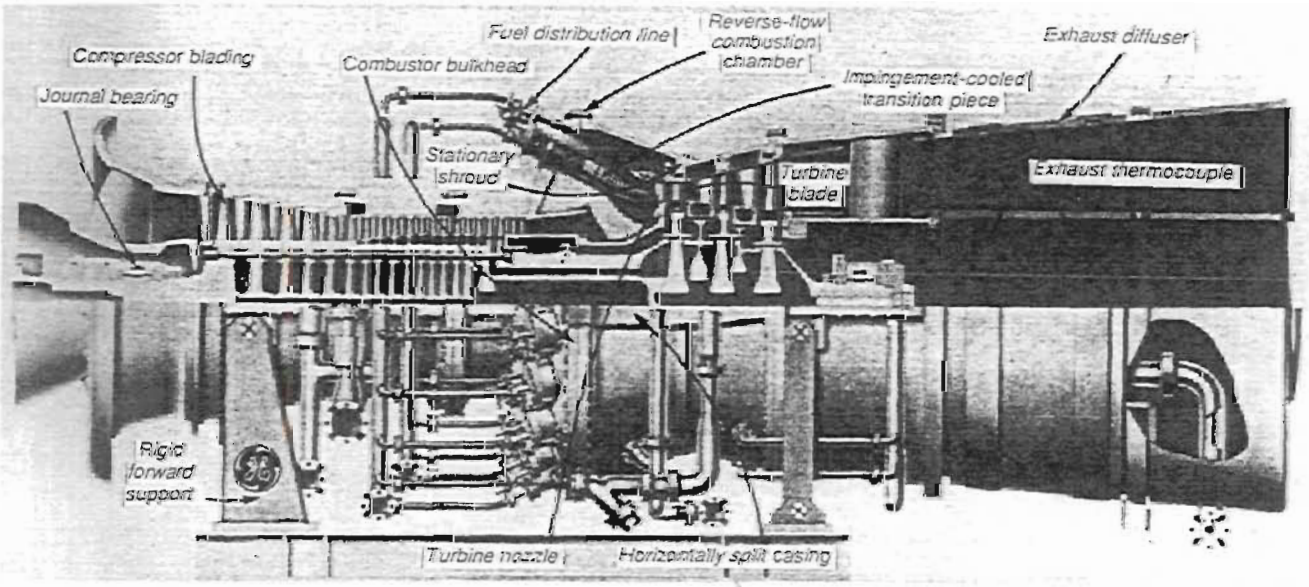
One approach is use of a mechanical shutter to distribute air between the combustion and dilution zones so that the combustor burns fuel at near-stoichiometric conditions at all times. Another concept is to employ a set of mini-burners fired according to a predetermined sequence instead of the single burner used in older units. Finally, one supplier replaced a single fuel nozzle on the combustor can with six nozzles mounted so that additional piping is not required. In addition to reducing NO_x emissions, this significantly reduces noise, shortens flame length, and extends the period between overhauls.

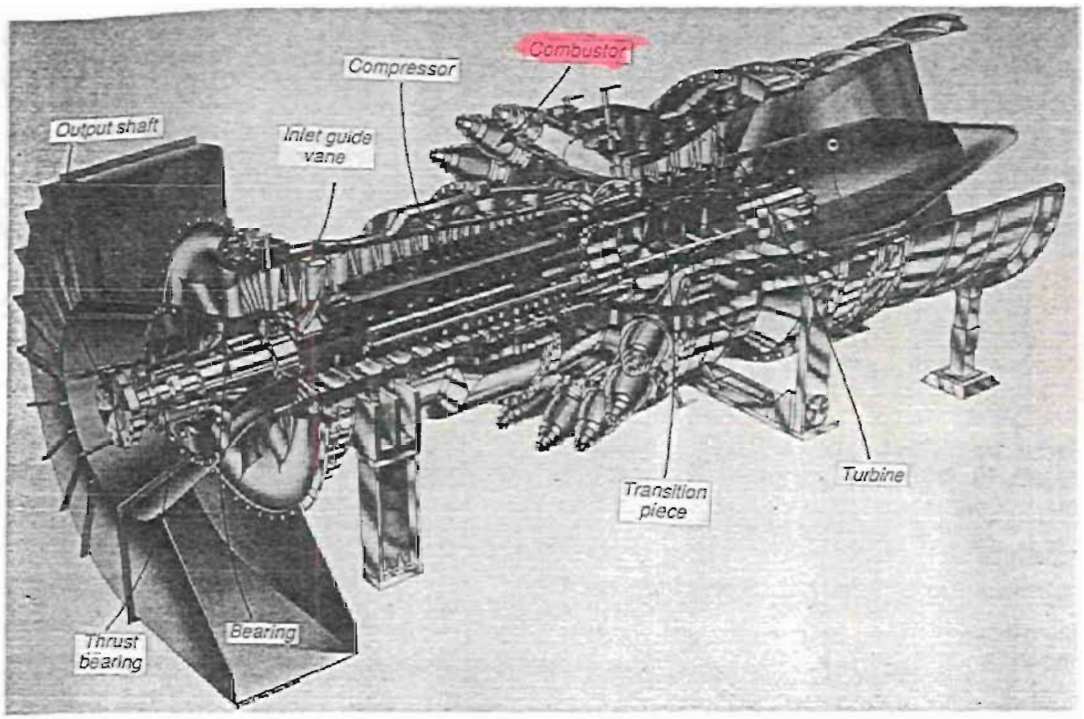
In general, today's combustors can achieve NO_x emissions levels of between 30 and 70 ppm at 15% excess O_2.

Small-machine advances

Though advances in large machines are taking center stage today, don't overlook what's happening with small units, especially the movement of machines from the

4. **Gas turbines of nominal 150-MW** size have inlet temperatures of about 2300F, fuel-to-power efficiencies of 50% and above in combined cycle





5. **Advanced cooling** techniques and high-strength thermally resistant alloys are required for large gas turbines to handle the high firing temperatures

aircraft industry to the power industry (Fig 7). In the most recent example, the industrial application features a turbine with the same inlet temperature as the previous-model aeroderivative but benefits from higher efficiency in the high-pressure compressor and high-pressure (h-p) turbine and the low-pressure turbine/power turbine.

Simple cycle, the machine has an efficiency close to five percentage points higher than previously, with an output of 40 MW or higher, depending on whether steam or water is injected into the combustor for NO_x control. In a combined-cycle configuration, output is expected to top 50 MW with net thermal efficiency of close to 52% when fired by natural gas.

Another concept being investigated by several manufacturers is an intercooled version of a recuperative gas turbine. In one configuration, an intercooler is placed between the existing two-stage centrifugal compressor. The intercooler circulates an ethylene glycol/water mixture which picks up the heat of compression. It is said to lower fuel consumption by over 25% and increase power output by 40% compared to a machine without reheat.

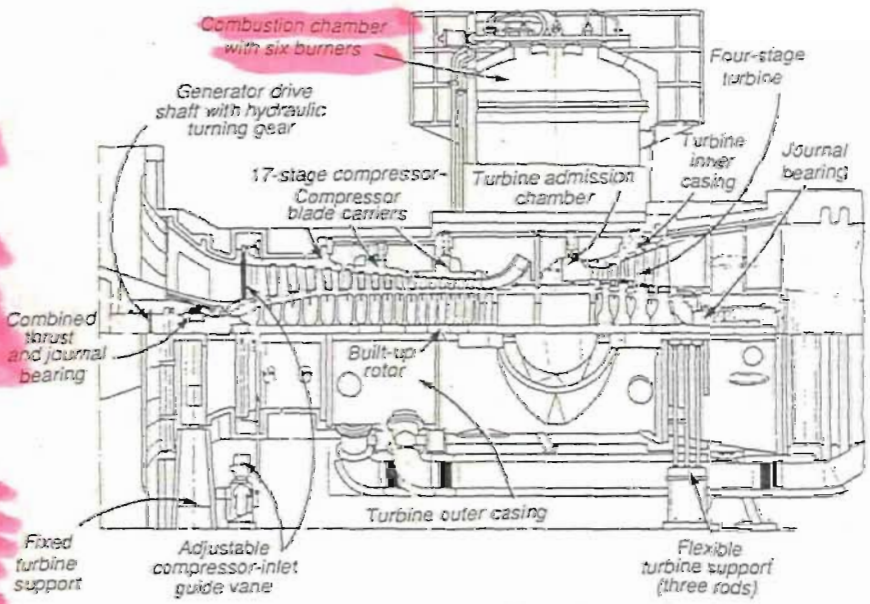
Year 2000 machines

With the worldwide market active, gas-turbine technology continues to advance at a rapid pace. Within 10 years, turbine inlet temperatures are expected to be around 2500F, pressure ratios around 16:1; also, the largest units will produce more than 200 MW and offer combined-cycle efficiencies near 60%.

To reach this point while continuing to reduce emissions, further improvements in combustion technology must ensue. An example is the double-cone premix burner (Fig 8). Primary air enters the cone via the longitudinal slots that form between the two half-cones. The parallel cones contain a series of small orifices through which the gaseous fuel enters the conical plenum. Liquid fuel can be injected via an atomizing nozzle at the apex of the burner. Main feature of this design is that there is no separation between premix and combustion zones. It reportedly can be used for annular as well as vertical, silo-type combustors.

Catalytic combustion is also in the offing for meeting emissions restrictions at higher and higher temperatures. Leaner combustion can be accomplished by using a catalyst to sustain the reactions. The challenge is to find a catalyst and substrate that can survive in a 2500F environment under thermal cycling normally imposed on gas turbines.

Longer term, gas-turbine cooling and/



6. **Multiple combustor arrangements** are necessary to keep NO_x production in check as firing temperatures are increased

or materials technology must be extended appreciably. Ceramic materials for hot-gas-path components are an area of active investigation. For one thing, this can eliminate the complex cooling circuitry needed with today's—and tommorrow's—designs. Ceramic coatings already have been demonstrated, but ceramic construction of combustors and of the first few stages of the hot gas path poses future challenges. Stationary components are likely to come first.

For the combined-cycle application, an interesting option involves steam cooling (Fig 9) of the blades in the first few stages. It is a logical extension of water-cooling techniques developed earlier. Most of the steam's energy can be easily retained in the bottoming cycle, losing only about 2% to various leakage paths. Technical challenges here include understanding the heat-transfer characteristics of steam in the various turbine components and developing adequate seals where the steam enters and leaves the rotor.

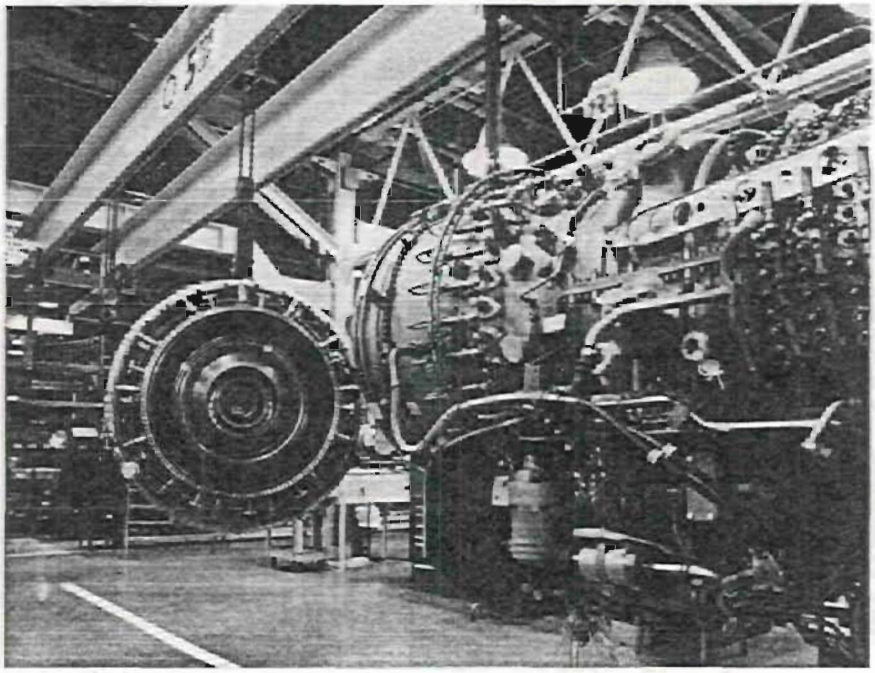
RAM important, too

As impressive as performance gains are, penetration of combined cycles for power generation may depend as much, if not more, on reliability, availability, and maintainability (RAM). In the eyes of many utilities for example, RAM characteristics of combined cycles are suspect because of poor RAM experience with their peaking gas turbines. Whether the reputation is deserved—combined cycles are anticipated to operate many more hours, reducing the thermal cycling imposed on the machine—is a question worth raising. But as operating temperatures, pressures, and service time rise, RAM characteristics will become even more critical.

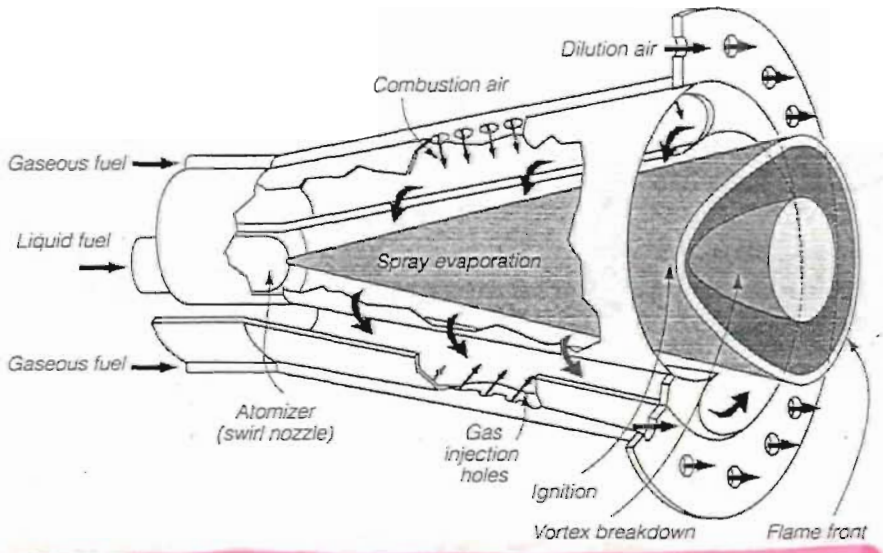
Large gas turbines are scaled up or down (such as from 50 to 60 Hz and vice versa) from smaller designs using basic scaling laws. But the scaling of thermodynamic performance is better known than the scaling of mechanical properties, especially thermal stresses that cause thermal fatigue. Such considerations must be accounted for in machine design.

Turbine vendors are factoring RAM design parameters into their machines in many ways. While one naturally thinks of the high-temperature components, the exhaust end requires some thought as well. Higher exhaust temperatures could lead to greater potential for flutter phenomena. This must be considered in material selection along with other factors.

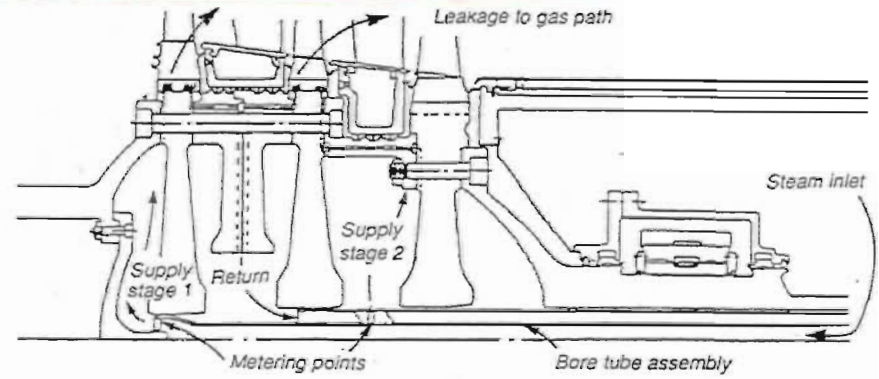
More sophisticated diagnostics may be another way to improve RAM characteristics. Instruments such as optical pyrometers for reading blade temperatures, optical fiber thermometers for monitoring hot-gas temperatures, and combustor viewing probes are being developed.



7. Aeroderivative gas turbines, as part of a combined cycle, increasingly find application in cogeneration in the under-100-MW capacity range



8. Advanced low-NO$_x$ burner has no separation between the premix and combustion zones, is said to be compatible with annular and vertical combustors



9. Advanced cooling of the turbine hot-gas path based on steam flow may be particularly appropriate for combined-cycle application

Steam turbines

With respect to combined cycles, steam-turbine technology tends to fall in the shadow of gas-turbine technology. Indeed, the idea is to match the steam turbine to the gas turbine(s), not the other way around—unless an existing steam turbine is being repowered. In fact, much of the steam-turbine-related activity in combined cycles involves developing units optimized for each of the available gas-turbine packages so that the steam turbine becomes a production item much like the gas turbine. Contrast this to the steam turbine that is custom-designed to match the exact output of a field-erected boiler.

At the high end of the capacity spectrum, modestly sized reheat units make sense. Some designs may be more adaptable to reheat. Two-casing single-shaft units, for example, may better handle the differential thermal expansion characteristic of reheat units than single-casing designs. Across the low- to mid-capacity range, wherever possible, single-flow units are employed with axial exhausts. This eliminates the condenser floor and simplifies installation because the entire unit can be at ground level. Other benefits of single flow include lower installed costs and improved efficiency because blades at each stage are longer.

Steam turbines in combined-cycle installations generally operate in the sliding-pressure mode throughout the load range to maintain efficiency. This leads to a relatively simple single-admission steam inlet arrangement. In at least one design, both h-p and low-pressure (l-p) turbine inlets are used. Main steam and l-p steam are mixed prior to expansion in the l-p turbine to reduce thermal stresses.

Another characteristic of combined-cycle application is moderate inlet steam temperatures and pressures, leading to wetter steam in the last stages of the low-pressure stage. This situation is similar to nuclear and geothermal steam turbines. Moisture removal and drainage must be considered along with means of preventing droplet erosion.

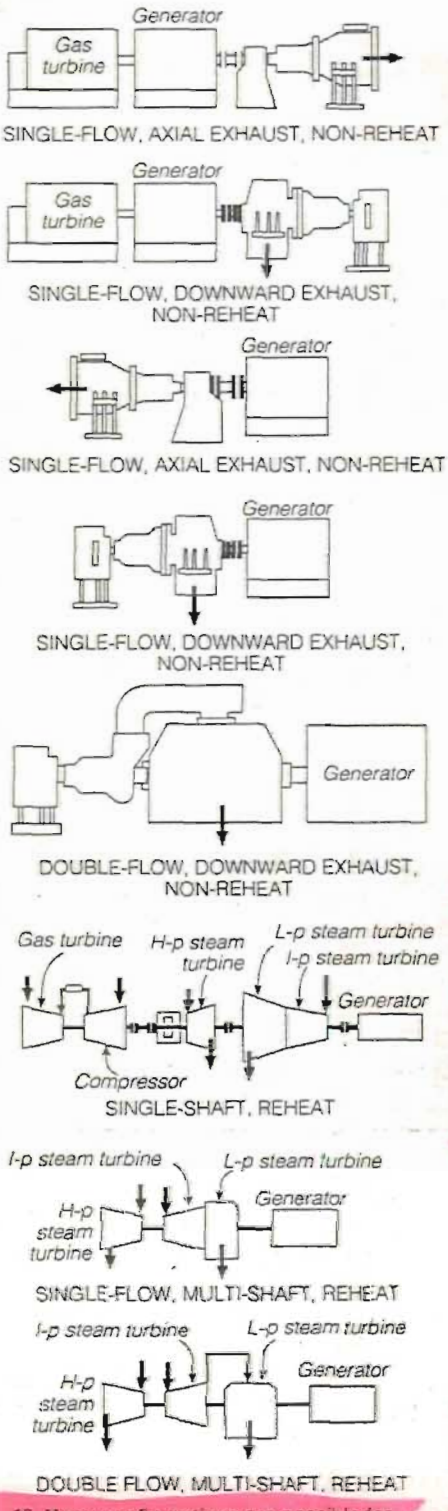
Combined cycles are known for their fast-start and excellent cycling capabilities but both must be accommodated in steam-turbine design. Areas of concern include: proper matching of steam and metal temperatures, gland-sealing steam temperatures, and axial thrust.

Horizontally split, single-casing designs may be more restrictive than two-casing units with a circumferential split when matching steam and metal temperatures. Other options include: (1) lowering steam pressure to reduce casing thickness and any effects from the temperature differentials, (2) using two half-capacity steam turbines, (3) incorporating steam bypass lines to the condenser, and (4) employing an external means of heating critical parts such as the steam chest and casing flange.

Depending on the types of seals used in the steam turbine, a separate supply of superheated steam may be required if the combined cycle experiences many starts and stops. Reason: Superheated steam from the HRSG cools quickly when the gas turbine comes off line; saturated steam from the auxiliary boiler is only suitable for a cold turbine. Alternatives include an electric or fired superheater or an auxiliary boiler with superheat capability.

Casing or cylinder arrangements (Fig 10) are varied and depend on, among other things, trade offs between operating and capital costs and the number of gas turbine/HRSG modules the steam turbine will serve. Single-flow single-casing design may be the best choice with only one gas turbine. Two modules can be served with a single-flow single-casing or two-casing double-flow approach. The latter involves higher first cost but better efficiency. The same principle holds for three gas-turbine/HRSG modules: A two-cyinder, double-flow arrangement is less efficient but less costly than a three-cylinder four-flow arrangement.

Now that reheat steam-turbine configurations make sense for combined cycles, it may not be long before supercritical steam turbines add value, too. Supplementary firing can boost steam temperature to beyond 1050F. But the next generation of large gas turbines, predicted to have exhaust temperatures at or above 1150F, can incorporate bottoming cycles with main steam temperatures of 1100F or higher. And, material advances may provide opportunities to superheat steam in coal gasifiers, thereby eliminating the gas-turbine exhaust temperature as the constraint on the steam bottoming cycle.

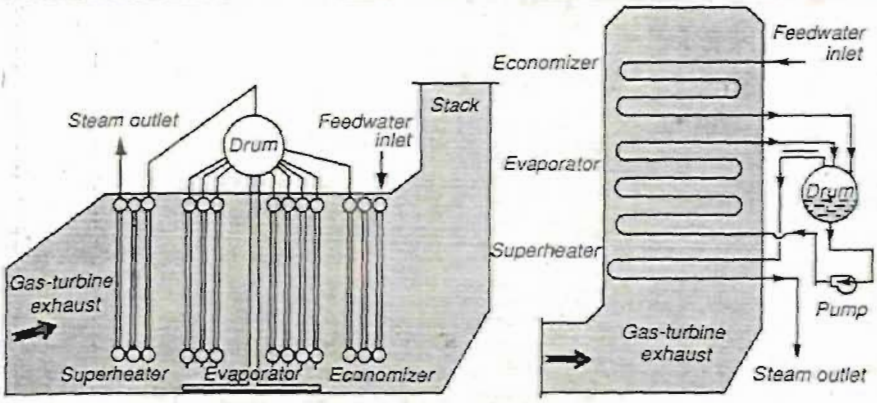


10. Many configurations are possible for matching steam turbine to gas turbine

HRSGs

In combined cycles, the HRSG provides the critical link between the gas turbine and the steam turbine. Once relatively straightforward, the design of the HRSG becomes more involved depending on the application for the combined cycle, the need for NO_x control downstream of the gas turbine, use of supplementary firing, and the need for enhancements to the thermal cycle—such as reheat and multiple pressure levels.

HRSGs for combined cycles are broadly classified as natural- or forced-circulation (Fig 11). In the former, gas-turbine exhaust flows horizontally past vertical tubes. Circulation is maintained by the density difference between the cold feedwater supplied through a downcomer to the evaporator tubes and the water/steam



11. HRSGs are classified fundamentally as forced-circulation (right) or natural-circulation (left). Note vertical and horizontal arrangements

mixture flowing to the steam drum. Forced-circulation units feature turbine exhaust flowing vertically past horizontal tubes. Feedwater is pumped through the tubes.

An alternative to the conventional drum-type HRSG is the once-through design. It eliminates the need for the drum, level controls, and blowdown and recirculation systems. High-alloy construction minimizes feedwater treatment requirements. Several years of experience have been obtained in small industrial cogeneration and combined-cycle systems. More recently, the once-through HRSG has been prepackaged for application to packaged gas turbines as small as 1 MW.

Traditionally, most HRSGs in Europe have been specified as forced-circulation while those in the US are generally natural-circulation (Fig 12). Natural-circulation units tend to be simpler to operate—avoidance of pumps is a primary reason. On the other hand, forced-circulation units can generally be made smaller, particularly with respect to plot space, and can be started up faster, although the actual differences in size and startup time may be small, and depending on the application, not significant. Proponents of both claim ease in handling a wide range of gas-turbine load and exhaust characteristics.

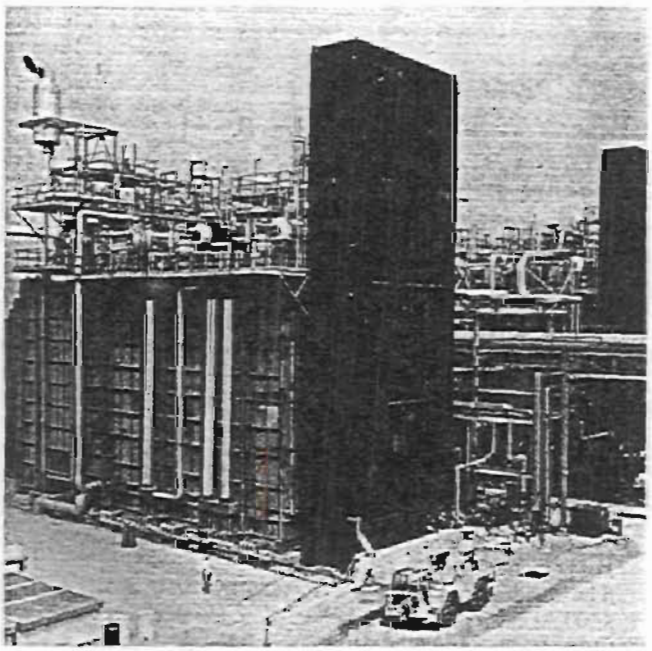
Variations in both gas-turbine exhaust velocity and temperature must be accounted for in HRSG design. Changes in ambient-air conditions, load, and/or quantities of steam or water injected into the combustor for NO_x control all affect the flow pattern experienced by the HRSG. This situation can be complicated by having two or more gas turbines exhausting into one HRSG. Flow straighteners are often specified to make the HRSG gas inlet more uniform.

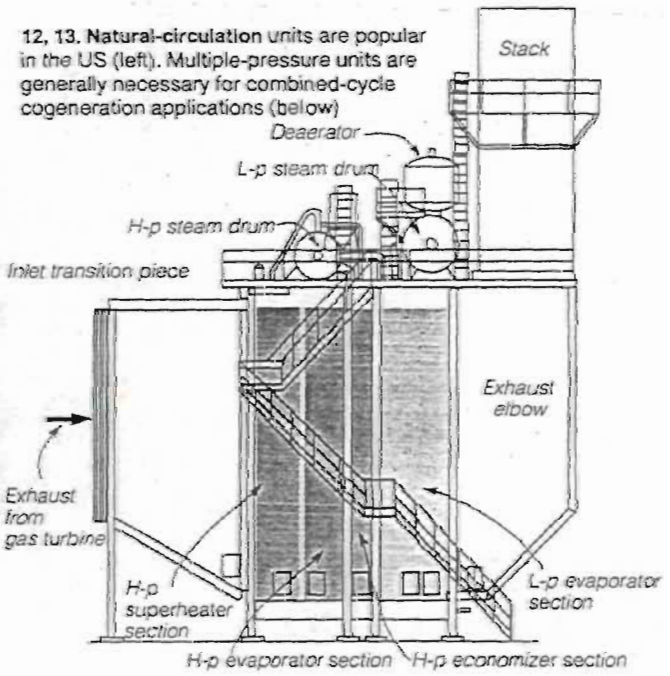
In combined-cycle cogeneration applications, two- and three-pressure-level HRSGs may be required (Fig 13) and a few units have four pressure levels with over a dozen superheater, evaporator, and economizer sections. L-p steam is usually used for feedwater heating while medium-pressure steam may be used in the process and h-p steam feeds the steam turbine. The deaerator may be mounted on top of the l-p steam drum.

One way to maximize heat recovery is to cascade steam-drum continuous blowdown. That is, blowdown from the h-p steam drum passes to the medium-pressure steam drum where it flashes and steam is recovered. Likewise, heat in the medium-pressure drum blowdown is recovered in the l-p drum.

As steam temperatures and pressures are elevated to meet the requirements of today's combined cycles, they must be accommodated in HRSG design. Thermal stresses are particularly important because the system must retain its rapid-start/stop and load-cycling capabilities. Consider the mass and thermal load being directed to or away from the HRSG in the span of a fraction of an hour as a gas turbine is started up or shut down. Also, the steam cycle of combined cycles is usually operated in sliding-pressure mode, meaning that h-p drum pressure evolves like steam flow which follows the gas-turbine load. The resulting transients become important in drum and other HRSG component design to ensure adequate life and prevent deterioration from fatigue.

Dewpoint corrosion becomes more of a factor as designers strive for the lowest stack temperatures by including feedwater heating in the HRSG. Acid-dewpoint corrosion must be accounted for if the fuel being burned has even a trace of sulfur in it. Also, potential for water dewpoint corrosion increases when water or steam is





12, 13. Natural-circulation units are popular in the US (left). Multiple-pressure units are generally necessary for combined-cycle cogeneration applications (below)

injected into the combustor for NO_x control because it greatly increases the moisture content of the turbine exhaust.

Flexibility, but also cost, is added to the system by providing an HRSG bypass, allowing the gas turbine to operate in the simple- or combined-cycle mode and/or to modulate flow to the HRSG. Keep in mind that the dampers required for this service are often found to be unreliable and special attention to them is required in both design and operation and maintenance.

Louver dampers may allow better control over exhaust flow than flap-type dampers but they exhibit higher leakage rates. Size will also play a role in selecting the appropriate damper as will application. Cogeneration plants may find that the louver's modulating ability outweighs leakage drawbacks. Plants intended for base-load power generation may avoid the bypass altogether while ensuring that the HRSG can withstand temperature gradients. Another alternative is to implement a steam-turbine bypass system for simple-cycle operation.

Supplementary firing

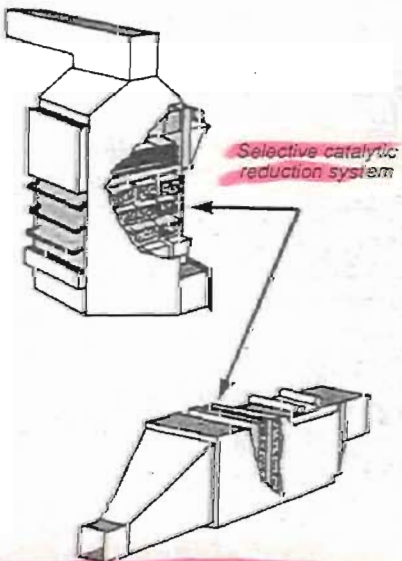
In some combined-cycle applications, more steam is needed than may be available from just the gas-turbine exhaust. Supplementary firing of gas or oil directly into the hot exhaust with a duct burner upstream of the HRSG yields important advantages, especially because the exhaust has enough oxygen to sustain good combustion. For one, an optimum match can be made between electric power and steam needs to maintain system output throughout the load range.

In some cases, the burner must also be designed to supply all the necessary heat input for full steam generation—using a separate fan for the combustion air source—when the gas turbines are down. In past years, this downtime may have reflected mostly planned or unscheduled outages, relatively short periods. Recently, though, dispatchability has become a requirement for some gas-turbine-based cogeneration systems. Depending on the purchasing utility's seasonal load curves, the auxiliary burner may be called upon to maintain steam output for a long period of time.

With the burner elements constantly exposed to exhaust temperatures of 900F or more, the design must be extremely robust and include alloys capable of withstanding these temperatures day in and day out. Regardless of whether O_2-starved exhaust or ambient air is the "air" source, the burner design will still have to ensure that emissions, especially CO, are kept within compliance. Fuel piping, flame safety logic, and combustion controls must also be flexible enough to handle the varying conditions.

SCR in the HRSG

Need for selective catalytic reduction (SCR) has certainly changed the way



14. Placement of SCR has changed how HRSGs are designed and operated

Combined cycles run gamut of sizes for cogeneration service

As utility application of combined cycles dwindled in the mid- to late 1970s, cogeneration and small power took up the slack—at both ends of the size spectrum. Systems as large as 465 MW (Fig A) serve in areas like the Gulf Coast and California where the industrial appetite for steam and power persists, where growth demands expansion of generation capability, and/or where state legislation provides incen-

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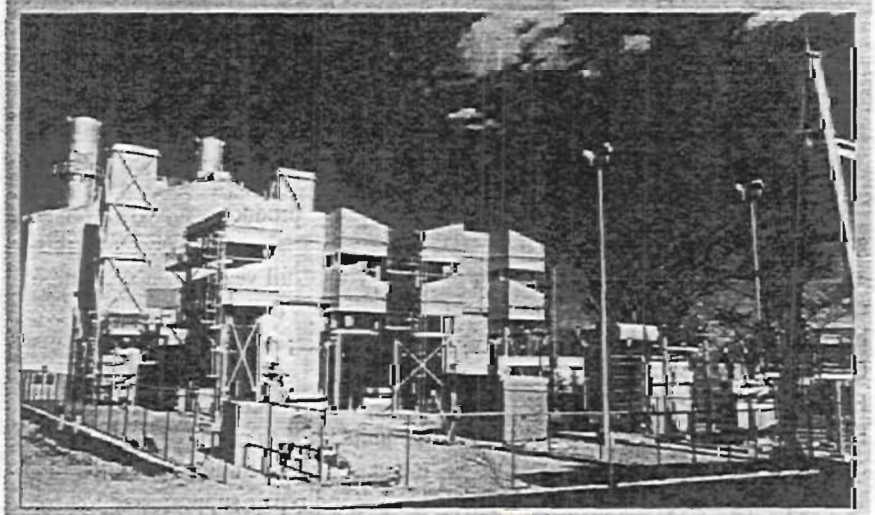
A. Large Gulf Coast combined-cycle plant is independently owned and supplies large quantities of process steam to adjacent industrial facility



B. Combined-cycle system for cogeneration serves a university in Colorado, makes use of highly packaged aeroderivative gas turbine

HRSGs are designed and operated. Recall that SCR involves the injection of ammonia into flue gas upstream of a catalyst structure (POWER special report, *Reducing NOx emissions*, September 1988). NO_x is catalytically reduced to nitrogen and water.

To meet the temperature requirements of the catalytic process, the SCR is usually sandwiched in between HRSG components (Fig 14). Location depends on matching the process temperature window of the catalyst with the proper window in the HRSG. But the HRSG temperature profile is a moving target that depends on gas-turbine load and ambient air conditions. Gas velocities through the SCR portion of the HRSG may have to be adjusted to meet residence-time requirements for the NO_x-reduction reactions.

Other considerations include ensuring proper control of ammonia injection (Fig 15) and mixing with turbine exhaust. Note that the NH_3 injection-nozzle grid may be located relatively far from the catalyst structure. Also, if sulfur is present in the fuel—and as SO_3 in the exhaust—it can react with ammonia to form, among other compounds, ammonium bisulfate which can promote rapid corrosion of downstream heat-transfer tubes. Provisions for water washing the cold section of an HRSG with SCR should be considered.

SCR in the HRSG may also limit operational flexibility. Supplemental firing can drastically change the temperature profile throughout the HRSG and turndown of the gas turbine must be accomplished while maintaining the exhaust in the correct temperature range. It may difficult to meet emissions limits if turbine exhaust is bypassed around the HRSG. As a final note, realize that as required NO_x removal efficiencies go up, it becomes more difficult to optimize the SCR process.

(continued from p 110)

tives or encourages the practice. Some are operated by so-called independent power companies who sell the steam to an industrial site and power to the utility. More recently, large combined-cycle plants have been constructed or planned for East Coast sites (Fig D).

These large systems represent the state-of-the-art in combined-cycle applications today. Many operate base load but some also are designed to be dispatchable—that is, the utility purchasing the power output can dictate when and at what load they should operate. They must be configured and controlled to reliably provide electric power on requirement *and* meet the steam demand of the industrial host. Steam demand can fluctuate widely within small time periods.

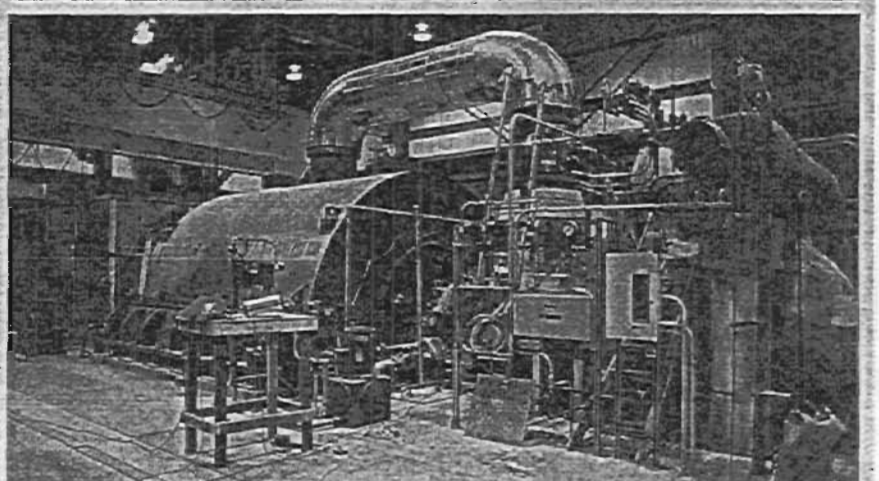
Experience with cogeneration and independent powerplants reportedly has been very favorable, although several more years of operation will be required to provide a meaningful data base on reliability and availability—a data base that the utilities undoubtedly will be interested in as they consider combined cycles for base-load power generation.

Combined cycles based on aeroderivative gas turbines (Figs B, C) are popular choices for cogeneration in the 10-100-MW capacity range. While most are fueled by natural gas, with distillate as backup, many fire methane from sewage treatment plants and landfills and refinery byproducts. Availability of digital controls has gone a long way toward making these systems manageable by operators or personnel with little training or experience with power equipment.

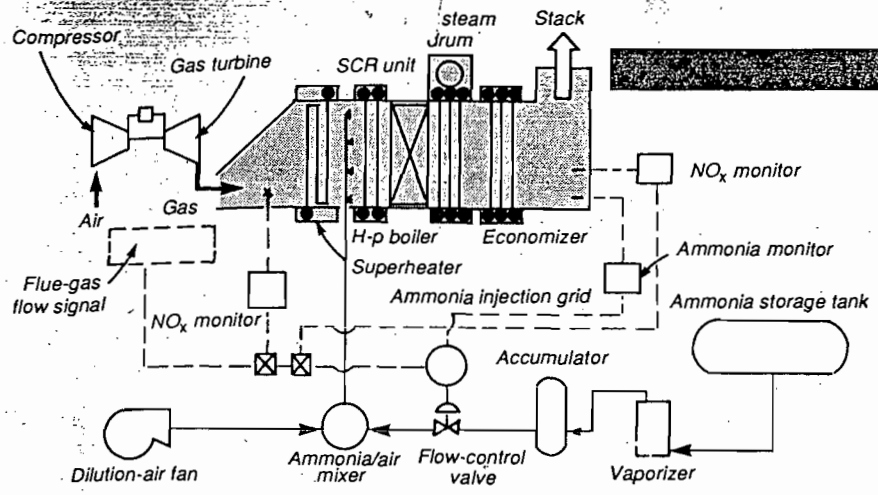
Many small systems take full advantage of laws requiring local utilities to buy back the power. Indeed, the steam-turbine cycle is often added mainly to increase electric power output while having just enough steam output to meet the efficiency requirements of the Public Utility Regulatory Policies Act of 1978—the legislation that promoted independent power.

Popular in Europe, although not in the US, is the idea of using combined-cycle systems for district heating. Here, power generation is sacrificed somewhat so that steam is of sufficient quality to circulate through what often amounts to miles of piping. Thermal efficiency of these plants is nominally 80%. By their nature, district heating systems must be sited close to urban centers, dictating clean combustion.

C. Entertainment center receives electric power and process steam from combined-cycle system based on aeroderivative gas turbine



D. Large cogeneration combined-cycle plants have more recently been installed at sites on the East Coast



15. The injection of ammonia for SCR can significantly affect the reliability and maintainability of the HRSG, and must be factored into design

Auxiliary systems

While the gas turbine, HRSG, and steam turbine comprise the major components of the combined cycle, many other components are necessary to complete the installation and/or to optimize performance. Only a brief mention of some of these is given here as more complete information is available elsewhere.

Water system

Combined cycles consume less water than competing forms of power generation. Nevertheless, competition for water is intensifying among such interests as agriculture, industry, residences, and recreation and wildlife preserves. Where water is available, its quality may be less than desired. Thus, the minimization of raw water makeup—either through greater water recycle within the plant (Fig 16) or by selecting alternatives to water use—will drive the design of combined cycles as it will other types of powerplants.

Avoiding water cooling is one way of sharply cutting down on water consumption. A direct air-cooled condenser can be used in place of the traditional surface condenser. So-called dry cooling towers avoid the plume and blowdown characteristic of wet cooling towers; however, dry cooling is not nearly as thermally efficient as wet cooling.

Boiler-feedwater treatment must receive more attention as steam temperatures and pressures rise to meet the performance goals of today's combined cycles. While utilities are likely to be familiar with these more stringent requirements, other potential users whose experience is limited to lower steam conditions should understand high-purity feedwater treatment.

Conditioning of inlet air

Higher temperatures in gas turbines and the need to maintain efficiency from base-load combined cycles dictate inlet-air treatment (Fig 17) that is more involved than it has been. Air filters, always a common element, now include pulse-jet fabric filters for extreme duty in addition to more conventional barrier and panel filters that can be equipped with automatic self-cleaning mechanisms. Microprocessor-based controls may be specified to avoid excessive pressure drop under all operating conditions.

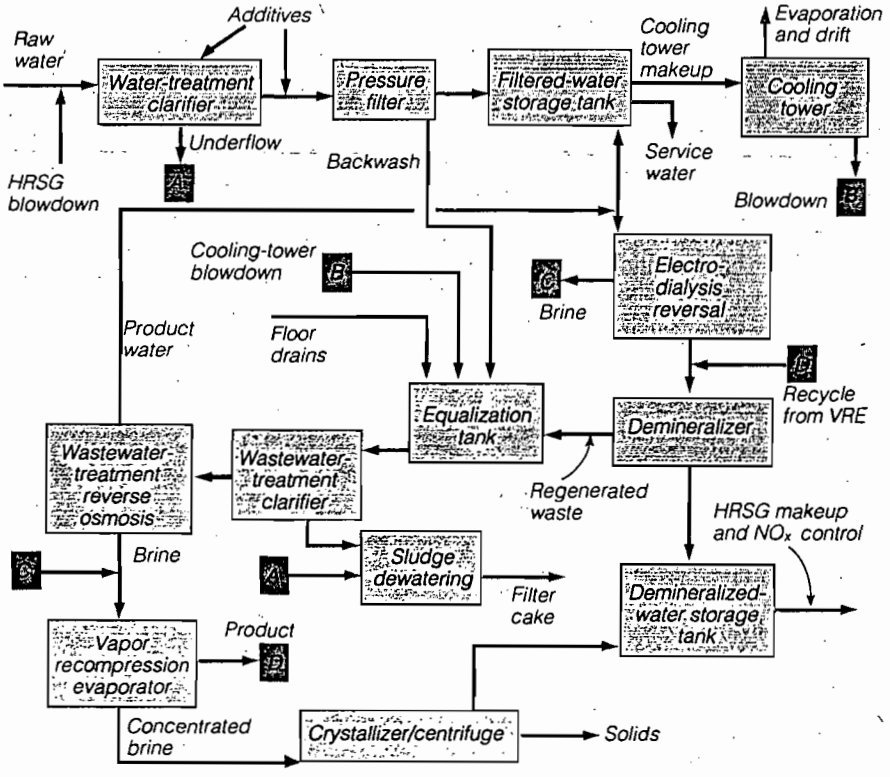
Ambient-air temperature has a significant effect on combined-cycle output. For this reason, evaporative coolers have been used more extensively in recent years to maintain output, especially in regions having extended periods of high temperature and/or high humidity. Evaporative coolers convert sensible heat into latent heat without changing the total heat content of the mixture. This increases the moisture content and density of the air. Removal of soluble contaminants and some NO_x reduction are other claimed advantages.

Fuel systems

Like those in the inlet air, contaminants that find their way into the gas turbine from the fuel can cause considerable loss of performance and can contribute to premature degradation of hot-gas-path components and heat-transfer surfaces in the HRSG. Much of the experience with combined cycles comes from installations where clean fuels are fired and fuel preparation is minimized.

A few installations routinely fire crude or residual oil which does require considerable fuel treatment, particularly the removal of salts and suspended sediment. However, performance still tends to suffer compared to systems fired by natural gas and distillate.

Regarding fuel systems, an important point to remember is that secondary or backup fuels may have to be used. Backup fuel systems require periodic inspection and maintenance, especially when they've gone a long time without use.



16. Though water consumption by combined cycles is less than for competing systems, approaching zero discharge will still be an important consideration

Oil storage tanks and handling systems are a particular area worth investigation. Resid and distillate fuels are both subject to oxidation and deterioration resulting in the accumulation of dirt, sediment, gum deposits, and sludge. Microbial growth at the fuel/water interface can cause severe pitting-type corrosion. And if coal gas is to be used at some point, it is critical to understand how even minute quantities of contaminants can affect combined-cycle performance.

System integration

A basic understanding of combined cycles is not complete without a review of those factors that affect the entire system. Here the term integration refers to physical integration of the primary components described above and factors important to the operation and performance of the combined cycle as a whole—such as operating mode, reliability/availability issues, and control systems. Also covered in this section are combined steam and gas cycles that do not involve a steam turbine.

As you review this information, keep in mind that as the combined cycle moves into base-load generation duties—either for cogeneration or power generation—further integration of the steam and gas cycles is inevitable.

Reheat

As mentioned earlier, the new large gas turbines have exhaust temperatures high enough to justify reheat in the steam cycle without supplementary firing (Fig 18). This represents the highest efficiency combined cycle available today.

Depending on the how the reheat cycle is configured (Fig 19), the thermal performance at rated conditions can vary by up to three percentage points, according to one estimate. It is interesting to compare this gain to that achievable with advances in gas-turbine firing temperature or in the steam cycle from higher main-steam pressure and temperature. The reheat surface is easily placed in the HRSG. One possibility is to arrange it in parallel with the superheater.

Note that reheat temperatures—in the range of 950 to 1000F—generally are close to those used in conventional fossil plants. Reheat-steam pressures are, however, more moderate, less than 500 psig. An important difference: Feedwater is heated by gas-turbine exhaust, not by extraction steam. Feedwater heating is often the subject of economic optimization for conventional fossil-fired plants, leading to custom design of the steam turbine. Avoiding extractions helps designers standardize steam turbines for the combined cycle. Condensate can be deaerated in the condenser.

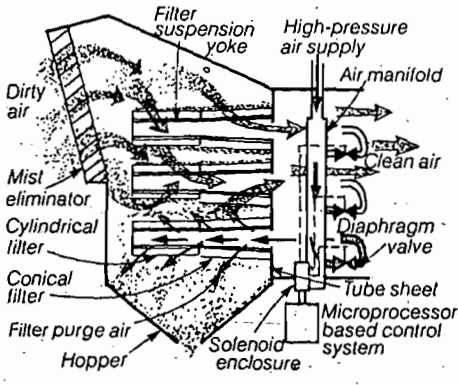
Reheat offers other advantages as well. It reduces the moisture content of the steam in the last few l-p turbine stages. This can lead to use of longer last-stage blades and more compact single-flow turbine instead of a double-flow arrangement. On the other hand, higher steam temperatures and pressures call for use of shorter blades on the steam-turbine inlet stage. This leads to steam leakage losses and must be accommodated in design.

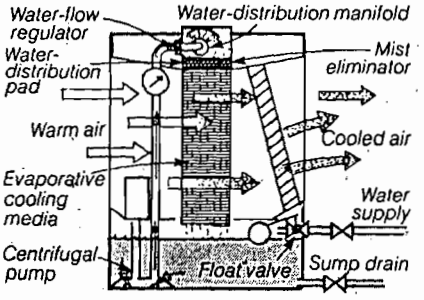
Single-shaft units

A recent advance in combined-cycle design that is likely to have important applications is combining the gas turbine, steam turbine, and generator on a single shaft (Fig 20). While this has been available for years for smaller non-reheat units with single-casing steam turbines, the concept has now been applied to reheat units with h-p, intermediate-pressure (i-p), and l-p turbine elements. Even a double-flow l-p casing can be accommodated in the single-shaft arrangement, although this application is more challenging.

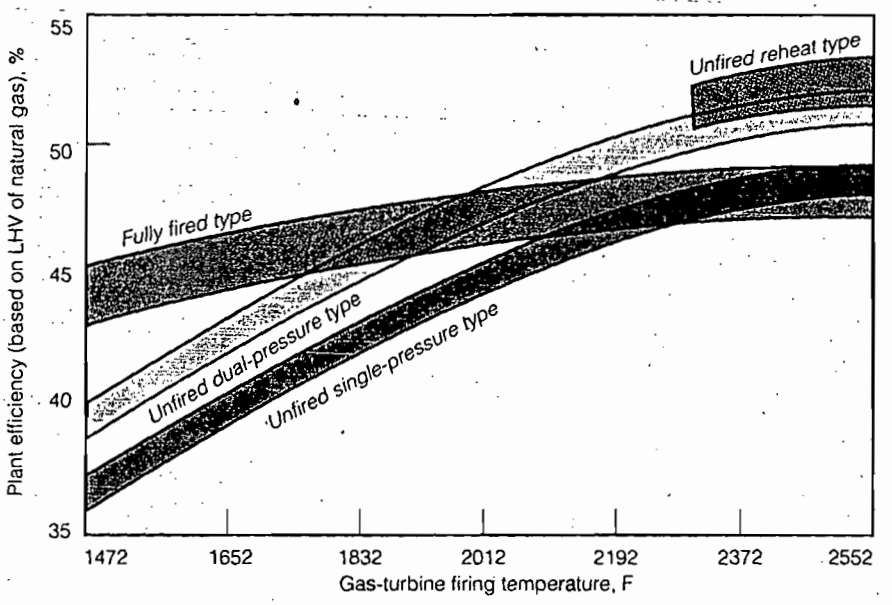
Features of one manufacturer's single-shaft design include: a single thrust bearing, all rotors connected with solid couplings, a common control system that integrates operation of the inlet steam control valve with the gas-turbine fuel and inlet guide-vane controls, and common lubricating and hydraulic control fluid systems. The generator is connected to the inlet end of the i-p turbine.

Like all condensing steam turbines, whether single- or multi-shaft, the annulus area of the exhaust must be matched with condenser pressure for a given site. Different l-p sections having varying last-stage blade lengths can be selected to optimize the steam turbine to the plant site.





17. Self-cleaning air filter (left) is guided by microprocessor control system. Evaporative cooler (above) boosts turbine output



18. Higher firing temperatures in today's gas turbines help to justify reheat steam cycles without the inefficiency of supplementary firing

Although there are trade offs in the thermodynamic performance of the single-shaft arrangement, the vendor indicates that overall performance is essentially identical to that of a multi-shaft design. The single-shaft approach does involve special considerations in the area of thermal expansion and movement and rotor flexibility.

Obvious, but worth noting, is that the single-shaft arrangement takes away the flexibility of installing a simple-cycle gas turbine first and then adding a steam turbine at a later date.

Operating modes

Combined cycles offer much in terms of operating flexibility. In the most basic sense, the gas turbine can be operated simple-cycle or in the combined mode. This allows the plant to satisfy capacity requirements in increments and also to produce electricity during steam-cycle component outages. Basic economic decisions must be made regarding the extent to which individual gas-turbine modules should share auxiliary systems.

Advanced coal processes add fuel flexibility to combined cycle

When it comes to selecting the generation technology for base-load electric-utility service and large-scale cogeneration, conventional wisdom has always penalized the combined cycle for its inability to use coal, the world's most abundant fossil fuel and the one most stable in price over the long haul. With the commercial introduction of advanced coal-conversion and combustion techniques (Fig A), this argument has been effectively removed. However, it is important to understand how coal-based processes affect the design, operation, and performance of a combined-cycle powerplant. Special emphasis must be placed on how the process can be integrated with the combined cycle to increase efficiency—that is, compared to a non-integrated plant design.

For near-term use, coal gasification (CG) and pressurized fluidized-bed combustion (PFBC) are viewed by industry experts as the most important technologies. Both are available today from a variety of suppliers in combined-cycle modules of several hundred megawatts or more. And, both are in the process of being demonstrated at capacities large enough to attract widespread industry interest. However, the scale at which these processes have been operated is not necessarily the same scale at which they are being offered commercially. And it is important to realize that these systems will not be as efficient as combined cycles firing premium fuels.

CGCC and PFBC-CC represent wholly different approaches to matching combined-cycle efficiencies with coal utilization. In the CGCC approach (Fig B), coal is first gasified, then fired in a combustion turbine. Like conventional combined cycles, around two-thirds of the total power output comes from the gas-turbine cycle, one-third from the steam cycle. The gasifier can be fully decoupled from the powerplant acting only as a fuel supplier, or the two can be integrated to whatever degree is desirable. Users contemplating the later addition of gasifiers to combined cycles need to appreciate this fact.

Depending on the gasification process, decoupling can involve substantial penalties on cycle performance. Areas that should be considered include: (1) design of the gas turbine combustor to burn coal gas without sacrificing efficiency or environmental performance, (2) need for high-temperature, high-pressure coal-gas cleanup—a technology

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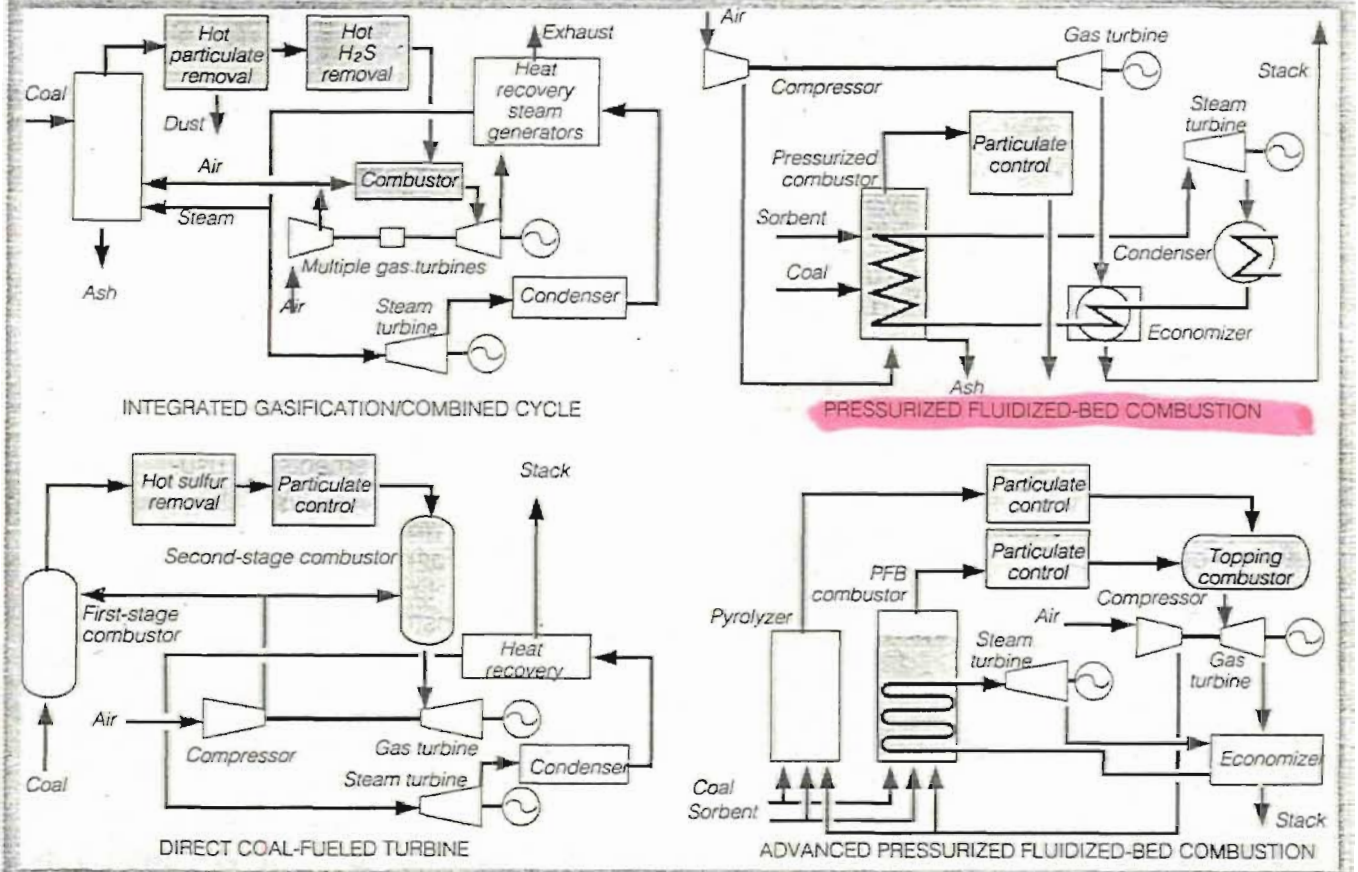

A. Advanced coal combustion, conversion techniques promise to extend the application range of combined cycles

Flexibility is extended as gas turbines, steam turbines, and HRSGs are added to the system. The largest combined cycle supported by one of today's large gas turbines is between 200 and 300 MW. On the one hand, this allows incremental addition of base-load capacity as well as leads to smaller blocks of power that might be forced or scheduled out of service. On the other, several modules are required to equal the same capacity available from a typical base-load boiler/steam turbine combination.

Several modules imply a high degree of system operating complexity. To illustrate: Consider the case of two gas turbine-generators each coupled to a supplementary-fired HRSG and a single condensing steam turbine/generator. Several of the possible operating modes are: (1) one or two gas turbines operating and bypassing both HRSGs, (2) one or two gas turbines exhausting into the HRSGs with or without supplementary firing, (3) one or two gas turbines exhausting into the HRSGs but with the steam turbine off-line, and (4) either gas turbine exhausting into its

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that lags gasification in commercial development—to take full advantage of the fuel's sensible heat, (3) use of steam recovered in the gasification section in the steam bottoming cycle, and (4) options for using compressed air from the gas turbine in the O_2-producing plant, and/or (5) returning N_2 from the O_2 plant to the gas turbine to act as a diluent—in place of steam—in the combustor to limit NO_x production and to increase mass flow through the unit.

The reason hot-gas cleanup is so important is that it allows a greater proportion of the coal's energy to be recovered in the gas-turbine cycle, which is thermodynamically more efficient than the steam cycle. Even without hot-gas cleanup, a highly integrated design is expected to achieve heat rates of around 8000 Btu/kWh assuming a gas-turbine inlet temperature of 2300F. Experts say that this can be lowered to 7500 Btu/kWh by the year 2000 as CGCC technology evolves.

In the commercial PFBC-CC approach (Fig C), the steam cycle produces about 75% of the power output. Here, the pressurized flue gas from the combustor is cleaned of particulates, alkali, and other contaminants, and then flows to the gas turbine. The gas turbine exhausts into a conventional HRSG. Steam for the bottoming cycle is also produced in tubes located in the fluidized bed.

Combustion air for the pressurized boiler is provided by the gas-turbine compressor. Pressure ratio of the gas turbine is matched to the operating pressure of the combustor. Pressurizing the system offers general process advantages of making primary equipment smaller, more amenable to shop fabrication, and easier to ship.

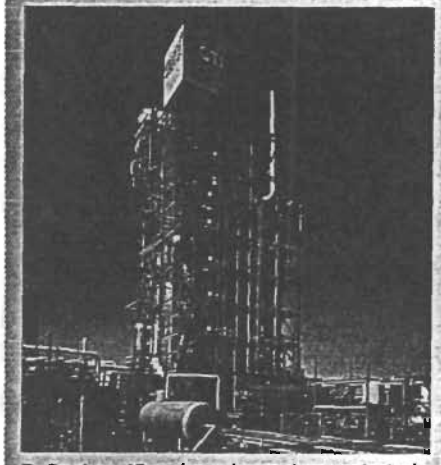
Overall cycle efficiency is limited by the operating temperature of the fluidized bed—around 1600F—which in turn limits the turbine inlet temperature. New PFBC-CC plants could achieve heat rates in the range of 8500 to 9000 Btu/kWh, assuming a subcritical steam cycle.

Several alternatives can be considered for overcoming the limitation on turbine inlet temperature. One that involves no technology extension is to employ an afterburner, or topping-combustor, scheme. If the inlet temperature is raised to 2300F, heat rates below 7000 Btu/kWh can be achieved. Another way around the temperature limitation, which involves a fundamental change to the process, is to partially gasify the coal first, burn the fuel gas in the gas turbine, and burn the char from the partial gasifier in an atmospheric or pressurized fluidized-bed boiler. This scheme has the potential to raise cycle efficiency several percentage points—over today's state-of-the-art PFBC-CC; however, a new level of coal processing is added, with attendent increases in capital cost and operational complexity.

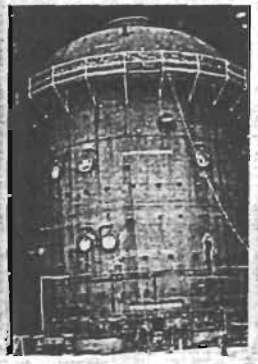
Regarding the bottoming cycle, the PFBC-CC can take advantage of steam-cycle advances. In particular, the use of the supercritical steam cycle, advanced more substantially in Europe and Japan, can add to PFBC-CC efficiency.

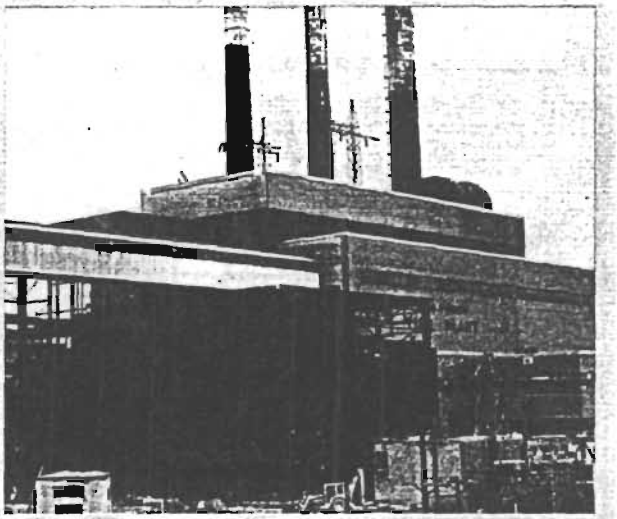
Air-cooled tubes can be used in the pressurized combustor instead of steam-cooled ones. This high-temperature air is then combined with the clean flue gas from the combustor and feeds the gas turbine. Among other things, this allows a greater output from the higher-efficiency gas-turbine cycle than from the steam cycle. Steam is generated only by the gas-turbine exhaust. Note that such an indirect-fired combined cycle can be accomplished with an atmospheric fluidized-bed air heater, too, although materials for the air heater require further development and demonstration.

Another technology being developed for making coal compatible with combined cycles is the slagging combustor, essentially a very small gasifier that can be thought of as an external combustor for the gas turbine. Development of the slagging combustor, though close to being demonstrated commercially for conventional boilers, is several years behind the above-mentioned gasification and fluidized-bed technologies for combined-cycle application.



B. Coal gasifiers have been demonstrated at several sites in the US





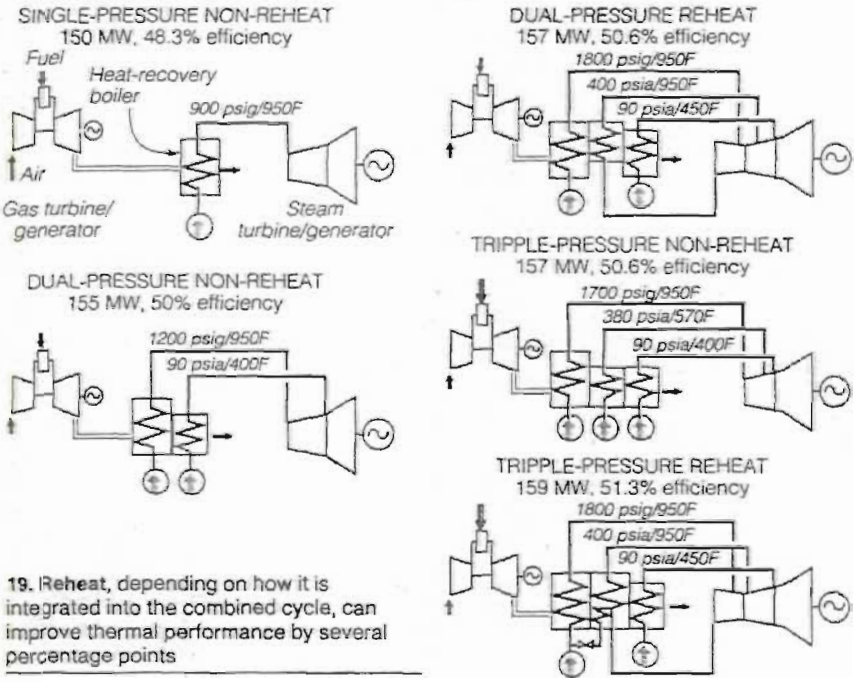
C. Pressurized fluidized-bed combustor (above) is ready for demonstration at site in Ohio (right). PFBC-CC plants also have been built in Europe

HRSG, with or without the steam turbine, while the other HRSG is bypassed.

The control system must coordinate these various operating modes. Today's distributed control systems make coordinated control a lot easier than it was in the past. In general, even large combined-cycle plants can be operated by one person in a central control room, although startup may require another person at a local control site or roving the equipment.

Each individual combined cycle also can be turned down for more flexibility, although unit performance suffers at part load—more significantly at less than 50% of gas-turbine output. One aeroderivative machine is described as performing at between 115 and 120% of its rated-capacity heat rate when operated at 50% of rated load.

Deterioration in part-load performance can be held in check with multiple modules because both can share load equally, minimizing turndown of individual gas turbines. Also, use of variable-inlet guide



19. Reheat, depending on how it is integrated into the combined cycle, can improve thermal performance by several percentage points

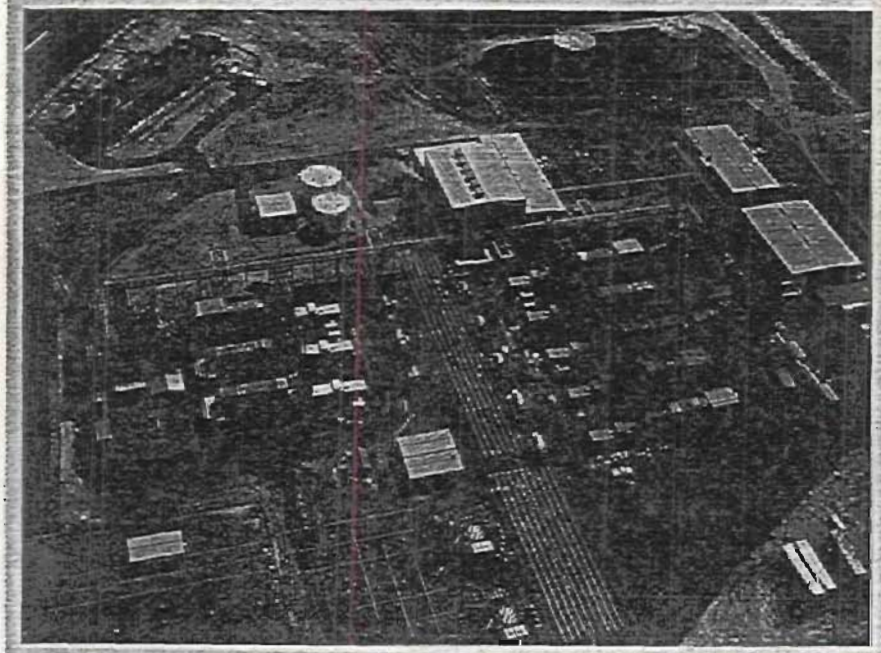
Repowering/retrofit schemes reveal design ingenuity

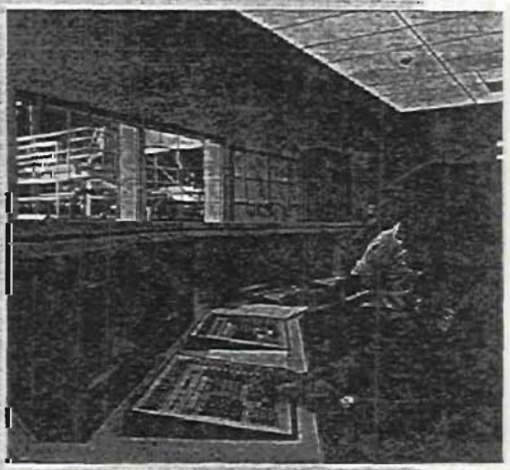
A major market segment for combined cycles involves the retrofit/repowering of existing equipment to improve efficiency, add capacity, and/or meet new environmental regulations. Because retrofits are so site-specific, the examples described here are intended only to represent the range of applications that have been demonstrated over the last few years.

Perhaps the most obvious retrofit is the addition of an HRSG and steam turbine to one or more existing gas turbines (Figs A, B). Many sites have converted peaking gas turbines this way. Basic non-reheat, single-flow steam turbines with two-drum HRSGs are logical equipment selections. SCR and/or steam/water injection into the combustor must be considered for NO_x control. Upgrades to the gas turbine—such as the addition of modulating inlet guide vanes, new hot-gas-path components, and digital controls—and addition of feedwater and cooling water systems are other aspects worthy of consideration.

Another approach: Steam turbines can be repowered with one or more gas turbine/HRSG modules when the existing boiler is no longer economical to operate. This scheme gets most attention as a way to meet new environmental restrictions, especially on old, relatively small fossil-fired steam units while avoiding the installation of emissions control equipment that may re-

(continues on p. 124)





A. Combined cycle boosts efficiency (left), controls simplify operation (below)

vanes on the gas-turbine compressor helps to maintain efficiency at part load. They allow partial control over steam temperature but at the expense of gas-turbine electric output.

Part-load operation also impacts emissions. CO emissions increase as load decreases and as steam/water is injected to control NO_x. Depending on the site permit, part-load operation may be restricted.

Very rapid start/stop capability is also characteristic of combined cycles, more so of the gas-turbine portion of the plant. Although start scenarios will vary substantially depending on the size, type of design, number of units, and other factors, here's a cold-start example with a multi-shaft system having two gas turbine/HRSG trains and one steam turbine:

Both gas turbines are started with HRSG bypass dampers fully open. One gas turbine is kept at 50% load with its adjustable guide vanes wide open to produce low exhaust temperatures. After eight minutes, the damper to the first HRSG is modulated to produce low main-steam temperatures for warmup of the steam cycle. Initially, steam bypasses the turbine. After 35 minutes, the proper steam conditions are established for loading and synchronizing of the steam turbine/generator. Within 75 minutes, the bypass of the first HRSG is fully closed and the half-loaded gas turbine is brought to rated load. The second HRSG bypass dampers are modulated to admit steam and two hours into the startup sequence, both HRSGs are at rated conditions. After about five minutes more, the second HRSG bypass is fully closed and all steam is directed to the steam turbine. Thus, full load is achieved in two and a half hours.

Reliable on/off cycling is dependent on auxiliaries—such as the starting-motor system. A failure to start leads to a second attempt. Because starting raises motor temperature substantially, you can avoid delays between starts by specifying a motor making at least two successive starts without cooling delays.

Another consideration for on/off cycling involves the HRSGs. They commonly have small steam drums and level can be difficult to control at the low flows common during startup. A steam bypass to the condenser is worth considering to improve stability during startup.

How combined cycles meet the demands for process steam in cogeneration applications is also worth reviewing. Here, the combined cycle may have to fluctuate between operating in a maximum power or maximum steam mode. To accomplish this, some of the operating flexibility may be compromised.

Consider a system with multiple gas turbines and single automatic-extraction steam turbine. If the steam turbine is out of service, one or more gas turbines may also be shut down to avoid producing too much process steam. An alternative is to operate the gas turbines at part load—sacrificing efficiency—so that full process steam can be provided quickly in case of a gas-turbine outage or increased demand.

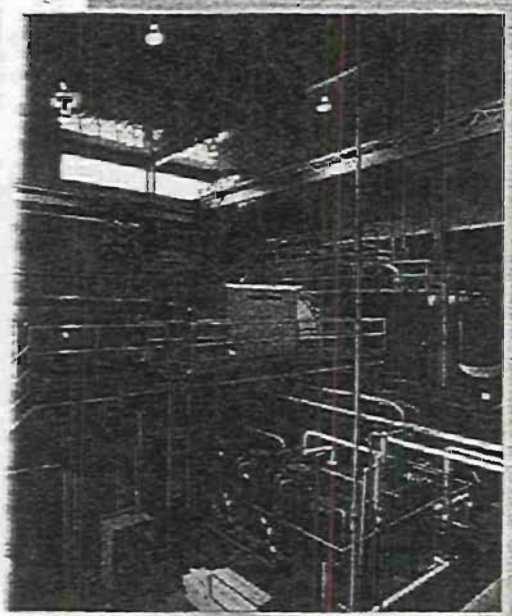
(continued from p 122)

duce output and/or efficiency. Depending on operating conditions, steam turbines may be more amenable to life extension than their accompanying boilers.

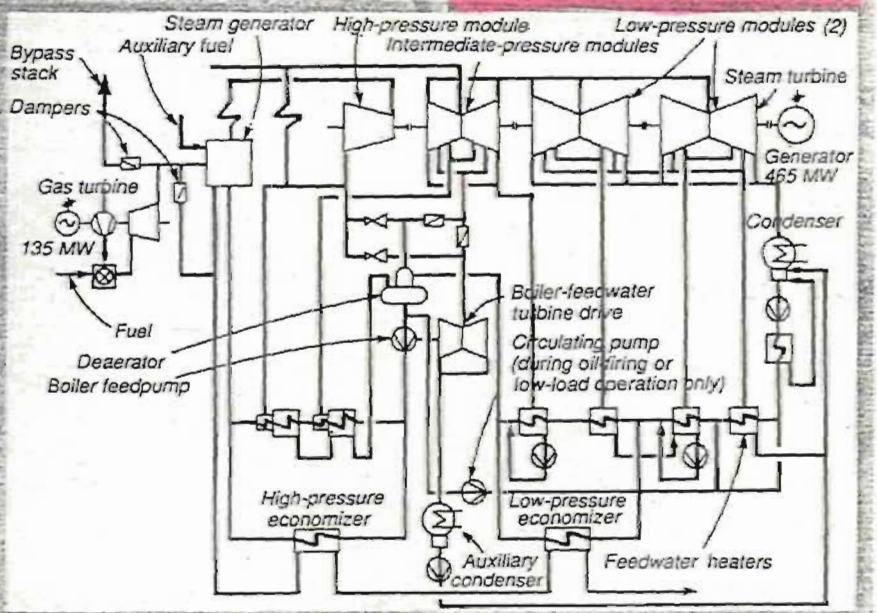
Similarly, the performance of existing fossil-fired units often can be improved by replacing the forced-draft fan with a gas turbine and directing its exhaust to the boiler as high-temperature combustion air.

This so-called turbocharged boiler (Fig C) concept has been implemented successfully at several locations in Europe and in the US. Areas of attention include matching the exhaust flow of the gas turbine to the boiler, replacing the air heater with feedwater-heater economizers, and resizing burners to handle different flow rates. The operating flexibility of the turbocharged-boiler cycle, similar to a conventional combined cycle, can be envisioned by considering the existing boiler a fired heat-recovery unit.

A unique repowering concept is the conversion of a nuclear-designed steam turbine to operate as a combined cycle. The first conversion of this type was conceived as a way to salvage a substantial investment in a nuclear plant that otherwise would have been abandoned. As one might suspect, substantial changes are required of the steam turbine, such as removal of feedwater-heater extractions, eliminating reheat, accommodation of higher steam temperatures and pressures, and addition of larger extractions if used for cogeneration. This conversion required a new h-p/i-p element.



B. Adding steam cycle converts peaking gas turbine for base-load operation



C. **Gas-turbine exhaust** acts as a forced-draft fan for an existing fossil-fired boiler in this repowering scheme applied in Europe

File

Florida Department of Environmental Regulation

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

Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary

April 18, 1990

Mr. Harry Schindehette
Director of Utilities
Ft. Pierce Utilities Authority
P. O. Box 3191
Ft. Pierce, Florida 33440

Dear Mr. Schindehette:

Re: 31.6 MW Combined Cycle Gas Turbine

As per Ms. Stephanie Brooks' request, your permit AC 56-141460 will be modified as follows:

Specific Condition No. 1

FROM:

1. The maximum emission rates for the 31.6 MW combined cycle gas turbine during natural gas firing shall not exceed the limits required by 40 CFR 60, Subpart GG, Standards of Performance for Stationary Gas Turbines, as follows:

Nitrogen oxides NSPS Standards = $0.0075 \left(\frac{14.4}{Y}\right) + F$

or

= 84 ppm NOx

and

Sulfur dioxide NSPS Standard = 0.015% by volume at 15% oxygen on a dry basis

Visible Emission Not to exceed 15% opacity

Fuel Oil No. 2 Not to exceed 0.5% sulfur content by weight

TO:

1. The maximum emission rates for the 31.6 MW combined cycle gas turbine during natural gas firing shall not exceed the limits required by 40 CFR 60, Subpart GG, Standards of Performance for Stationary Gas Turbines, as follows:

Nitrogen oxides NSPS Standards = $0.0075 \left(\frac{14.4}{Y}\right) + F$

or

= 84 ppm NOx

and

Sulfur dioxide NSPS Standard = 0.015% by volume at 15% oxygen on a dry basis

Visible Emission — Not to exceed 15% opacity

Fuel Oil No. 2 — Not to exceed 0.5% sulfur content by weight

Carbon Monoxide — Not to exceed 32.85 lbs/hr and 110.4 tons/yr

Specific Condition No. 8

FROM:

The operating permits for this facility shall be modified as follows:

	Unit 6		Unit 7		Unit 8	
Parameter	lbs/hr	ton/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
Part.	0.04	0.0024	0.568	0.382	0.945	3.017
SOx	12.38	0.0743	0.1199	0.0806	0.1917	0.617
NOx	1.31	0.007854	104.35	70.126	173.20	552.86
VOC	0.0236	0.000142	0.266	0.179	0.441	1.407
CO	0.15	0.0009	7.589	5.100	12.59	40.20
hrs/yr	12		1344		6384	

TO:

The operating permits emission limits for this facility's existing boilers shall not exceed the following rates:

	Unit 6		Unit 7		Unit 8	
Parameter	lbs/hr	ton/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
Part.	0.4	0.0024	0.568	0.382	0.945	3.017
SOx	12.38	0.0743	0.1199	0.0806	0.1917	0.617
NOx	1.31	0.007854	104.35	70.126	173.20	552.86
VOC	0.0236	0.000142	0.266	0.179	0.441	1.407
CO	0.15	0.0009	7.589	5.100	12.59	40.20
hrs/yr	12		1344		6384	

The operating permits emission limits for these boilers (units No. 6, 7, and 8) shall be modified as stated above.

Attachment to be Incorporated

Ms. Stephanie Brooks' request

This letter must be attached to the above mentioned permit and shall become a part of the permit.

Sincerely,

STEVE SMALLWOOD, P.E.
Director
Division of Air Resources
Management

SS/TH/plm

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

For Routing To Other Than The Addressee

To: _____ Location: _____
To: _____ Location: _____
To: _____ Location: _____
From: _____ Date: _____

Interoffice Memorandum

TO: Stephanie Brooks

FROM: Clair Fancy

DATE: April 23, 1990

SUBJ: 31.6 MW Combined Cycle Gas Turbine
AC 56-141460

In response to your telephone conversation with Mr. Jim Pennington on April 2, 1990, we are modifying permit AC 56-141460.

An emission limit will be included as a specific condition for the CO pollutant. The Bureau will modify specific condition No. 1 by adding the following sentence:

Carbon monoxide emissions shall not exceed 32.85 lbs/hr and 110.4 tons/yr when burning natural gas.

This limit for CO was the basis for the rule applicability and it is the same emission limit that the company proposed.

In addition, you also requested we clarify condition No. 8. This condition calls for modification of the permit for units No. 6, 7, and 8. You indicated this condition does not give emission limits.

The Bureau's intent was to make emissions from boilers No. 6, 7, and 8 federally enforceable since the reduction of emissions from these boilers (net emission change) were credited to the combined cycle gas turbine (unit No. 9) project. The new emission limits are as stated in specific condition No. 8 (units are lbs/hr, tons/yr and hrs/yr) of permit AC 56-141460.

It should also be noted that particulate emissions from unit No. 6 need to be changed from 0.04 lbs/hr to 0.4 lbs/hr (this appears to be a typographical error).

The existing boilers' compliance schedule, specific conditions, and operating limitations (excepting the new emission limits) should remain the same as stated in the current operating permits.

CHF/TH/plm

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

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

Interoffice Memorandum

TO: Steve Smallwood

FROM: Clair Fancy

DATE: April 18, 1990

SUBJ: Air Construction Permit Amendment
AC 56-141460, Ft. Pierce Utilities Authority

Attached for your signature is an amendment prepared by the Bureau of Air Regulation for the above referenced permit to construct a 31.6 MW combined cycle gas turbine.

I recommend your approval.

CF/TH/pa

Attachment

P 938 762 852

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to Harry Schindehette	
Street and No. Ft Pierce Utilities	
P.O. State and ZIP Code P.O. Box 3191 - Ft Pierce Fla.	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date 4-26-90 AC56-141460	

PS Form 3800, June 1985

BEST AVAILABLE COPY

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4. Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.

1. ☐ Show to whom delivered, date, and addressee's address. *(Extra charge)*
2. ☐ Restricted Delivery *(Extra charge)*

3. Article Addressed to: Harry Schindehette Director Ft Pierce Utilities Authority P.O. Box 3191 Ft Pierce, Fl 33450

4. Article Number P 938 762 852

Type of Service:
☐ Registered ☐ Insured
☐ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Address
X

6. Signature — Agent
X

7. Date of Delivery MAY - 1 1990

8. Addressee's Address *(ONLY if requested and fee paid)*

PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865 DOMESTIC RETURN RECEIPT

Florida Department of Environmental Regulation

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

Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary

August 31, 1989

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Frederick A. Brock
Supt. of Power Resources
Ft. Pierce Utilities Authority
P. O. Box 1298 (34954)
Ft. Pierce, Florida 33448

Dear Mr. Brock:

Re: Ft. Pierce Utility Authority - File No. AC 56-141460

The Department is in receipt of your letter dated August 8, 1989, on behalf of Ft. Pierce Utilities Authority, requesting to change the expiration date of permit No. AC 56-141460.

The Department has considered your request and determined that the expiration date of the above mentioned permit will be changed as per your letter of August 8, 1989.

From: December 1, 1989
To: June 1, 1990

Attachments to be Incorporated:

Letter of August 8, 1989.

Sincerely,

Dale Twachtmann
Secretary

DT/kt

attachment

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

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

Interoffice Memorandum

Please call Patty Adams @ 488-1344 when signed. Thanks,

TO: Dale Twachtmann

FROM: Steve Smallwood

DATE: August 30, 1989

SUBJ: Extension of Expiration Date
Ft. Pierce Utilities Authority
AC 56-141460

Attached for your approval and signature is a letter that will extend the expiration date of the above referenced air construction permit.

I recommend that the extension be approved.

SS/TH/t

P 938 762 675

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to Mr. Frederick A. Brock, Ft. Pierce Utilites	
Street and No. P. O. Box 1298	
P.O., State and ZIP Code Ft. Pierce, FL 33448	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date Permit: AC 56-141460 Mailed: 9-13-89	

PS Form 3800, June 1985

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.
Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.
1. ☐ Show to whom delivered, date, and addressee's address. 2. ☐ Restricted Delivery *(Extra charge)*

3. Article Addressed to:
Mr. Frederick A. Brock
Supt. of Power Resources
Ft. Pierce Utilities Authority
P. O. Box 1298 (34954)
Ft. Pierce, FL 33448

4. Article Number
P 938 762 675

Type of Service:
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Address
X

8. Addressee's Address *(ONLY if requested and fee paid)*

6. Signature — Agent
X

7. Date of Delivery

SEP 1989

PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865 DOMESTIC RETURN RECEIPT

H.D. KING ELECTRIC GENERATING PLANT
311 North Indian River Drive (34950)
Post Office Box 1298 (34954)
Fort Pierce, Florida
(407) 464-5792

August 8, 1989

C. H. Fancy, P.E.
Deputy Chief
Division of Air Resources Management
Dept. of Environmental Regulation
Twin Towers Office Bldg.
2600 Blairstone Road
Tallahassee, FL 32399-2400

Permit Number: AC 56-141460
Expiration Date: December 1, 1989
County: St. Lucie
Latitude/Longitude: 27° 27' 00"N
80° 19' 26"W
Project: 31.6 MW Combined Cycle
Gas Turbine

Dear Mr. Fancy:

In regard to the above mentioned Permit, we are respectfully requesting an extension of the Construction Permit until June 1, 1990.

We will be running Environmental and Acceptance Tests next month. Providing we pass these tests and upon receipt of the reports, we would then file for an Operating Permit. If we should fail either the Environmental or Acceptance Test, we would need time to correct the problem and then retest and file for an Operating Permit. We feel we can do this prior to June 1, 1990.

Thank you for your consideration of this request.

Yours truly,

Frederick A. Brock

Frederick A. Brock, Supt.
Power Resources

FAB:m

cc: Harry Schindehette, Director of Utilities
Victor Garrison, Director of Electric/Gas Systems
Harry Lamb, Asst. Supt., Power Resources
Geo. Whitmer, Hunter/ESE
James Massey, Hunter/ESE
Tom Petty, Metric
Tom Tittle, DER-West Palm Bch.

copied: J. Nixon
CHF/BT

H. D. KING ELECTRIC GENERATING PLANT
Post Office Box 1298
Fort Pierce, Florida 34954

WEST PALM BEACH, FL 334
PM
9 AUG
1989

C. H. Fancy, P.E.
Deputy Chief
Division of Air Resources Management
Dept. of Environmental Regulation
Twin Towers Office Bldg.
2600 Blairstone Road
Tallahassee, FL 32399-2400

Florida Department of Environmental Regulation

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

Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary

October 31, 1988

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. George L. Whitmer
Environmental Compliance Manager
Environmental Science and Engineering, Inc.
Post Office Box 4943
Jacksonville, Florida 32201

Dear Mr. Whitmer:

Re: Ft. Pierce Utility Authority - File No. AC 56-141460

The Department is in receipt of your letter dated October 6, 1988, on behalf of Ft. Pierce Utilities Authority, requesting changes in the specific conditions of permit No. AC 56-141460.

The Department has considered your request and determined that Specific Condition No. 3 regarding ASTM methods and No. 5 regarding steam to fuel ratio will be modified as per your letter of October 6, 1988.

The formula which includes the factor in Specific Condition No. 5 is an error. The correct formula must be used in determining the compliance status of this source. Please see the attached letter.

Please replace pages 6 and 7 of permit No. AC 56-141460 with the attached new pages.

Attachments to be Incorporated:

Mr. George L. Whitmer's letter of October 6, 1988.
Mr. Eric A. Noble's letter of April 28, 1983.

PERMITTEE:
Ft. Pierce Utilities Authority

Permit Number: AC 56-141460
Expiration Date: December 1, 1989

SPECIFIC CONDITIONS:

Nitrogen oxides NSPS Standards = $0.0075 \left(\frac{14.4}{Y}\right) + F$

or

= 84 ppm NOx

and

Sulfur dioxide NSPS Standard = 0.015% by volume at 15% oxygen on a dry basis

Visible Emission	Not to exceed 15% opacity
Fuel oil No. 2	Not to exceed 0.5% sulfur content by weight

2. The combined cycle gas turbine shall be allowed to operate continuously (8736 hours per year). The gas turbine shall operate on natural gas at all times, except that No. 2 fuel oil with a maximum sulfur content of 0.5 percent by weight shall be allowed to be burned only as a emergency back-up fuel.

3. Before this construction permit expires, the 31.6 MW combined cycle gas turbine will be tested for sulfur dioxide, visible emissions, carbon monoxide and nitrogen oxides. Except as provided under 40 CFR 60.8(b), the performance tests shall be in accordance with the provisions of the following reference methods in Appendix A of 40 CFR 60.

a. Method 1. Sample and Velocity Traverses

b. Method 2. Volumetric Flow Rate

c. Method 3. Gas Analysis

d. Compliance with the opacity limitation will be determined by reference Method 9, Visual Determination of Opacity of Emission from Stationary Sources.

e. Compliance with the sulfur dioxide emission limits will be determined by reference Method 20 or by calculations based on fuel analysis (ASTM D1552) for sulfur content.

f. Compliance with the carbon monoxide emission limit will be determined by Method 10, Determination of Carbon Monoxide Emissions from Stationary Sources.

PERMITTEE:
Ft. Pierce Utilities Authority

Permit Number: AC 56-141460
Expiration Date: December 1, 1989

SPECIFIC CONDITIONS:

g. Compliance with the allowable emissions limits for nitrogen oxides shall be conducted using EPA reference Method 20 subpart GG Section 60.335.

During performance tests to determine compliance with the proposed standard, measured NOx emission at 15 percent oxygen will be adjusted to ISO ambient atmospheric conditions by the following correction factor:

$$NOx = (NOx\ obs)\ \left(\frac{P_{ref}}{P_{obs}}\right)^{0.5}\ e^{19(H_{obs} - 0.00633)\left(\frac{288°K}{T_{AMB}}\right)}\ 1.53$$

where:

NOx = Emissions of NOx at 15% oxygen and ISO standard ambient conditions.

NOx obs = Measured NOx emission at 15% oxygen, ppmv.

P_{ref} = Reference combustor inlet absolute pressure at 101.3 kilopascals ambient pressure.

P_{bs} = Measured combustor inlet absolute pressure at test ambient pressure.

H_{obs} = Specific humidity of ambient air at test.

e = Transcendental constant (2.718)

T_{AMB} = Temperature of ambient air at test.

4. Test results will be the average of 3 valid runs. The Department's District office in West Palm Beach will be notified 15 days in advance of the compliance test. Tests shall be conducted operating between 90 and 100% of permitted capacity while using natural gas fuel.

5. A continuous monitoring system shall be installed to monitor and record the fuel consumption and the ratio of steam to fuel being fired in the turbine.

This letter must be attached to the above mentioned permit and shall become a part of the permit.

Sincerely,

Dale Twachtmann
Secretary

DT/ks

cc: S. Brooks

ESE Jacksonville, FL

AN RSH COMPANY

ENVIRONMENTAL SCIENCE
AND ENGINEERING, INC.

October 6, 1988
87031-0000

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

Subject: Permit No. AC56-141460
Combined Cycle Gas Turbine
Fort Pierce Utilities Authority
Fort Pierce, Florida

Dear Mr. Fancy:

The enclosed letter was received from General Electric Company, vendor supplying the gas turbine for Fort Pierce Utilities Authority (FPUA). They bring three Specific Conditions of the subject permit to our attention. Two of the items are obvious typographical errors and should be corrected. These are:

- Specific Condition No. 3.e - "ASTM 1552" should read "ASTM D1552".
- Specific Condition No. 5 - "ratio of water to fuel" should read "ratio of steam to fuel".

The other item listed is not as readily apparent. General Electric contends that the formula listed in 40 CFR 60.335 for adjusting NO_x emission levels measured by Reference Method 20 to ISO standard day conditions is in error in the Code of Federal Regulations (CFR) and, therefore, is in error in Specific Condition No. 3.g. in the permit. It is General Electric's contention that the formula as printed:

$$NO_x = (NO_{x_{obs}}) \left(\frac{P_{ref}}{P_{obs}}\right) 0.5\, e^{19(H_{obs}-0.00633)} \left(\frac{T_{AMB}}{288°K}\right)^{1.53}$$

should read:

$$NO_x = (NO_{x_{obs}}) \left(\frac{P_{ref}}{P_{obs}}\right) 0.5\, e^{19(H_{obs}-0.00633)} \left(\frac{288°K}{T_{AMB}}\right)^{1.53}$$

General Electric refers to this as a "long standing error" in the CFR. In discussions with FDER Air Quality personnel, I was told they were not aware of this error and unless the CFR were corrected, FDER would continue to use the formula as it is presently printed.

We would appreciate your office looking into this matter and determining whether this formula is correct as written or whether it should be corrected as stated above. It is realized that either way the formula is written, the change in the resulting figure will be very slight and possibly insignificant. We would also appreciate the correction of the two typographical errors in Specific Conditions Number 3.e and 5.

Your cooperation in this matter is appreciated. Please feel free to call me if you need further information or have any questions.

Very truly yours,

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
A HUNTER COMPANY

George L. Whitmer

George L. Whitmer
Environmental Compliance Manager
Industrial Environmental Division

GLW/cdb

Enclosure
cc: Bob Gambon - RS&H
Harry Schindehette - FPUA
L.E. Tandy - Metric Constructors

cc'd: Teresa Huron
D. Baldman, SE Dist.
CHF/ET

FILE COPY

GE Turbines

RS&H DWG NUMBER

General Contracts Management
General Electric Company
1 River Road, Schenectady, NY 12345

REYNOLDS, SMITH & HILLS
ARCHITECTS-ENGINEERS-PLANNERS
JACKSONVILLE, FLORIDA

DEPARTMENTAL CHECK

DEPT	REVIEWER		
ARCH			
STRUC			
MECH			
ELEC			
SITE			
PLAN			

FINAL DISPOSITION

PROJ MGR			

7 September 1988

Subject: Metric Constructors
Ft. Pierce, Fla.
GE Reqn. 340-000143
PO 86-508-100
Emissions Permit

Mr. LE Tandy
Construction Manager
Metric Constructors
Two South Executive Park
6135 Park Road
Charlotte, NC 28210-3294

In the process of reviewing the EPA Permit for the emissions test criteria, the Engineering Dept. noticed some problems. You may wish to bring these to RS&H's attention to have the permit corrected.

1. Under Specific Condition 3.e., GE is interpreting "ASTM 1552" as meaning "ASTM D1552".

2. In Specific Condition 3.g., the formula has one term inverted just as in the Federal Regulations. This long standing error has

$$\left(\frac{T_{AMB}}{288^{\circ}K}\right)^{1.53} \quad \text{and it should be} \quad \left(\frac{288^{\circ}K}{T_{AMB}}\right)^{1.53}$$

3. In Specific Condition 5, "ratio of water to fuel" should read "ratio of steam to fuel".

VE Hoeppner
Contract Manager

cc: SF Ginter #36-605
BL Bailey #23-384B
RW Keith #53-401
J. Lowe Charlotte

SEP 1988
METRIC CONSTRUCTORS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

APR 28 1983

DER
MAY 02 1983
BAQM

Ms. Teresa M. Heron
Department of Environmental Regulation
State of Florida
2600 Blair Stone Road
Tallahassee, Florida 32301

Dear Ms. Heron:

As you requested in our phone conversation of April 26, 1983, I am sending you this letter to confirm the correct ISO adjustment equation for the new source performance standard for stationary gas turbines. The equation as it appears in the Federal Register of September 10, 1979, (44 FR 52800) is incorrect. The correct equation is as follows:

$$NO_x = (NO_{x_{OBS}}) \left(\frac{Pref.}{P_{OBS}}\right)^{0.5} e^{19(H_{OBS} - 0.00633)} \left(\frac{288°K}{Tamb.}\right)^{1.53}$$

Also, as we discussed, the allowance for fuel NO_x in the standard must be based on the amount of bound nitrogen actually present in the fuel being burned in the gas turbine. There is no bound nitrogen in natural gas (the primary fuel for the Kissimee Utility gas turbine) and only a negligible amount in most #2 distillate (the emergency fuel). Thus, for most (if not all) of this gas turbine operating time, a fuel NO_x allowance will be inappropriate and allowable NO_x emissions will be 79 ppmv. However, the permit does require the fuel nitrogen to be measured (p.4 of 5), so the allowance for it can be applied when appropriate. It should be noted that the plant must file a report whenever the plant burns fuel with a nitrogen level giving a higher fuel NO_x allowance than that provided during compliance tests.

You commented that the proposed standards allowed only the gas turbine heat rate to be used in determining allowable NO_x emissions, but that this limitation does not appear in the promulgated standards (Part 60, Subpart GG). The limitation is defined in Part 60, Subpart GG as follows:

1. The standard is defined by the formula in 60.332(a)(1), when y = manufacturer heat rate ... for the affected facility.

2. The affected facility is, per 60.330, all stationary gas turbines.

3. And, in 30.331(a) "Stationary gas turbine" means any ... gas turbine portion of a combined cycle steam/electric generating system .... portability.

If you have any further questions, please contact me at (919) 541-5596, or call Doug Bell at (919) 541-5578.

Sincerely yours,

Eric A. Noble
Industrial Studies Branch
Emission Standards and
Engineering Division

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

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

Interoffice Memorandum

TO: Dale Twachtmann

FROM: Steve Smallwood for

SUBJ: Approval of Amendments to Construction Permit: AC 56-141460, Ft. Pierce Utilities Authority

DATE: October 31, 1988

Attached for your approval and signature is a letter authorizing changes in the specific conditions of the above referenced air construction permit. There are no controversies associated with these changes.

I recommend your approval and signature.

SS/TH/s

attachment

P 274 007 494

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to Mr. George L. Whitmer, ESE	
Street and No. P.O. Box 4943	
P.O., State and ZIP Code Jacksonville, FL 32201	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date Permit: AC 56-141460 Mailed: 11-4-88	

PS Form 3800, June 1985 ★ U.S.G.P.O. 1985-480-794

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.

Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.

1. ☐ Show to whom delivered, date, and addressee's address. 2. ☐ Restricted Delivery
†*(Extra charge)*† †*(Extra charge)*†

3. Article Addressed to:
Mr. George L. Whitmer
Environmental Compliance Manager
Environmental Science & Eng.
P. O. Box 4943
Jacksonville, FL 32201

4. Article Number
P 274 007 494

Type of Service:
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X

6. Signature – Agent
X

7. Date of Delivery
11-7-88

8. Addressee's Address *(ONLY if requested and fee paid)*

PS Form 3811, Mar. 1987 ★ U.S.G.P.O. 1987-178-268 DOMESTIC RETURN RECEIPT

PM
10-6-88
Jacksonville, FL

file copy

ESE
AN RSH COMPANY
ENVIRONMENTAL SCIENCE
AND ENGINEERING, INC.

October 6, 1988
87031-0000

RECEIVED
OCT 7 1988
DER-BAQM

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

Subject: Permit No. AC56-141460
Combined Cycle Gas Turbine
Fort Pierce Utilities Authority
Fort Pierce, Florida

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ESE®

AN R&H COMPANY

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.

6737 Southpoint Drive, South
Post Office Box 4943
Jacksonville, Florida 32201

JACKSONVILLE FLA OCT - 6'89

U.S POSTAGE

0.25

C.H. Fancy, P.E., Deputy Chief
Bureau of Air Quality Management
Florida Dept. of Environmental Regulation
Twin Towers Office Bldg.
2600 Blair Stone Rd.
Tallahassee, FL 32399-2400

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ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
A HUNTER COMPANY

George L. Whitmer
Environmental Compliance Manager
Industrial Environmental Division

GLW/cdb

Enclosure
cc: Bob Gambon - RS&H
Harry Schindehette - FPUA
L.E. Tandy - Metric Constructors

copied: Teresa Heron
D. Goldman, SE Dist.
CHF/BT

GE Turbines

7 September 1988

Subject: Metric Constructors
Ft. Pierce, Fla.
GE Reqn. 340-000143
PO 86-508-100
Emissions Permit

Mr. LE Tandy
Construction Manager
Metric Constructors
Two South Executive Park
6135 Park Road
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and it should be

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VE Hoeppner
Contract Manager

cc: SF Ginter #36-605
BL Bailey #23-384B
RW Keith #53-401
J. Lowe Charlotte

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
NOTICE OF PERMIT

Mr. Harry Schindehette, Director
Fort Pierce Utilities Authority
Post Office Box 3191
Fort Pierce, Florida 33448

March 28, 1988

Enclosed is permit No. AC 56-141460, for Fort Pierce Utilities Authority to install/construct a 31.6 MW combined cycle gas turbine (a 23.4 MW combustion turbine generator, steam generator and a 8.2 MW condensing turbine generator) to be located in Fort Pierce, St. Lucie County, Florida. This permit is issued pursuant to Section 403, Florida Statutes.

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

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality Management

Copy furnished to:

Stephanie Brooks, SE Dist.
Lloyd H. Stebbins, P.E.

Final Determination

Ft. Pierce Utilities Authority
Ft. Pierce, St. Lucie County, Florida

Permit No. AC 56-141460

31.6 MW Combined Cycle Gas Turbine

Department of Environmental Regulation
Bureau of Air Quality Management
Central Air Permitting

March 22, 1988

Final Determination

Ft. Pierce Utilities Authority's application for a permit to install/construct a 31.6 MW combined cycle turbine at its facility in Ft. Pierce, St. Lucie County, Florida, has been reviewed by the Bureau of Air Quality Management.

Public Notice of the Department's Intent to Issue the construction permit was published in the News Tribune on February 18, 1988.

Copies of the Technical Evaluation and Preliminary Determination have been available for public inspection at the Department's district office in West Palm Beach and the Bureau of Air Quality Management office in Tallahassee.

Comments on several specific conditions were received on March 17, 1988, from Ms. Stephanie Brooks, DER Engineer, West Palm Beach office.

The Bureau has listed comments and made appropriate changes to the specific conditions where necessary.

Specific Condition No. 1:

The variable Y is not defined in the NOx standard. Is the SO_2 standard of 0.015% by volume equivalent to 0.8% by weight? The sulfur content for fuel oil not to exceed 0.5% by weight?

Response:

The variable Y is defined on Subpart GG, Standards of Performance for Stationary Gas Turbines 40 CFR 60.332(a)(1). The SO_2 standard of 0.015% by volume at 15% percent oxygen on a dry basis refers to the SO_2 concentration of gases being discharged into the atmosphere. The SO_2 standard of 0.8 percent sulfur by weight is the sulfur content in the fuel. A standard of 0.015% SO_2 by volume in air is substantially equivalent to 0.8% SO_2 by weight in the fuel. Specific Condition No. 1 limiting the fuel oil to 0.5 percent sulfur by weight is more stringent than the NSPS.

The applicant's proposal of No. 2 distillate fuel oil with a sulfur content of 0.355% by weight will meet the NSPS. This condition will not be changed.

Specific Condition No. 2:

Define emergency backup fuel.

Response:

Emergency fuel, referred to as emergency backup fuel in the permit, is defined in Subpart GG, Standards of Performance for Stationary Gas Turbines, 40 CFR 60.331.

Specific Condition No. 3:

Tests required on each fuel? On worst case fuel? On the most used fuel?

d. EPA Method 9
e. EPA Method 20
f. EPA Method 10

Response:

Tests are required on natural gas only (see condition No. 2). Fuel oil is to be used only as emergency backup when natural gas is not available.

Specific Condition No. 4:

Where is Specific Condition No. 4? Are you allowing the unit to be operated over capacity?

Response:

This condition was renumbered and reworded in the final permit as follows:

From:

Test results will be the average of 3 valid runs. The Department will be notified 15 days in advance of the compliance test. The test will be conducted at permitted capacity $\pm$ 10%.

To:

Test results will be the average of 3 valid runs. The Department's District office in West Palm Beach will be notified 15 days in advance of the compliance test. Tests shall be conducted operating between 90 and 100% of permitted capacity while using natural gas fuel.

Specific Condition No. 5:

What about the calibration of the continuous monitoring system.

Response:

The combined cycle gas turbine shall comply with monitoring requirements in accordance with 40 CFR 60.334. Subpart GG, NSPS for Gas Turbines. The continuous monitoring system shall be accurate to within ±5.0 percent and shall be approved by the Bureau of Air Quality Management.

Specific Conditions No. 9 and No. 11:

Where are Specific Conditions 9 and 11?

Response:

These numbers were inadvertently omitted from the specific conditions. These specific conditions have been renumbered.

Based on discussions within BAQM, the limits in the table listed in Specific Condition No. 8 was rounded to three decimal points.

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

Attachment

Ms. Stephanie Brooks' memo of March 10, 1988.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

PERMITTEE:
Ft. Pierce Utilities Authority
P. O. Box 3191
Ft. Pierce, Florida 33448

Permit Number: AC 56-141460
Expiration Date: December 1, 1989
County: St. Lucie
Latitude/Longitude: 27° 27' 00"N
80° 19' 26"W
Project: 31.6 MW Combined Cycle Gas Turbine

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

For the construction of a 31.6 MW combined cycle gas turbine (a 23.4 MW combustion turbine generator, a steam generator and a 8.2 MW condensing turbine generator). This will be located at the Ft. Pierce Utilities Authority facility in Ft. Pierce, St. Lucie County, Florida. The UTM coordinates of this site are Zone 17, 566.8 E and 3.306.3 N.

Construction shall be in accordance with the attached permit application, plans, documents, and drawings except as noted in the General Conditions and Specific Conditions of this permit.

Attachments:

1. Application to Construct Air Pollution Sources, DER Form 17-1.122(16) dated November 2, 1987.
2. Department's letter of December 1, 1987.
3. Applicant's letter of December 17, 1987.

PERMITTEE:
Ft. Pierce Utilities Authority

Permit Number: AC 56-141460
Expiration Date: December 1, 1989

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

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. Nor 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 does not constitute a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

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

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefore caused by the construction or operation of this permitted source, 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.

GENERAL CONDITIONS:

6. The permittee shall at all times 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, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

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

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

c. Sampling or monitoring 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 notify and provide the Department with the following information:

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

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

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or 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 arising under the Florida Statutes or Department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

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

11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, 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 is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

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

14. The permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under Department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the Department, during the course of any unresolved enforcement action.

GENERAL CONDITIONS:

b. The permittee shall retain 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), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be 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 date(s) 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 submitted or corrected promptly.

SPECIFIC CONDITIONS:

1. The maximum emission rates for the 31.6 MW combined cycle gas turbine during natural gas firing shall not exceed the limits required by 40 CFR 60, Subpart GG, Standards of Performance for Stationary Gas Turbines, as follows:

SPECIFIC CONDITIONS:

Nitrogen oxides NSPS Standards = $0.0075 \left(\frac{14.4}{Y}\right) + F$

or

= 84 ppm NOx

and

Sulfur dioxide NSPS Standard = 0.015% by volume at 15% oxygen on a dry basis

Visible Emission	Not to exceed 15% opacity
Fuel oil No. 2	Not to exceed 0.5% sulfur content by weight

2. The combined cycle gas turbine shall be allowed to operate continuously (8736 hours per year). The gas turbine shall operate on natural gas at all times, except that No. 2 fuel oil with a maximum sulfur content of 0.5 percent by weight shall be allowed to be burned only as a emergency back-up fuel.

3. Before this construction permit expires, the 31.6 MW combined cycle gas turbine will be tested for sulfur dioxide, visible emissions, carbon monoxide and nitrogen oxides. Except as provided under 40 CFR 60.8(b), the performance tests shall be in accordance with the provisions of the following reference methods in Appendix A of 40 CFR 60.

a. Method 1. Sample and Velocity Traverses

b. Method 2. Volumetric Flow Rate

c. Method 3. Gas Analysis

d. Compliance with the opacity limitation will be determined by reference Method 9, Visual Determination of Opacity of Emission from Stationary Sources.

e. Compliance with the sulfur dioxide emission limits will be determined by reference Method 20 or by calculations based on fuel analysis (ASTM 1552) for sulfur content.

f. Compliance with the carbon monoxide emission limit will be determined by Method 10, Determination of Carbon Monoxide Emissions from Stationary Sources.

SPECIFIC CONDITIONS:

g. Compliance with the allowable emissions limits for nitrogen oxides shall be conducted using EPA reference Method 20 subpart GG Section 60.335.

During performance tests to determine compliance with the proposed standard, measured NOx, emission at 15 percent oxygen will be adjusted to ISO ambient atmospheric conditions by the following correction factor:

$$NOx = (NOx\ obs)\ \left(\frac{P_{ref}}{P_{obs}}\right)^{0.5}\ e^{19(H_{obs} - 0.00633)}\ \left(\frac{T_{AMB}}{288°K}\right)^{1.53}$$

where:

NOx = Emissions of NOx at 15% oxygen and ISO standard ambient conditions.

NOx obs = Measured NOx emission at 15% oxygen, ppmv.

P_{ref} = Reference combustor inlet absolute pressure at 101.3 kilopascals ambient pressure.

P_{bs} = Measured combustor inlet absolute pressure at test ambient pressure.

H_{obs} = Specific humidity of ambient air at test.

e = Transcendental constant (2.718)

T_{AMB} = Temperature of ambient air at test.

4. Test results will be the average of 3 valid runs. The Department's District office in West Palm Beach will be notified 15 days in advance of the compliance test. Tests shall be conducted operating between 90 and 100% of permitted capacity while using natural gas fuel.

5. A continuous monitoring system shall be installed to monitor and record the fuel consumption and the ratio of water to fuel being fired in the turbine.

PERMITTEE:
Ft. Pierce Utilities Authority

Permit Number: AC 56-141460
Expiration Date: December 1, 1989

SPECIFIC CONDITIONS:

6. Sulfur and nitrogen content of the fuel being fired in the gas turbine shall be determined and recorded as specified in the NSPS for Gas Turbines 40 CFR 60, Subpart GG, Section 60.334. The records of fuel oil usage will be kept by the company, available for regulatory agency's inspection, for a two year period.

7. The applicant shall comply with all requirements of 40 CFR 60, Subpart GG, Standards of Performance for stationary gas turbines.

8. The operating permits for this facility shall be modified as follows:

	Unit 6		Unit 7		Unit 8	
Parameter	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
Part.	0.04	0.003	0.568	0.382	0.945	3.017
SOx	12.38	0.074	0.119	0.080	0.191	0.612
NOx	1.31	0.008	104.350	70.126	173.200	552.860
VOC	0.02	0.001	0.266	0.179	0.441	1.407
CO	0.15	0.001	7.589	5.100	12.590	40.200
hrs/yr	12		1344		6384	

9. The construction shall reasonably conform to the plans and schedule submitted in the application. If the permittee is unable to complete construction on schedule, the Department must be notified in writing 60 days prior to the expiration of the construction permit and submit a new schedule and request for an extension of the construction permit, (Rule 17-2, FAC).

10. To obtain a permit to operate, the permittee must demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit, including the application fee, along with compliance test results and Certificate of Completion, to the Department's Southeast District

SPECIFIC CONDITIONS:

office 90 days prior to the expiration date of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until its expiration date. Operation beyond the construction permit expiration date requires a valid permit to operate, (Rules 17-2 and 17-4, FAC).

11. If the construction permit expires prior to the permittee requesting an extension or obtaining a permit to operate, then all activities at the project must cease and the permittee must apply for a new permit to construct which can take up to 90 days to process a complete application, (Rule 17-4, FAC).

12. Upon obtaining a permit to operate, the permittee will be required to submit annual reports on the actual operation and emissions of the facility. Annual reports shall be sent to the Department's Southeast District office in West Palm Beach.

Issued this 24 day of March 1988

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

Dale Twachtmann

Dale Twachtmann, Secretary

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

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

TO: Dale Twachtmann

FROM: Howard L. Rhodes

SUBJ: Approval of Fort Pierce Utilities Authority
Air Construction Permit Number: AC 56-141460

DATE: March 22, 1988

Attached for your approval and signature is a permit prepared by Central Air Permitting for the above mentioned company to install/construct a 31.6 MW combined cycle gas turbine (a 23.4 MW combustion turbine generator, steam generator and a 8.2 MW condensing turbine generator) to be located in Ft. Pierce, St. Lucie County, Florida.

Comments were received on March 17, 1988, from Ms. Stephanie Brooks, DER Engineer, West Palm Beach office.

Day 90, after which this permit will be issued by default, is April 8, 1988.

I recommend your approval and signature.

HLR/aqm/th

attachment

RECEIVED
MAR 23 1988

Office of the Secretary
RECEIVED
MAR 24 1988
DER - BAQM

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

FOR ROUTING TO OTHER THAN THE ADDRESSEE

To: _____ Loc'n: _____
To: _____ Loc'n: _____
To: _____ Loc'n: _____
From: _____ Date: _____

RECEIVED
MAR 17 1988
DER - BAQM

TO: C. H. Fancy, P. E.

FROM: Stephanie Brooks Stephanie Brooks

DATE: March 10, 1988

SUBJECT: Ft. Pierce Utilities Authority 31.6 MW Combined Cycle Gas Turbine

---

Comments as follows:

Specific Condition 1

The variable Y is not defined in the NO_x standard. Is the SO_2 standard of 0.015% by volume equivalent to 0.8% by weight. The sulfur content for fuel oil not to exceed 0.5% by weight?

Specific Condition 2

Define emergency back-up fuel.

Specific Condition 3

Tests required on each fuel? On worst case fuel? On the most used fuel?

d. EPA Method 9

e. EPA Method 20

f. EPA Method 10

Where is specific condition 4? Are you allowing the unit to be operated over capacity?

Specific Condition 5

What about the calibration of the continuous monitoring system?

Where are specific conditions 9 & 11?

SB:s/210

Copied: CHF/BT
Teresa Heron } 3-17-88 mp

RECEIVED

FEB 22 1988

DER - BAQM

NEWS TRIBUNE

P.O. BOX 69
Fort Pierce, St. Lucie County, Florida 34954-0069

STATE OF FLORIDA
COUNTY OF ST. LUCIE

Before the undersigned authority personally appeared James J. McMillen or Kathleen K. LeClair, who on oath says that he/she is publisher, publisher's secretary of the News Tribune, a daily newspaper published at Fort Pierce in St. Lucie County, Florida; that the attached copy of the advertisement, being a legal notice in the matter of DER application was published in said newspaper in the issues of 2/18/88

Affiant further says that the said News Tribune is a newspaper published at Fort Pierce, in said St. Lucie County, Florida, and that the said newspaper has heretofore been continuously published in said St. Lucie County, Florida, each day and has been entered as second class mail matter at the post office in Fort Pierce, in said St. Lucie County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement: and affiant further says that he has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.
Sworn to and subscribed before me

This 18th day of FEB
A.D. 1988

(SEAL) Notary Public

NOTARY PUBLIC STATE OF FLORIDA
MY COMMISSION EXP. APR 29,1989
BONDED THRU GENERAL INS. UND.

No. 03964
State of Florida
Department of
Environmental Regulation
Notice of Intent

The Department of Environmental Regulation hereby gives notice of its intent to issue a permit to Ft. Pierce Utilities Authority to install/construct a 31.6 MW combined cycle gas turbine (a 23.4 MW combustion turbine generator, a steam generator and a 8.2 MW condensing turbine generator) to be located at Ft. Pierce, St. Lucie County, Florida. Department is issuing this intent to issue for the reasons stated in the attached Technical Evaluation and Preliminary Determination.

Persons whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative determination (hearing) in accordance with Section 120.57, Florida Statutes. The petition must conform to the requirements of Chapters 17-103 and 28-5, Florida Administrative Code, and must be filed (received) in the Department's Office of General Counsel, 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32399-2400, within fourteen (14) days of publication of this notice. Failure to file a petition within this time period constitutes a waiver of any right such person has to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

Copied: Teresa Heron
I. Goldman, SE FL Dist.
2-25-88 mp

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the proposed agency action. Therefore, persons who may not wish to file a petition may wish to intervene in the proceeding. A petition for intervention must be filed pursuant to Rule 28-5.207, Florida Administrative Code, at least five (5) days before the final hearing and be filed with the hearing officer if one has been assigned at the Division of Administrative Hearings, Department of Administration, 2009, Apalachee Parkway, Tallahassee, Florida 32301. If no hearing officer has been assigned, the petition is to be filed with the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Failure to petition to intervene within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, Florida Statutes.

The application is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:
Dept. of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32399-2400
Dept. of Environmental Regulation
Southeast Florida District
1900 S. Congress Ave. Suite A
P.O. Box 3858
West Palm Beach, Florida 33406

Any person may send written comments on the proposed action to Mr. Bill Thomas at the Department's Tallahassee address. All comments mailed within 14 days of the publication of this notice will be considered in the Department's final determination.

PUBLISH: February 18, 1988

P 274 010 356

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to: Harry Schindehette, Dir. Fort Pierce Utilities Author.	
Street and No. P.O. Box 3191	
P.O., State and ZIP Code Fort Pierce, FL. 33448	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date Mailed: 03-28-88 Permit: AC 56-141460	

PS Form 3800, June 1985 ★U.S.G.P.O. 1985-480-794

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.
Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees, the following services are available. Consult postmaster for fee and check box(es) for additional service(s) requested.
1. ☐ Show to whom delivered, date, and addressee's address. 2. ☐ Restricted Delivery

3. Article Addressed to:
Mr. Harry Schindehette, Director
Fort Pierce Utilities Authority
P.O. Box 3191
Fort Pierce, FL 33448

4. Article Number
P 274 010 356

5. Type of Service:
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail

Always obtain signature of addressee or agent and DATE DELIVERED.

8. Addressee's Address (ONLY if requested and fee paid)

6. Signature — Addressee
X

6. Signature — Agent
X

7. Date of Delivery
APR 1 1988

PS Form 3811, Feb. 1986 DOMESTIC RETURN RECEIPT

file

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

February 12, 1988

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. Harry Schindehette, Director
Ft. Pierce Utilities Authority
P. O. Box 3191
Ft. Pierce, Florida 33448

Dear Mr. Schindehette:

Attached is one copy of the Technical Evaluation and Preliminary Determination and proposed permit for Ft. Pierce Utilities Authority to install a 31.6 MW Combined Cycle Gas Turbine in Ft. Pierce, St. Lucie County, Florida.

Please submit, in writing, any comments which you wish to have considered concerning the Department's proposed action to Mr. Bill Thomas of the Bureau of Air Quality Management.

Sincerely,

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/TH/s

Attachments

cc: Stephanie Brooks, SE District
Lloyd H. Stebbins, P.E.

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

In the Matter of
Application for Permit by:

Ft. Pierce Utilities Authority
P. O. Box 3191
Ft. Pierce, Florida 333448

DER File No. AC 56-141460

INTENT TO ISSUE

The Department of Environmental Regulation hereby gives notice of its intent to issue a permit (copy attached) for the proposed project as detailed in the applications specified above. The Department is issuing this Intent to Issue for the reasons stated in the attached Technical Evaluation and Preliminary Determination.

The applicant, Ft. Pierce Utilities Authority, applied on November 2, 1987, to the Department of Environmental Regulation for a permit to construct/install a 31.6 MW combined cycle gas turbine (a 23.4 MW combustion turbine generator, a steam generator and a 8.2 MW condensing turbine generator) to be located at Ft. Pierce, St. Lucie County, Florida.

The Department has permitting jurisdiction under Chapter 403, Florida Statutes, and Florida Administrative Code Rules 17-2 and 17-4. The project is not exempt from permitting procedures. The Department has determined that an air construction permit was needed for the proposed work.

Pursuant to Section 403.815, F.S. and DER Rule 17-103.150, FAC, you (the applicant) are required to publish at your own expense the enclosed Notice of Proposed Agency Action on permit applications. The notice must be published one time only in a section of a major local newspaper of general circulation in the county in which the project is located and within thirty (30) days from receipt of this intent. Proof of publication must be provided to the Department within seven days of publication of the notice. Failure to publish the notice and provide proof of publication within the allotted time may result in the denial of the permits.

The Department will issue the permits with the attached conditions unless petition for an administrative proceeding (hearing) is filed pursuant to the provisions of Section 120.57, F.S. A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. Petitions must comply with the

requirement of Florida Administrative Code Rules 17-103.155 and 28-5.201 (copy enclosed) and be filed with (received by) the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Petitions filed by the permit applicant must be filed within fourteen (14) days of receipt of this intent. Petitions filed by other persons must be filed within fourteen (14) days of publication of the public notice or within fourteen (14) days of receipt of this intent, whichever first occurs. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes, concerning the subject permit application. Petitions which are not filed in accordance with the above provisions will be dismissed.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

Copies furnished to:

Stephanie Brooks, SE District
Lloyd H. Stebbins, P.E.

RULES OF THE ADMINISTRATIVE COMMISSION
MODEL RULES OF PROCEDURE
CHAPTER 28-5
DECISIONS DETERMINING SUBSTANTIAL INTERESTS

28-5.15 Requests for Formal and Informal Proceedings

(1) Requests for proceedings shall be made by petition to the agency involved. Each petition shall be printed, typewritten or otherwise duplicated in legible form on white paper of standard legal size. Unless printed, the impression shall be on one side of the paper only and lines shall be double spaced and indented.

(2) All petitions filed under these rules should contain:

(a) The name and address of each agency affected and each agency's file or identification number, if known;

(b) The name and address of the petitioner or petitioners;

(c) All disputed issues of material fact. If there are none, the petition must so indicate;

(d) A concise statement of the ultimate facts alleged, and the rules, regulations and constitutional provisions which entitle the petitioner to relief;

(e) A statement summarizing any informal action taken to resolve the issues, and the results of that action;

(f) A demand for the relief to which the petitioner deems himself entitled; and

(g) Such other information which the petitioner contends is material.

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this NOTICE OF INTENT TO ISSUE and all copies were mailed before the close of business on 2-12-88.

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

Martha Allen 2-12-88
Clerk Date

State of Florida
Department of Environmental Regulation
Notice of Intent

The Department of Environmental Regulation hereby gives notice of its intent to issue a permit to Ft. Pierce Utilities Authority to install/construct a 31.6 MW combined cycle gas turbine (a 23.4 MW combustion turbine generator, a steam generator and a 8.2 MW condensing turbine generator) to be located at Ft. Pierce, St. Lucie County, Florida. Department is issuing this Intent to Issue for the reasons stated in the attached Technical Evaluation and Preliminary Determination.

Persons whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative determination (hearing) in accordance with Section 120.57, Florida Statutes. The petition must conform to the requirements of Chapters 17-103 and 28-5, Florida Administrative Code, and must be filed (received) in the Department's Office of General Counsel, 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32399-2400, within fourteen (14) days of publication of this notice. Failure to file a petition within this time period constitutes a waiver of any right such person has to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the proposed agency action. Therefore, persons who may not wish to file a petition may wish to intervene in the proceeding. A petition for intervention must be filed pursuant to Rule 28-5.207, Florida Administrative Code, at least five (5) days before the final hearing and be filed with the hearing officer if one has been assigned at the Division of Administrative Hearings, Department of Administration, 2009, Apalachee Parkway, Tallahassee, Florida 32301. If no hearing officer has been assigned, the petition is to be filed with the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Failure to petition to intervene within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, Florida Statutes.

The application is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Dept. of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dept. of Environmental Regulation
Southeast Florida District
1900 S. Congress Ave. Suite A
P. O. Box 3858
West Palm Beach, Florida 33406

Any person may send written comments on the proposed action to Mr. Bill Thomas at the Department's Tallahassee address. All comments mailed within 14 days of the publication of this notice will be considered in the Department's final determination.

Technical Evaluation
and
Preliminary Determination

Ft. Pierce Utilities Authority
Ft. Pierce, St. Lucie County, Florida

Permit No. AC 56-141460

31.6 MW Combined Cycle Gas Turbine

APIS No. 50WPB56000309

Bureau of Air Quality Management
Central Air Permitting
New Source Review Section

February 12, 1988

I. NAME AND ADDRESS OF APPLICANT

Ft. Pierce Utilities Authority
Post Office Box 3191
Ft. Pierce, Florida 33448

II. REVIEWING AND PROCESS SCHEDULE

Date of Receipt of Application: November 2, 1987

Completeness Review (30 days): Department's letter of December 1, 1987

Response to Request for Additional Information:

Ft. Pierce Utilities Authority's letter of December 17, 1987

Application Completeness Date: December 18, 1987

III. FACILITY INFORMATION

III.1 Facility Location

The proposed source is located on 311 North Indian river Drive in Ft. Pierce, St. Lucie County, Florida. The UTM coordinates are 566.8 East and 3063.3 North.

III.2 Standard Industrial Classification Code (SIC)

This facility is classified as follows:

Major Group No. - 49 ELECTRIC, GAS, AND SANITARY SERVICES

Group No. - 491 ELECTRIC SERVICES

Industry No. - 4911 ELECTRIC SERVICES

III.3 Facility Category

Ft. Pierce Electric Utility is a major facility for nitrogen oxides (NOx) and carbon monoxide (CO).

The proposed project will increase the overall NOx and CO emissions by 19.7 TPY and 99.2 TPY, respectively.

III.3.1 Background Information

A revision of the current existing permits at the Ft. Pierce facility was conducted by Environmental Science and Engineering Inc.

It was concluded that the contemporaneous emissions calculations, as presented, are creditable in accordance with Rule 17-2.500(2)(e)4, Creditable Emissions Changes. The current operating rate for all boilers (Unit 6, Unit 7, and Unit 8) are less than the permitted rates (hours per year) listed on the operating permits. These permitted rates (hours/year) will be decreased as a result of the operation of the new combined cycle turbine (see Table 2). The current operating permits will be modified as follows:

	Unit 6		Unit 7		Unit 8	
Parameter	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
Part.	0.04	0.0024	0.568	0.382	0.945	3.017
SOx	12.38	0.0743	0.1199	0.0806	0.1917	0.612
NOx	1.31	0.007854	104.35	70.126	173.20	552.86
VOC	0.0236	0.000142	0.266	0.179	0.441	1.407
CO	0.15	0.0009	7.589	5.100	12.59	40.20
hrs/yr	12		1344		6384	

IV. PROJECT DESCRIPTION

The new source at Ft. Pierce Utility Authority will consist of a combustion turbine-generator, a heat recovery steam generator (HRSG), cooling tower, and a steam turbine-generator.

Electrical energy will be produced directly from the combustion turbine generator (23.4 MW). A significant portion of the waste heat from the products of combustion will be captured by passing the hot gas steam through a heat recovery steam generator (boiler). The steam produced will drive a smaller (8.2 MW) condensing turbine-generator.

Power produced by the facility will be transferred to the authority's transmission system via step-up transformers and the existing 69 KV substation at the power plant.

The combined cycle unit will provide baseload power to the Ft. Pierce community and the regional grid. The new unit will use natural gas as the primary fuel and No. 2 fuel oil as an emergency secondary fuel.

Emissions control will be provided by steam injection into the turbine, which will reduce NOx emissions by 65%.

V. RULE APPLICABILITY

The proposed project is subject to preconstruction review under the provisions of Chapter 403, Florida Statutes, and Chapter 17-2, Florida Administrative Code, (FAC).

The facility site is in an area, St. Lucie County, designated attainment for all pollutants in accordance with Rule 17-2.420, Florida Administrative Code (FAC).

Ft. Pierce Electric Utilities Authority is classified as a major facility. Emissions of nitrogen oxides are in the order of 776 tons per year.

This source, combined cycle gas turbine, is exempt from the New Source Review Requirements of the Prevention of Significant Deterioration, Rule 17-2.500 because the net emissions increases of NOx and CO are below the significance levels, Rule 17-2.500(2)(e)4., FAC.

This project shall be permitted under Rule 17-2.520 Sources Not Subject to Prevention of Significant Deterioration or Nonattainment Requirements. The proposed source shall comply with Rule 17-2.660 Standards of Performance for New Stationary Sources (NSPS). Specifically, Subpart GG, NSPS for Gas Turbines, Rule 17-2.610, General Particulate Emissions Limiting Standards and Rule 17-2.700 Stationary Point Sources Emissions Test Procedures.

For a future modification, this facility may be subject to a Prevention of Significant Deterioration Review, Rule 17-2.500, if the net increase of emissions of any criteria pollutant is equal to or greater than the significant emission rates listed in Table 500-2, FAC.

VI. EMISSIONS SUMMARY

The operation of the combined cycle gas turbine will produce emissions of nitrogen oxides (NOx), sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter (PM), and volatile organic compounds (VOC) to the atmosphere.

Table 1 summarizes the potential to emit all pollutants regulated under the ACT which are affected by the proposed project. These permitted emissions are in compliance with all applicable requirements of Chapter 17-2, FAC.

Table 2 shows a summary of the existing and proposed emissions for this facility.

VI.1 Air Quality Analysis

From a technical review of the application, the department has determined that the installation and operation of this source will not have a detrimental impact on Florida's ambient air quality standards.

VI.2 Air Toxics Information

Currently, the Department is developing acceptable ambient concentrations for toxic substances. Specifically, sources classified as Category A (carcinogens and highly toxic substances) and Category B (moderately toxic substances).

In the event toxics emission limits are set during the term of this permit or any subsequent permit, the Department may seek modification pursuant to Rule 17-4.08, FAC.

VII. CONCLUSION

Based on the review of the data submitted by Ft. Pierce Electric Authority, the Florida Department of Environmental Regulation (FDER) concludes that compliance with all applicable state air quality regulations will be achieved provided certain specific conditions are met. The impact of installing and operating the combined cycle gas turbine at the Ft. Pierce facility will not cause or contribute to a violation of any ambient air quality standards.

Table 1
Allowable Emission Limits
31.6 MW Combined Cycle Gas Turbine

Pollutant	Standard	Gas Turbine (1)	Waste Heat Boiler
NOx	0.0075 $\frac{14.4}{Y}$ +F(2)	84 ppm (gas); 172.5 TPY 134 ppm (No. 2 oil)	
SO_2	0.8% by weight 0.015% by volume at 15% oxygen on a dry basis	0.17 lb/hr 0.576 TPY (gas)	
PM		15% opacity	15% opacity
CO	---	32.85 lbs/hr (gas) 110.4 TPY (gas)	

(1) The combined cycle gas turbine will be operating mostly with natural gas. Diesel fuel No. 2 will be used for emergency back-up. The NOx allowance for oil burning is 50 ppm. The maximum sulfur content in the oil shall not exceed 0.5% by weight.

(2) F = O (NOx emission allowance for fuel-bound nitrogen). Natural gas has virtually no fuel-bound nitrogen.

Table 2

SUMMARY OF EMISSIONS
(tons per year)

PRESENT ACTUAL EMISSIONS

Pollutant	No. 6 12 hrs (0.07 wks)	No. 7 2748.6 hrs (16.3 wks)	No. 8 7262.9 hrs (43.2 wks)	6,7,8 10023.5 hrs TOTAL
Part	0.0061	0.781	3.451	4.238
SOx	0.0743	0.16485	0.70002	0.93917
NOx	0.007854	143.4134	632.338	775.760
VOC	0.000142	0.36507	1.6096	1.974
CO	0.0009	10.43	45.98	56.41

PROJECTED EMISSIONS

Pollutant	No. 6 12 hrs (0.07 wks)	No. 7 1344 hrs (8 wks)	No. 8 6384 hrs (38 wks)	No. 9 6720 hrs (40 wks)	6,7,8,9 144460 hrs TOTAL	Net Emissions Increase	Significant Emission Rate
Part	0.0024	0.382	3.017	13.44	16.841	12.607	25
SOx	0.0743	0.0806	0.612	0.567	1.334	0.395	40
NOx	0.007854	70.126	552.86	172.52	795.51	19.75	40
VOC	0.000142	0.179	1.407	12.10	13.69	11.72	40
CO	0.0009	5.100	40.20	110.4	155.7	99.29	100

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

PERMITTEE:
Ft. Pierce Utilities Authority
P. O. Box 3191
Ft. Pierce, Florida 33448

Permit Number: AC 56-141460
Expiration Date: December 1, 1989
County: St. Lucie
Latitude/Longitude: 27° 27' 00"N
80° 19' 26"W
Project: 31.6 MW Combined Cycle Gas Turbine

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

For the construction of a 31.6 MW combined cycle gas turbine (a 23.4 MW combustion turbine generator, a steam generator and a 8.2 MW condensing turbine generator). This will be located at the Ft. Pierce Utilities Authority facility in Ft. Pierce, St. Lucie County, Florida. The UTM coordinates of this site are Zone 17, 566.8 E and 3.306.3 N.

Construction shall be in accordance with the attached permit application, plans, documents, and drawings except as noted in the General Conditions and Specific Conditions of this permit.

Attachments:

1. Application to Construct Air Pollution Sources, DER Form 17-1.122(16) dated November 2, 1987.
2. Department's letter of December 1, 1987.
3. Applicant's letter of December 17, 1987.

PERMITTEE:
Ft. Pierce Utilities Authority

Permit Number: AC 56-141460
Expiration Date: December 1, 1989

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

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. Nor 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 does not constitute a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

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

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefore caused by the construction or operation of this permitted source, 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.

GENERAL CONDITIONS:

6. The permittee shall at all times 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, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

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

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

c. Sampling or monitoring 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 notify and provide the Department with the following information:

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

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

PERMITTEE:
Ft. Pierce Utilities Authority

Permit Number: AC 56-141460
Expiration Date: December 1, 1989

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or 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 arising under the Florida Statutes or Department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

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

11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, 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 is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

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

14. The permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under Department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the Department, during the course of any unresolved enforcement action.

GENERAL CONDITIONS:

b. The permittee shall retain 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), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be 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 date(s) 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 submitted or corrected promptly.

SPECIFIC CONDITIONS:

1. The maximum emission rates for the 31.6 MW combined cycle gas turbine during natural gas firing shall not exceed the limits required by 40 CFR 60, Subpart GG, Standards of Performance for Stationary Gas Turbines, as follows:

PERMITTEE:
Ft. Pierce Utilities Authority

Permit Number: AC 56-141460
Expiration Date: December 1, 1989

SPECIFIC CONDITIONS:

Nitrogen oxides NSPS Standards = $0.0075 \left(\frac{14.4}{Y}\right) + F$

or

= 84 ppm NOx

and

Sulfur dioxide NSPS Standard = 0.015% by volume at 15% oxygen on a dry basis

Visible Emission	Not to exceed 15% opacity
Fuel oil No. 2	Not to exceed 0.5% sulfur content by weight

2. The combined cycle gas turbine shall be allowed to operate continuously (8736 hours per year). The gas turbine shall operate on natural gas at all times, except that No. 2 fuel oil with a maximum sulfur content of 0.5 percent by weight shall be allowed to be burned only as a emergency back-up fuel.

3. Before this construction permit expires, the 31.6 MW combined cycle gas turbine will be tested for sulfur dioxide, visible emissions, carbon monoxide and nitrogen oxides. Except as provided under 40 CFR 60.8(b), the performance tests shall be in accordance with the provisions of the following reference methods in Appendix A of 40 CFR 60.

a. Method 1. Sample and Velocity Traverses

b. Method 2. Volumetric Flow Rate

c. Method 3. Gas Analysis

d. Compliance with the opacity limitation will be determined by reference Method 9, Visual Determination of Opacity of Emission from Stationary Sources.

e. Compliance with the sulfur dioxide emission limits will be determined by reference Method 20 or by calculations based on fuel analysis (ASTM 1552) for sulfur content.

f. Compliance with the carbon monoxide emission limit will be determined by Method 10 Determination of Carbon Monoxide Emissions from Stationary Sources.

SPECIFIC CONDITIONS:

g. Compliance with the allowable emissions limits for nitrogen oxides shall be conducted using EPA reference Method 20 subpart GG Section 60.335.

During performance tests to determine compliance with the proposed standard, measured NOx emission at 15 percent oxygen will be adjusted to ISO ambient atmospheric conditions by the following correction factor:

$$NOx = (NOx\ OBS)\ \left(\frac{P_{ref}}{P_{OBS}}\right)^{0.5}\ e^{19(H_{obs} - 0.00633)}\ \left(\frac{T_{AMB}}{288°K}\right)^{1.53}$$

where:

NOx = Emissions of NOx at 15% oxygen and ISO standard ambient conditions.

NOx obs = Measured NOx emission at 15% oxygen, ppmv.

P_{ref} = Reference combustor inlet absolute pressure at 101.3 kilopascals (1 atmosphere) ambient pressure.

P_{bs} = Measured combustor inlet absolute pressure at test ambient pressure.

H_{obs} = Specific humidity of ambient air at test.

e = Transcendental constant (2.718)

T_{AMB} = Temperature of ambient air at test.

Test results will be the average of 3 valid runs. The Department will be notified 15 days in advance of the compliance test. The test will be conducted at permitted capacity $\pm$10%.

5. A continuous monitoring system shall be installed to monitor and record the fuel consumption and the ratio of water to fuel being fired in the turbine.

PERMITTEE:
Ft. Pierce Utilities Authority

Permit Number: AC 56-141460
Expiration Date: December 1, 1989

SPECIFIC CONDITIONS:

6. Sulfur and nitrogen content of the fuel being fired in the gas turbine shall be determined and recorded as specified in the NSPS for Gas Turbines 40 CFR 60, Subpart GG, Section 60.334. The records of fuel oil usage will be kept by the company, available for regulatory agency's inspection, for a two year period.

7. The applicant shall comply with all requirements of 40 CFR 60, Subpart GG, Standards of Performance for stationary gas turbines.

8. The operating permits for this facility shall be modified as follows:

	Unit 6		Unit 7		Unit 8	
Parameter	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
Part.	0.04	0.0024	0.568	0.382	0.945	3.017
SOx	12.38	0.0743	0.1199	0.0806	0.1917	0.612
NOx	1.31	0.007854	104.35	70.126	173.20	552.86
VOC	0.0236	0.000142	0.266	0.179	0.441	1.407
CO	0.15	0.0009	7.589	5.100	12.59	40.20
hrs/yr	12		1344		6384	

9. The construction shall reasonably conform to the plans and schedule submitted in the application. If the permittee is unable to complete construction on schedule, the Department must be notified in writing 60 days prior to the expiration of the construction permit and submit a new schedule and request for an extension of the construction permit, (Rule 17-2, FAC).

12. To obtain a permit to operate, the permittee must demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit, including the application fee, along with compliance test results and Certificate of Completion, to the Department's District office 90

SPECIFIC CONDITIONS:

days prior to the expiration date of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until its expiration date. Operation beyond the construction permit expiration date requires a valid permit to operate, (Rules 17-2 and 17-4, FAC).

13. If the construction permit expires prior to the permittee requesting an extension or obtaining a permit to operate, then all activities at the project must cease and the permittee must apply for a new permit to construct which can take up to 90 days to process a complete application, (Rule 17-4, FAC).

14. Upon obtaining an operation permit, the permittee will be required to submit annual reports on the actual operation and emissions of the facility. Annual reports shall be sent to the Department's District office in West Palm Beach.

Issued this_____day of_____, 19___

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL REGULATION

_____
Dale Twachtmann, Secretary

ATTACHMENTS

Available Upon Request.

P 274 007 644

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to Mr. Harry Schindehette, Dir. Ft. Pierce Utilities Auth.	
Street and No. P.O. Box 3191	
P.O., State and ZIP Code Ft. Pierce, FL 33448	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date Mailed: 12/1/87 Permit: AC 56-141460	

PS Form 3800, June 1985 * U.S.G.P.O. 1985-480-794

PS Form 3811, July 1983 447-845

SENDER: Complete items 1, 2, 3 and 4.

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested.

1. ☒ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to:
Harry Schindehette
311 North Indian River Drive
Ft. Pierce Utilities Authority
P.O. Box 3191
Ft. Pierce, FL 33448

4. Type of Service:
☐ Registered ☑ Insured
☒ Certified ☐ COD
☐ Express Mail

Article Number
P 274 007 644

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature - Addressee
X [signature]

6. Signature - Agent
X

7. Date of Delivery
DEC - 4 1987

8. Addressee's Address *(ONLY if requested and fee paid)*

DOMESTIC RETURN RECEIPT

Federal Express File Copy
12-17-87
Jax, FL 32216
Airbill #6951037741

USS 3/24/88

ESE

AN RSH COMPANY

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.

December 17, 1987
87031-0000

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

DER
DEC 18 1987
BAQM

Subject: File No. AC56-141460
Fort Pierce Utilities Authority
Fort Pierce, Florida

Re: Letter to H. Schindehette, FPUA, from C.H. Fancy, FDER, dated 12/1/87

Dear Mr. Fancy:

The following information is submitted on behalf of the Fort Pierce Utilities Authority (FPUA) as requested in the referenced letter. This submittal has been discussed with Ms. Teresa Heron of your staff.

- Contemporaneous Emissions Calculations

It is agreed that the currently operating Units 6, 7, and 8 are currently permitted to operate more hours each than the number of hours requested in the permit application for the new Unit 9. The following table depicts the number of hours each unit is permitted to operate, is currently operating, and is projected to operate after construction of Unit 9:

Unit	Permitted Limits (hrs/yr)	Current Operating Rate (hrs/yr)	Projected Operating Rate (hrs/yr)
6	840	12	12
7	3024	2748.6	1344
8	8736	7262.9	6384
9	N/A	N/A	6720
TOTAL	12,600	10,023.5	14,460

FEDERAL EXPRESS®

QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL NUMBER 6951037741

7344 M 6951037741

Date 12-17-87

From (Your Name)-Please Print (1) George L. Whitmer

Your Phone Number (Very Important) (904) 739-2007

Company ENVIRONMENTAL SCIENCE & ENG

Department/Floor No.

Street Address 6737 SOUTHPOINT DR S.

City JACKSONVILLE **State** FL **ZIP Required For Correct Invoicing** 32216

To (Recipient's Name) Please Print (2) Clark Fancy

Recipient's Phone Number (Very Important) (904) 488-0786

Company FL Dept. of Environmental Regulation

Department/Floor No.

Exact Street Address *(Use of P.O. Boxes or P.O. # Zip Codes Will Delay Delivery And Result in Extra Charge.)* 2600 Blair Stone Rd.

City Tallahassee, **State** FL **ZIP Street Address Zip Required** 32399

(3) **YOUR BILLING REFERENCE INFORMATION (FIRST 24 CHARACTERS WILL APPEAR ON INVOICE.)** 87031-0000

DEC 18

PAYMENT [X] Bill Sender [ ] Bill Recipient's FedEx Acct. No. [ ] Bill 3rd Party FedEx Acct. No. [ ] Bill Credit Card [ ] Cash

(4) **SERVICES CHECK ONLY ONE BOX**

1 [ ] **PRIORITY 1** Overnight Delivery Using Your Packaging — 6 [X] **OVERNIGHT LETTER*** (Our Packaging) 9½"x12½"

OVERNIGHT DELIVERY USING OUR PACKAGING

2 [ ] Courier-Pak Overnight Envelope* 12"x 15½"

3 [ ] Overnight Box 12½"x 17½"x 3" — A [ ]

4 [ ] Overnight Tube 38"x 6"x 6" — B [ ]

*Declared Value Limit $100.

5 [ ] **STANDARD AIR** Delivery not later than second business day

SERVICE COMMITMENT

PRIORITY 1 - Delivery is scheduled early next business morning in most locations. It may take two or more business days if the destination is outside our primary service areas.

STANDARD AIR - Delivery is generally next business day or not later than second business day. It may take three or more business days if the destination is outside our primary service areas.

DELIVERY AND SPECIAL HANDLING CHECK SERVICES REQUIRED

1 [ ] **HOLD FOR PICK-UP** (Fill in Section H at right)

2 [X] **DELIVER WEEKDAY**

3 [ ] **DELIVER SATURDAY** (Extra charge) [ ]

4 [ ] **DANGEROUS GOODS** (P-1 and Standard Air Packages only. Extra charge)

5 [ ] **CONSTANT SURVEILLANCE SERVICE (CSS)** (Extra charge) (Do Not Complete Section 5)

6 [ ] **DRY ICE** _____ Lbs.

7 [ ] **OTHER SPECIAL SERVICE** _____

8 [ ]

9 [ ] **SATURDAY PICK-UP** (Extra charge)

10 [ ]

PACKAGES	WEIGHT	YOUR DECLARED VALUE	OVER SIZE
Total	Total	Total	

Received At
1 [ ] Regular Stop
2 [ ] On-Call Stop
3 [ ] Drop Box 4 [ ] B.S.C. 5 [ ] Station

Federal Express Corp. Employee No. 2711

(5) Sender authorizes Federal Express to deliver this shipment without obtaining a delivery signature and shall indemnify and hold harmless Federal Express from any claims resulting therefrom.

Release Signature:

Date/Time For Federal Express Use 12/18 1330

(H) **HOLD FOR PICK-UP AT THIS FEDERAL EXPRESS LOCATION:** Street Address (See Service Guide or Call 800-238-5355)

City State

ZIP ® Zip Code of Street Address Required

Emp. No. Date

[ ] Cash Received

[ ] Return Shipment [ ] Third Party [ ] Chg. To Del. [ ] Chg. To Hold

Street Address

City State Zip

Received By: X

Date/Time Received FedEx Employee Number

Federal Express Use

Base Charges

Declared Value Charge

Origin Agent Charge

Other

Total Charges

PART #106001 REV 5/87
PRINTED U.S.A. SRCE

007

RECIPIENT'S COPY

12-18-87
FYI

Although the projected operating hours and corresponding annual emissions listed on page 6, Attachment 10 of the subject permit application are less than those in the current operating permits, this situation is not anticipated to present a problem to FPUA because the sum of the projected operating hours for Units 6, 7, 8, and 9 will be greater than the sum of the presently permitted or operating hours for Units 6, 7, and 8. The maximum hours and emissions from the existing sources at this facility are correct as listed on page 6, Appendix 10 of the subject permit application and are repeated below for your convenience.

	Unit 6		Unit 7		Unit 8	
Parameter	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
Part.	0.4	0.0024	0.568	0.382	0.945	3.017
SO_x	12.38	0.0743	0.1199	0.0806	0.1917	0.612
NO_x	1.31	0.007854	104.35	70.126	173.20	552.86
VOC	0.0236	0.000142	0.266	0.179	0.441	1.407
CO	0.15	0.0009	7.589	5.100	12.59	40.20
hrs/yr	12		1344		6384	

The decrease in emissions listed above and on page 6, Appendix 10 of the subject permit application, are creditable in accordance with Rule 17-2.500(2)(e)4, Creditable Emissions Changes. As requested, a copy of the construction permit application and current operating permit for Unit 6 and the applications for permit renewal and current operating permits for Units 7 and 8 are included as Attachment 1. (The construction permit applications for Units 7 and 8 are not available.)

The other data requested in your letter are addressed as follows:

- Fuel data

  The 285.8 x 10^6 Btu/hr represents the lower heating value (LHV) of the fuel (Attachment 2).

- Heat rate

  The 12.87 kilojoules/watt-hr is based on the manufacturer's rated heat rate at manufacturer's rate load and is calculated from the heat input rate of the gas turbine.

- Maximum heat input to the boiler

  The maximum heat input to the boiler is based on the maximum design flow rate (Attachment 2). No operating data are available.

- No. 2 fuel oil

  No. 2 fuel oil will be used as emergency back-up fuel only in the proposed equipment. There are no plans to use any fuel other than natural gas on a routine basis.

I trust that this letter will sufficiently address your questions. We are very anxious to proceed on this project and will appreciate any effort by your office to expedite its processing.

Please feel free to call me if you have any questions concerning this information.

Very truly yours,

George L. Whitmer
Environmental Compliance Manager
Environmental Engineering Division

GLW/cdb

Attachments

cc: Harry Schindehette, P.E., FPUA
Victor Garrison, P.E., FPUA
Harry Lamb, FPUA
Fred Brock, FPUA
Jim Massey, RS&H

Copied: Teresa Heron
CHF1BT
I. Goldman
12.18.87 MY

ATTACHMENT 1A

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

SOUTHEAST FLORIDA DISTRICT
BRANCH OFFICE
2745 SOUTHEAST MORNINGSIDE BOULEVARD
PORT ST. LUCIE, FLORIDA 33452

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE:
Superintendent, Power Production
Fort Pierce Utilities Authority
311 North Indian River Drive
Fort Pierce, Florida 33450

APIS No.: 50/56/0003/08
Permit Number: AO-56-112678
Date of Issue: February 14, 1986
Expiration Date: February 14, 1991
County: St. Lucie
Latitude/Longitude: 27°27'00"N/80°19'26"W
Project: Boiler #8

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

OPERATE:

Foster Wheeler Boiler, Unit No. 8, burning natural gas, 596 x 10^3 ft.^{3}/hr. or 611 million BTU/hr. maximum, discharging pollutants through 96-inch diameter stack, 150 ft. above ground level; equipped with continuous in-stack NO_x and O_2 monitors. Operation is continuous.

IN ACCORDANCE WITH:

The original construction permit, AC-56-12778 and "Application for Renewal of Permit to Operate Air Pollution Source(s)", DER Form 17-1.202(4), received November 22, 1985.

LOCATED AT:

311 North Indian River Drive, Fort Pierce; UTM Coordinates are: Zone 17, 566.8 km E./3,036.3 km N.

SUBJECT TO:

GENERAL CONDITIONS one (1) through fifteen (15) and SPECIFIC CONDITIONS one (1) through eight (8).

MITTEE:

I.D. Number:
Permit/Certification Number:
Date of Issue:
Expiration Date:

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

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. Nor 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 does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.

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

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, 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 at all times 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, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

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

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

   c. Sampling or monitoring 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 notify and provide the department with the following information:

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

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

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

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and othe information relating to the construction or operation of this permitted source, which are submitted to the depart ment, may be used by the department as evidence in any enforcement case arising under the Florida Statutes o department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

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

11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rule 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted acti vity until the transfer is approved by the department.

12. This permit is required to be kept at the work site of the permitted activity during the entire period of con struction or operation.

13. This permit also constitutes:

( ) Determination of Best Available Control Technology (BACT)
( ) Determination of Prevention of Significant Deterioration (PSD)
( ) Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
( ) Compliance with New Source Performance Standards

14. The permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under department rules. The reten tion period for all records will be extended automatically, unless otherwise stipulated by the department during the course of any unresolved enforcement action.

b. The permittee shall retain at the facility or other location designated by this permit records of all monitor ing information (including all calibration and maintenance records and all original strip chart recordings fo continuous monitoring instrumentation), copies of all reports required by this permit, and records of all dat used to complete the application for this permit. The time period of retention shall be at least three year 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 date(s) 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 b law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant fact were not submitted or were incorrect in the permit application or in any report to the department, such facts o information shall be submitted or corrected promptly.

PERMITTEE:
Superintendent, Power Production
Fort Pierce Utilities Authority

APIS Number: 50/56/0003/08
Permit Number: AO-56-112678
Date of Issue: February 14, 1986
Expiration Date: February 14, 1991

SPECIFIC CONDITIONS:

1. The emission limits for this source are as referenced in FAC Rule 17-2.660, however, since this source is permitted to burn natural gas only, annual compliance with the particulate standard is determined as granted in the May 13, 1985 permit amendment, the conditions of which are restated below.

2. Natural gas is the only permitted fuel for normal operation. In an emergency or if natural gas is temporarily curtailed, fuel oil may be burned upon notification to the Department within twenty-four hours. Visible emissions shall be no more that 15 percent opacity while using fuel oil.

3. Visible emissions shall be less than 5 percent opacity while firing natural gas. Compliance with the visible emissions standard and the NO_x standard shall be tested for annually, using EPA Methods 9 and 7 respectively, no later than September 30 of each year; at least 15 days prior notification will be afforded to the Department. During the tests the unit will be operating within $\pm$ 10 percent of maximum rated capacity.

4. If fuel oil usage should exceed 15 days per calender year, the Department shall be notified and provisions for stack tests per EPA Method 5 shall be made within thirty (30) days. If the Permittee desires to switch to fuel oil for normal operation, application for modification to the permit shall be filed with the Department prior to the fuel switch.

5. Prior to September 30, 1989, compliance testing using EPA Method 5 while firing fuel oil shall be accomplished, at $\pm$ 10 percent of maximum rated capacity, as least 15 days prior notification shall be afforded to the Department.

6. Should applicable new rules governing this source be promulgated prior to expiration of this permit, the Permittee agrees to comply with the new regulation(s) within a reasonable period of time as allowed by such regulation(s).

7. Quarterly Excess Emission Reports pursuant to the federal New Source Performance Standards (NSPS) contained in 40 CFR 60 (Title 40 Code of Federal Regulations, Part 60) shall be submitted to the Port St. Lucie Branch Office, postmarked no later than the 30th day following the end of each calendar quarter.

8. This permit will expire on 2/14/1991. No later than 60 days prior to this date, the Permittee shall apply for a renewal of the permit on forms provided by the Department. Along with the application, test results showing compliance with the standard must be submitted. The test must have been run no earlier than 90 days from the date of expiration. At least 14 days prior notice shall be afforded the DER Southeast Florida Office in Port St. Lucie so that a representative may witness the test.

Issued this 14th day of February, 1986

AP:tps/17

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

4 Pages attached.

Alexander Padva, Ph.D.
Acting District Manager

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

SOUTHEAST FLORIDA
SUBDISTRICT
2745 SOUTHEAST MORNINGSIDE BOULEVARD
PORT ST. LUCIE, FLORIDA 33452

APPLICATION FOR RENEWAL OF PERMIT TO OPERATE AIR POLLUTION SOURCE(S)

If major alterations have occurred, the applicant should complete the Standard Air Permit Application Form.

Source Type: Power Plant; Boiler #8 Renewal of DER Permit No. AO-56-41413

Company Name: Fort Pierce Utilities Authority County: Saint Lucie

Identify the specific emission point source(s) addressed in this application (i.e., Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired):

Boiler No. 8 Fired with No. 6 Fuel Oil or Natural Gas

Source Location: Street: 311 North Indian River Drive City: Fort Pierce

UTM: East 17,566.8 Km North 3,036.3 Km

Latitude: 27 ° 27 ' 00 "N. Longitude: 80 ° 19 ' 26 "W.

---

1. Attach a check made payable to the Department of Environmental Regulation in accordance with operation permit fee schedule set forth in Florida Administrative Code Rule 17-4.05.

2. Have there been any alterations to the plant since last permitted? [ ] Yes [X] No If minor alterations have occurred, describe on a separate sheet and attach.

3. Attach the last compliance test report required per permit conditions if not submitted previously. PREVIOUSLY SUBMITTED

4. Have previous permit conditions been adhered to? [X] Yes [ ] No If no, explain on a separate sheet and attach.

5. Has there been any malfunction of the pollution control equipment during tenure of current permit? [ ] Yes [X] No If yes, and not previously reported, give brief details and what action was taken on a separate sheet and attach.

6. Has the pollution control equipment been maintained to preserve the collection efficiency last permitted by the Department? [X] Yes [ ] No

7. Has the annual operating report for the last calendar year been submitted? [X] Yes [ ] No If no, please attach.

8. Please provide the following information if applicable:

A. Raw Materials and Chemical Used in Your Process: N/A

Description	Contaminant Type	Contaminant %Wt	Utilization Rate lbs/hr

B. Product Weight (lbs/hr): N/A

C. Fuels

Type (Be Specific)	Consumption* Avg/hr*	Consumption* Max/hr**	Maximum Heat Input (MMBTU/hr)
No. 6 Fuel Oil	25	97	611
Natural Gas	.316	.596	611

D. Normal Equipment Operating Time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ; hrs/yr (power plants only) 8,736 ; if seasonal, describe _____

The undersigned owner or authorized representative*** of Fort Pierce Utilities Authority is fully aware that the statements made in this application for a renewal of a permit to operate an air pollution source are true, correct and complete to the best of his knowledge and belief. Further, the undersigned agrees to maintain and operate the pollution source and pollution control facilities in such a manner as to comply with the provisions of Chapter 403, Florida Statutes, and all the rules and regulations of the Department. He also understands that a permit, if granted by the Department, will be non-transferable and he will promptly notify the Department upon sale or legal transfer of the permitted facility.

*During actual time of operation.
**Units: Natural Gas-MMCF/hr; Fuel Oils-barrels/hr; Coal-lbs/hr.
***Attach letter of authorization if not previously submitted

Signature, Owner or Authorized Representative
(Notarization is mandatory)

J. P. Smith, Superintendent - Power Production
Typed Name and Title

311 North Indian River Drive
Address

Fort Pierce, FL 33450
City State Zip

11/20/85 305/464-5600
Date Telephone No.

Notary Public, State of Florida
My Commission Expires May 2 1988
Janice Jones

ATTACHMENT 1B

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

SOUTHEAST FLORIDA DISTRICT
BRANCH OFFICE
2745 SOUTHEAST MORNINGSIDE BOULEVARD
PORT ST. LUCIE, FLORIDA 33452

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE:
Superintendent, Power Production
Fort Pierce Utilities Authority
311 North Indian River Drive
Fort Pierce, Florida 33450

APIS No.: 50/56/0003/07
Permit Number: AO-56-112679
Date of Issue: February 14, 1986
Expiration Date: February 14, 1991
County: St. Lucie
Latitude/~~Longitude~~: 27°27'00"N/80°19'26"W
Project: Boiler #7

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

OPERATE:

Foster Wheeler Boiler, Unit No. 7, burning natural gas, 456.3 x 10^3 $ft.^3$/hr. or 470 million BTU/hr. maximum, discharging pollutants through 7.1 $ft.^2$ diameter stack, 148 ft. above ground; normally operating 24 hours/day, 7 days/week, 18 weeks/year.

IN ACCORDANCE WITH:

"Application for Renewal of Permit to Operate Air Pollution Source(s)", DER Form 17-1.202(4), received November 22, 1985.

LOCATED AT:

311 North Indian River Drive, Fort Pierce; UTM Coordinates are: Zone 17, 566.8 km E./3,036.3 km N.

SUBJECT TO:

GENERAL CONDITIONS one (1) through fifteen (15) and SPECIFIC CONDITIONS one (1) through seven (7).

AMITTEE:

I.D. Number:
Permit/Certification Number:
Date of Issue:
Expiration Date:

NERAL CONDITIONS:

. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

.. 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. Nor 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 does not constitute 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.

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

. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, 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.

. The permittee shall at all times 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.

. 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, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

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

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

c. Sampling or monitoring 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.

. 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 notify and provide the department with the following information:

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

b. the period of noncompliance, including exact 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 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 arising under the Florida Statutes or department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes.

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

11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, 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 is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

( ) Determination of Best Available Control Technology (BACT)
( ) Determination of Prevention of Significant Deterioration (PSD)
( ) Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
( ) Compliance with New Source Performance Standards

14. The permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.

b. The permittee shall retain 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), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be 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 date(s) 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 submitted or corrected promptly.

PERMITTEE:
Superintendent, Power Production
Fort Pierce Utilities Authority

APIS Number: 50/56/0003/07
Permit Number: AO-56-112679
Date of Issue: February 14, 1986
Expiration Date: February 14, 1991

SPECIFIC CONDITIONS:

1. The emission limits for this source are as referenced in FAC Rule 17-2.600(5)(b); however, since this source is permitted to burn natural gas only, annual compliance will be determined as granted in the May 13, 1985 permit ammendment, the conditions which are restated below.

2. Natural gas is the only permitted fuel for normal operation. In an emergency or if natural gas is temporarily curtailed, fuel oil may be burned upon notification to the Department within twenty-four hours. Visible emissions shall be no more that 15 percent opacity while using fuel oil.

3. Visible emissions shall be less than 5 percent opacity while firing natural gas. Compliance shall be tested for annually no later than September 30 each year using EPA Method 9; at least 15 days prior notification will be afforded to the Department.

4. If fuel oil usage should exceed 15 days per calender year, the Department shall be notified and provisions for stack tests per EPA Method 5 shall be made within thirty (30) days. If the Permittee desires to switch to fuel oil for normal operation, application for modification to the permit shall be filed with the Department prior to the fuel switch.

5. Prior to September 30, 1989, compliance testing using EPA Method 5 while firing fuel oil shall be accomplished, at ± 10 percent of maximum rated capacity, as least 15 days prior notification shall be afforded to the Department.

6. Should applicable new rules governing this source be promulgated prior to expiration of this permit, the Permittee agrees to comply with the new regulation(s) within a reasonable period of time as allowed by such regulation(s).

7. This permit will expire on 2/14/1991. No later than 60 days prior to this date, the Permittee shall apply for a renewal of the permit on forms provided by the Department. Along with the application, test results showing compliance with the standard must be submitted. The test must have been run no earlier than 90 days from the date of expiration. At least 14 days prior notice shall be afforded the DER Southeast Florida Office in Port St. Lucie so that a representative may witness the test.

Issued this 14th day of February 1986

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

Alexander Padva, Ph.D.
Acting District Manager

AP:tps/17

4 Pages attached.

STATE OF FLORIDA

11-20-85

DEPARTMENT OF ENVIRONMENTAL REGULATION

SOUTHEAST FLORIDA
SUBDISTRICT

2745 SOUTHEAST MORNINGSIDE BOULEVARD
PORT ST. LUCIE, FLORIDA 33452

APPLICATION FOR RENEWAL OF PERMIT TO OPERATE AIR POLLUTION SOURCE(S)

If major alterations have occurred, the applicant should complete the Standard Air Permit Application Form.

Source Type: Power Plant; Boiler #7 Renewal of DER Permit No. AO-56-32948

Company Name: Fort Pierce Utilities Authority County: Saint Lucie

Identify the specific emission point source(s) addressed in this application (i.e., Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired):

Boiler No. 7 Fired with No. 6 Fuel Oil or Natural Gas

Source Location: Street: 311 North Indian River Drive City: Ft. Pierce

UTM: East 17,566.8 Km North 3,036.3 Km

Latitude: 27 ° 27 ' 00 "N. Longitude: 80 ° 19 ' 26 "W.

1. Attach a check made payable to the Department of Environmental Regulation in accordance with operation permit fee schedule set forth in Florida Administrative Code Rule 17-4.05.

2. Have there been any alterations to the plant since last permitted? [ ] Yes [X] No If minor alterations have occurred, describe on a separate sheet and attach.

3. Attach the last compliance test report required per permit conditions if not submitted previously. PREVIOUSLY SUBMITTED

4. Have previous permit conditions been adhered to? [X] Yes [ ] No If no, explain on a separate sheet and attach.

5. Has there been any malfunction of the pollution control equipment during tenure of current permit? [ ] Yes [X] No If yes, and not previously reported, give brief details and what action was taken on a separate sheet and attach.

6. Has the pollution control equipment been maintained to preserve the collection efficiency last permitted by the Department? [X] Yes [ ] No

7. Has the annual operating report for the last calendar year been submitted? [X] Yes [ ] No If no, please attach.

8. Please provide the following information if applicable:

A. Raw Materials and Chemical Used in Your Process: N/A

Description	Contaminant Type	Contaminant %Wt	Utilization Rate lbs/hr

B. Product Weight (lbs/hr): N/A

C. Fuels

Type (Be Specific)	Consumption* Avg/hr*	Consumption* Max/hr**	Maximum Heat Input (MMBTU/hr)
No. 6 Fuel Oil	37.2	72.7	450
Natural Gas	0.23301	0.45631	470

D. Normal Equipment Operating Time: hrs/day 24 ; days/wk 7 ; wks/yr 18 ;

hrs/yr (power plants only) 3,025; if seasonal, describe _____

The undersigned owner or authorized representative*** of Fort Pierce Utilities Authority is fully aware that the statements made in this application for a renewal of a permit to operate an air pollution source are true, correct and complete to the best of his knowledge and belief. Further, the undersigned agrees to maintain and operate the pollution source and pollution control facilities in such a manner as to comply with the provisions of Chapter 403, Florida Statutes, and all the rules and regulations of the Department. He also understands that a permit, if granted by the Department, will be non-transferable and he will promptly notify the Department upon sale or legal transfer of the permitted facility.

*During actual time of operation.
**Units: Natural Gas-MMCF/hr; Fuel Oils-barrels/hr; Coal-lbs/hr.
***Attach letter of authorization if not previously submitted

J. P. Smith

Signature, Owner or Authorized Representative
(Notarization is mandatory)

J. P. Smith, Superintendent - Power Production
Typed Name and Title

311 North Indian River Drive
Address

Fort Pierce, FL 33450
City State Zip

11/20/85
Date

305/464-5600
Telephone No.

Notary Public, State of Florida
My Commission Expires May 2, 1988
Bonded Thru Troy Fain - Insurance, Inc.

ATTACHMENT 1c

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

SOUTHEAST FLORIDA DISTRICT
BRANCH OFFICE
2745 SOUTHEAST MORNINGSIDE BOULEVARD
PORT ST. LUCIE, FLORIDA 33452

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE:
Fort Pierce Utilities Authority
311 North Indian River Drive
Fort Pierce, Florida 33450

APIS Number: 50/56/0003/01 & 02
Permit Number: AO-56-113534
Date of Issue: February 28, 1986
Expiration Date: February 28, 1991
County: St. Lucie
Latitude/Longitude: 27°27'00"N/80°19'26"W
Project: Unit No. 6

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

OPERATE:

Babcock & Wilcox Boiler, Unit No. 6, burning natural gas, 213,000 ft.^{3}/hr. or 218.8 million BTU/hr. maximum, discharging pollutants through 5 ft. diameter stack, 148 ft. above ground; normally used for standby or peaking purposes.

IN ACCORDANCE WITH:

"Application to Operate/Construct Air Pollution Sources", DER Form 17-1.202(1), as received December 12, 1985.

LOCATED AT:

311 North Indian River Drive, Fort Pierce. UTM Coordinates are: Zone 17; 566.8 km E/3036.3 km N.

SUBJECT TO:

GENERAL CONDITIONS one (1) through fifteen (15) and SPECIFIC CONDITIONS one (1) through seven (7).

PERMITTEE:

I.D. Number:
Permit/Certification Number:
Date of Issue:
Expiration Date:

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

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. Nor 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 does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.

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

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, 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 at all times 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, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

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

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

   c. Sampling or monitoring 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 notify and provide the department with the following information:

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

b. the period of noncompliance, including exact 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 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 arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

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

11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, 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 is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

( ) Determination of Best Available Control Technology (BACT)
( ) Determination of Prevention of Significant Deterioration (PSD)
( ) Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
( ) Compliance with New Source Performance Standards

14. The permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.

b. The permittee shall retain 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), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be 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 date(s) 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 submitted or corrected promptly.

PERMITTEE:
Fort Pierce Utilities Authority

APIS Number: 50/56/0003/01 & 02
Permit Number: AO-56-113534
Date of Issue: February 28, 1986
Expiration Date: February 28, 1991

SPECIFIC CONDITIONS:

1. The emission limits for this source are as referenced in FAC Rule 17-2.600(6); however, since this source is permitted to burn natural gas only, annual compliance will be determined as granted in the May 13, 1985 permit ammendment, the conditions which are restated below.

2. Natural gas is the only permitted fuel for normal operation. In an emergency or if natural gas is temporarily curtailed, fuel oil may be burned upon notification to the Department within twenty-four hours. Visible emissions shall be no more than 15 percent opacity while using fuel oil.

3. Visible emissions shall be less than 5 percent opacity while firing natural gas. Compliance shall be tested for annually no later than September 30 each year using EPA Method 9; at least 15 days prior notification will be afforded to the Department.

4. If fuel oil usage should exceed 15 days per calender year, the Department shall be notified and provisions for stack tests per EPA Method 5 shall be made within thirty (30) days. If the Permittee desires to switch to fuel oil for normal operation, application for modification to the permit shall be filed with the Department prior to the fuel switch.

5. Prior to September 30, 1989, compliance testing using EPA Method 5 while firing fuel oil shall be accomplished, at ± 10 percent of maximum rated capacity, at least 15 days prior notification shall be afforded to the Department.

6. Should applicable new rules governing this source be promulgated prior to expiration of this permit, the Permittee agrees to comply with the new regulation(s) within a reasonable period of time as allowed by such regulation(s).

7. This permit will expire on 02/28/1991. No later than 60 days prior to this date, the Permittee shall apply for renewal of the permit on forms provided by the Department. Along with the application, test results showing compliance with the standard must be submitted. The test must have been run no earlier than 90 days from the date of expiration. At least 14 days prior notice shall be afforded the DER Southeast Florida Office in Port St. Lucie so that a representative may witness the test.

Issued this 28th day of February, 1986

AP:tps/20

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

Alexander Padva, Ph.D.
Acting District Manager

4 Pages attached.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

SOUTHEAST FLORIDA
SUBDISTRICT
3 SOUTHEAST MORNINGSIDE BOULEVARD
ORT ST. LUCIE, FLORIDA 33452

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Power Plant Boiler No. 6 [ ] New[1] [X] Existing[1]

APPLICATION TYPE: [ ] Construction [X] Operation [ ] Modification

COMPANY NAME: Fort Pierce Utilities Authority COUNTY: Saint Lucie

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) Boiler No. 6, Fired with No. 6 Fuel Oil

SOURCE LOCATION: Street 311 North Indian River Drive City Fort Pierce

UTM: East 17,566.8 Km North 3,036.3 Km

Latitude 27 ° 27 ' 00 "N Longitude 80 ° 19 ' 26 "W

APPLICANT NAME AND TITLE: J. P. Smith, Superintendent - Power Production

APPLICANT ADDRESS: 311 North Indian River Drive

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Fort Pierce Utilities Authority

I certify that the statements made in this application for an Operating permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: J. P. Smith

J. P. Smith, Superintendent - Power Production
Name and Title (Please Type)

Date: 11-20-85 Telephone No. 305/464-5600

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

[1] See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed Joe B Gerson

Joe B. Gerson, P.E.

Name (Please Type)

Reynolds, Smith and Hills

Company Name (Please Type)

Post Office Box 4850, Jacksonville, FL 32201

Mailing Address (Please Type)

Florida Registration No. 20131 Date: 12-4-85 Telephone No. (904)739-2000

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

Continued operation of No. 6 Boiler, burning #6 Fuel Oil.

Unit has cyclone type mechanical collector.

operation will remain in compliance

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction _____ Completion of Construction _____

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

AO-56-2522 Issued June 24, 1975 Expired June 30, 1980

AO-56-32954 Issued November 4, 1980 Expired October 31, 1985

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 5 ; if power plant, hrs/yr 840 ; if seasonal, describe: Used during peak loads and/or as standby unit only.

F. If this is a new source or major modification, answer the following questions. (Yes or No) NOT APPLICABLE

1. Is this source in a non-attainment area for a particular pollutant? _____

   a. If yes, has "offset" been applied? _____

   b. If yes, has "Lowest Achievable Emission Rate" been applied? _____

   c. If yes, list non-attainment pollutants. _____

2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. _____

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. _____

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? _____

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? _____

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? NOT APPLICABLE _____

   a. If yes, for what pollutants? _____

   b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted.

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		

B. Process Rate, if applicable: (See Section V, Item 1) NOT APPLICABLE

1. Total Process Input Rate (lbs/hr): _____

2. Product Weight (lbs/hr): _____

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

Name of Contaminant	Emission[1]		Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Potential[4] Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr.	T/yr	
Particulates	20	8.4	17-2.600(6)(b)	0.4 lb.	20	8.4	A
	per permit			per 10^6 BTU			
Sulfur Dioxide	Calculated		-------	-------	411	173	A

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard.

[4]Emission, if source operated without control (See Section V, Item 3).

NOTE: According to Chapter 17-2.100 (127), the revised definition of "Potential Emission" refers to emissions after the control device.

D. Control Devices: (See Section V, Item 4) NOT APPLICABLE

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
No. 6 Fuel Oil	22.6	35.1	218.82
Natural Gas	0.137	0.213	218.82

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis:

Percent Sulfur: 2.69 Percent Ash: 0.029

Density: 8.05 lbs/gal Typical Percent Nitrogen: Not available

Heat Capacity: 18,439 BTU/lb 148,434 BTU/gal

Other Fuel Contaminants (which may cause air pollution): _____

F. If applicable, indicate the percent of fuel used for space heating. NOT APPLICABLE

Annual Average _____ Maximum _____

G. Indicate liquid or solid wastes generated and method of disposal. NOT APPLICABLE

Brief description of operating characteristics of control devices: _____

_____

_____

_____

_____

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

_____

_____

_____

_____

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]

2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.

3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).

4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)

5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).

6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.

7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).

8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY N/A

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

[ ] Yes [ ] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

[ ] Yes [ ] No

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:

* Explain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device:

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

[1]Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION N/A

A. Company Monitored Data

1. _____no. sites _____ TSP _____( ) SO^{2}* _____ Wind spd/dir

Period of Monitoring ____/____/____ to ____/____/____
month day year month day year

Other data recorded _____

Attach all data or statistical summaries to this application.

Specify bubbler (B) or continuous (C).

2. Instrumentation, Field and Laboratory

a. Was instrumentation EPA referenced or its equivalent? [ ] Yes [ ] No

b. Was instrumentation calibrated in accordance with Department procedures?

[ ] Yes [ ] No [ ] Unknown

B. Meteorological Data Used for Air Quality Modeling

1. _____ Year(s) of data from ____/____/____ to ____/____/____
month day year month day year

2. Surface data obtained from (location)_____

3. Upper air (mixing height) data obtained from (location)_____

4. Stability wind rose (STAR) data obtained from (location)_____

C. Computer Models Used

1. _____ Modified? If yes, attach description.

2. _____ Modified? If yes, attach description.

3. _____ Modified? If yes, attach description.

4. _____ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate	
TSP	_____	grams/sec
SO^2	_____	grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description of point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

ATTACHMENT

INFORMATION: In response to DER Form 17-1.122(33) Dated 8-11-80

NAME: Boiler #6

PERMIT FILE NO.: AO-56-32954

A. Name of manufacturer, model number, and serial number of boilers/ engines, and generators:

Boiler: Babcock & Wilcox Series FH

Generator: Westinghouse S/N IS58P809

B. Indicate whether this unit operates on more than one type of fuel:

XXXX YES

C. Describe all fuel additives:

None

D. Where dual fuels may be burned, supply information for each fuel, as requested in the application:

6 Fuel Oil

Natural Gas

E. Supply a vendors recent copy of the oil analysis which represents type of oil currently in storage on the premises and ready for combustion:

Oil Sheet Attached

Copy To Kent Lawson Please.
cc 1-21-80

TECHNICAL SERVICES, INC.

SOUTHERN ANALYTICAL LABORATORY DIVISION

ENVIRONMENTAL CONSULTANTS — INDUSTRIAL CHEMISTS

105 STOCKTON STREET — P.O. BOX 52329

JACKSONVILLE, FLORIDA 32201

(904) 353-5761

Laboratory No. 33761 January 17 19 80

Sample of Oil

Date Received January 11, 1980

For Ft. Pierce Utilities Authority, Henry D. King Electric Station, P. O. Box 1298, Ft. Pierce, Fl 33450

Marks:

Oil from #7 Oil Hour Test 1-9-80

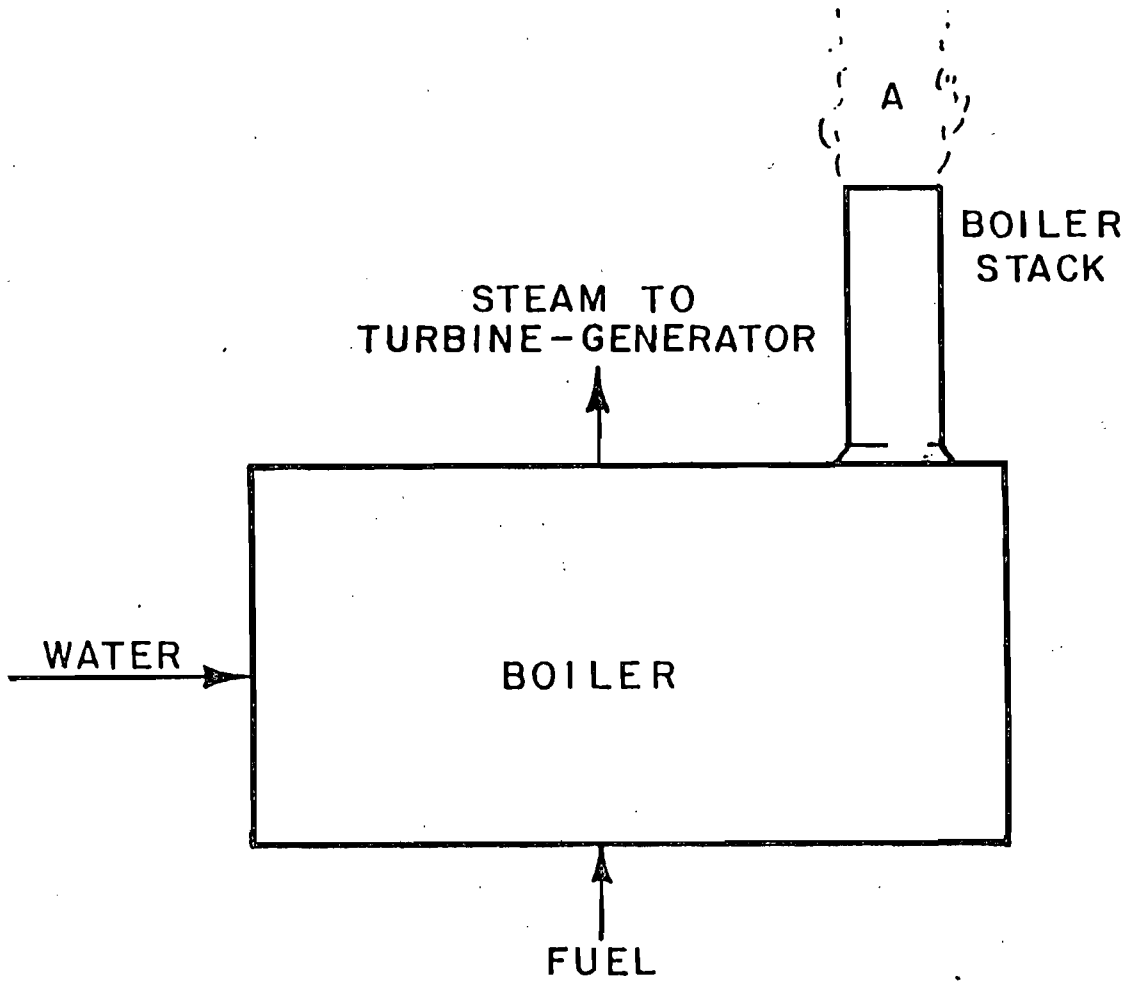
CERTIFICATE OF ANALYSIS OR TESTS (TYPICAL)

API Gravity @ 60°F	15.2
BTU/lb.	18,316
Sulfur	2.44%
Viscosity in Centestokes	598.4 Cst @ 122°F
Saybolt Furol Viscosity	282.4 Sec @ 122°F

Respectfully submitted,

SOUTHERN ANALYTICAL LABORATORY

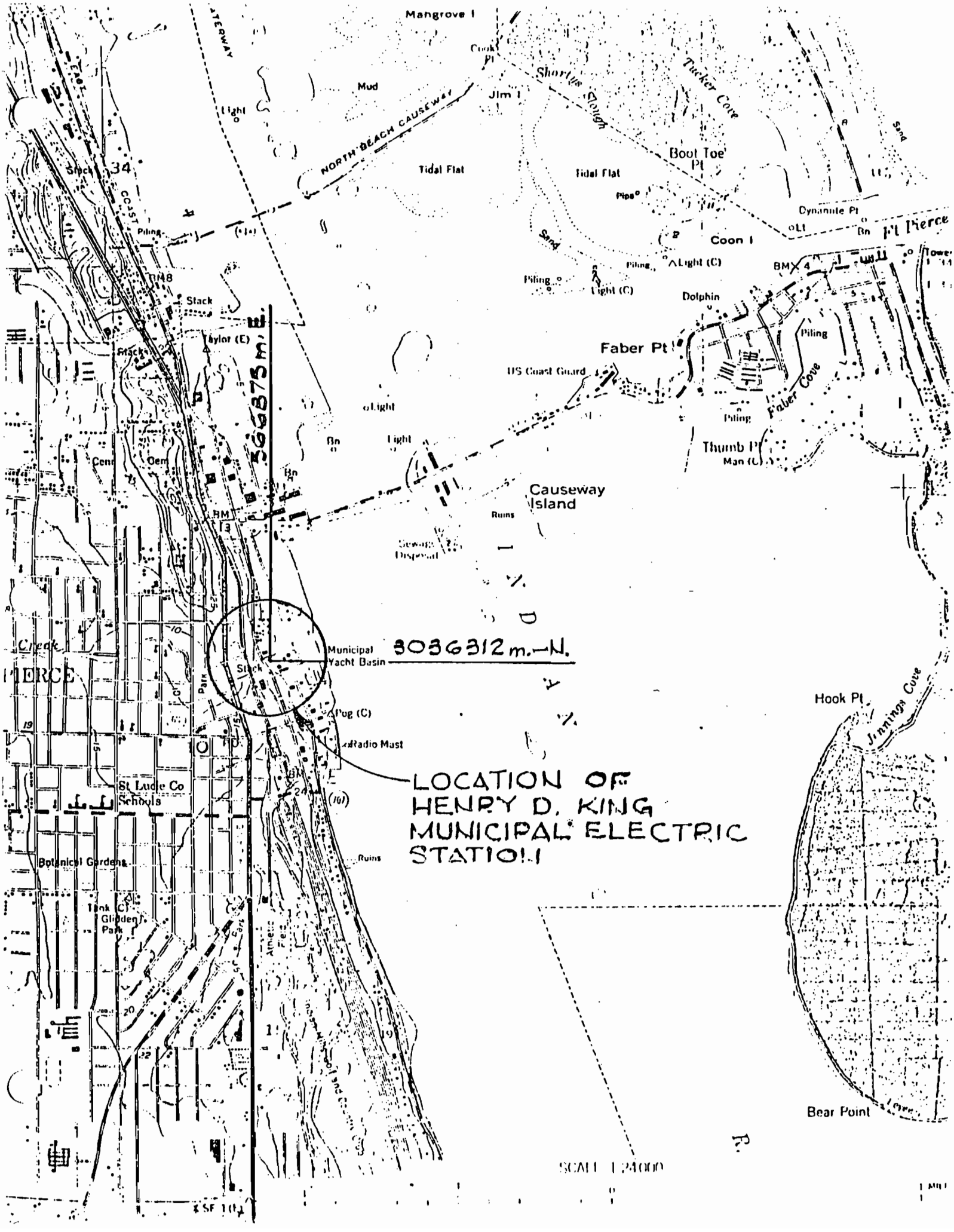
By Harvey C. Gray, Jr.

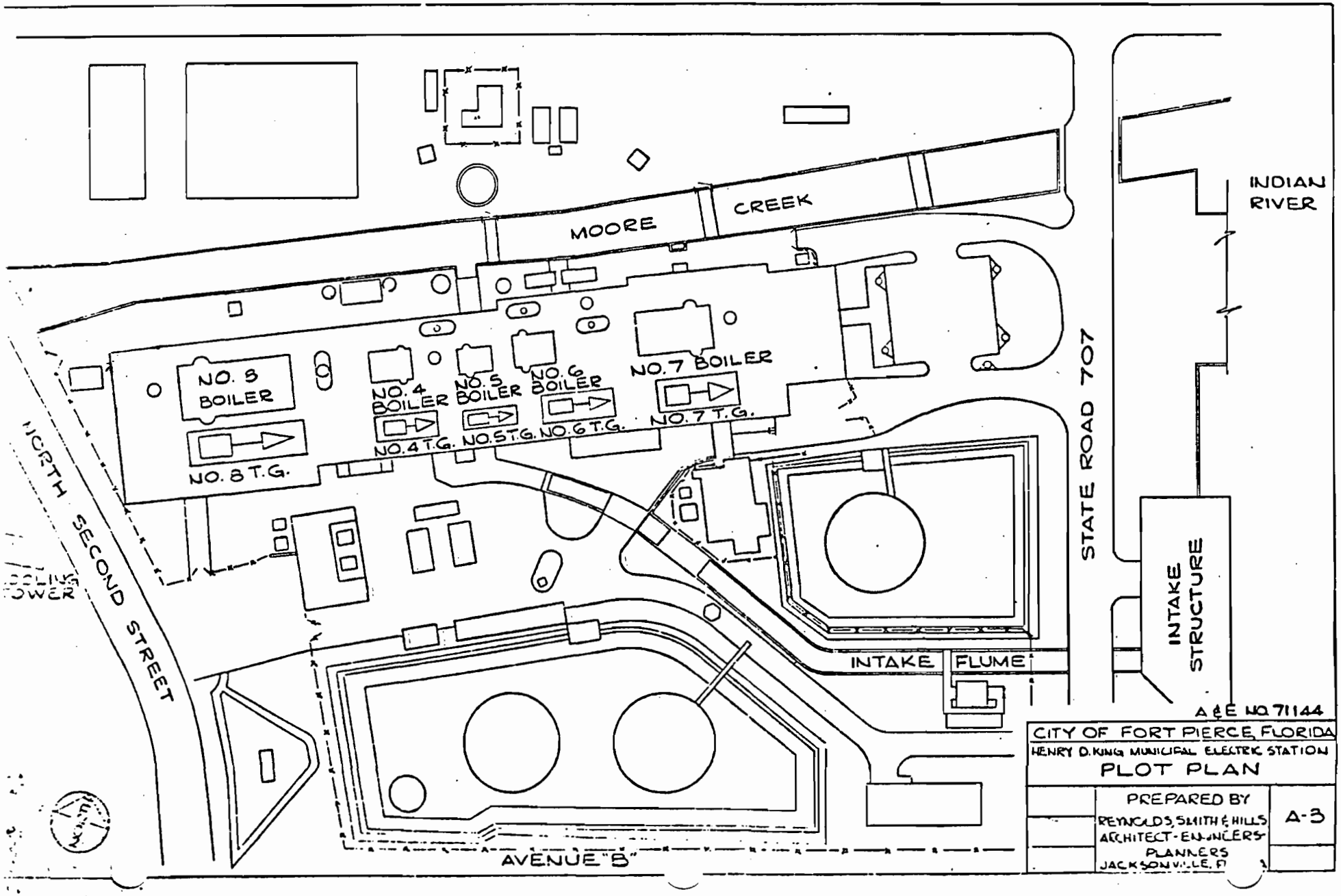


FLOW DIAGRAM NO. 6 BOILER

REYNOLDS, SMITH AND HILLS ARCHITECTS • ENGINEERS • PLANNERS INCORPORATED	Fort Pierce Utilities Authority Henry D. King Electric Generating Plant Fort Pierce, Florida	DRAWN RJG CHECKED JBG DATE 9-10-80	SHEET A-6 FILE 71144-000

BEST AVAILABLE COPY





APPLICATION FOR POWER PLANT BOILER NO. 6

Corrected Page 4, Section III C, Columns 3, 4, 5

Attachment, Paragraph E calls for a No. 6 fuel oil analysis, not an analysis of diesel engine lubricating oil. If you have one, it should agree with the information on page 5, E.

ATTACH MODIFIED

COMBINED CYCLE POWER PLANT

FOR

H. D. KING GENERATING STATION
FORT PIERCE, FLORIDA

Bidder to provide data as indicated.

Bidder: Metric Constructors, Ir

(Please insert all data in this column)

COMBUSTION TURBINE UNIT

Manufacturer	General Electric	
Type	Heavy Duty Gas Turbine	
Model No.	PG 5371 (PA)	
Base Load:		
(ISO - Natural Gas)	26,300	KW
(ISO - Distillate Fuel)	25,800	KW

GUARANTEED OPERATING CONDITIONS: #See Note

Base load and fuel consumption (base load as defined in Section 01004) when burning the specified fuel at ambient temperature of 90 F, sea level operation, exhausting through HRSG generating 87,000 lbs/hr of steam at 440 psig and 755 F, and 12,250 lbs/hr of steam at 450 psig and 579°F for injection to control NOx and provide additional power output.

a. Firing Natural Gas:
Base Load 23,410 # KW, Fuel Consumption 285.8 ~~Btu/KW.Hr~~ 10^6 Btu/hr LHV

b. Firing #2 Distillate Oil:
Base Load 22,930 # KW, Fuel Consumption 283.4 ~~Btu/KWHr~~ 10^6 Btu/hr LHV

Fuel flow and pressure to be available at turbine fuel terminals:

Natural gas:	6,600	SCFM	@	275 PSIG
Distillate fuel:	50	GPM	@	Flooded suction at fuel forwarding skid 5 PSIG

Provide the following performance curves; for by-pass operation and for exhaust through HRSG, as applicable:

a. Full load and part load performance based on ISO standard (59F at 14.7 PSIA), natural gas fuel and distillate fuel:

#Note: Only data marked "#" is guaranteed.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

December 1, 1987

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Harry Schindehette, Director
311 North Indian River Drive
Ft. Pierce Utilities Authority
Post Office Box 3191
Ft. Pierce, Florida 33448

Dear Mr. Schindehette:

Re: File No. AC 56-141460

The Bureau of Air Quality Management has received your application for permit to construct a new cogeneration system at your facility in Ft. Pierce, St. Lucie County, Florida. We have reviewed your data and have determined your application is not complete.

Therefore, to complete the application, you need to submit the following information:

In reference to Attachment No. 9, Contemporaneous Emissions Calculations, we want to confirm that the decrease of emissions listed on page 6 are creditable in accordance with the Prevention of Significant Deterioration regulations. Rule 17-2.500(2)(e)4., FAC, which reads as follows:

4. Creditable Emissions Changes.

a. An increase or decrease in the actual emissions or in the quantifiable fugitive emissions of a facility is creditable if:

(i) The Department has not relied on it in issuing a permit under the provisions of Rule 17-2.500 or EPA has not relied on it in issuing a permit under the provisions of 40 CFR 52.21, which permit is in effect when the increase in emissions of the modification occurs; or

(ii) The Department has not relied on it in demonstrating attainment, defining reasonable further progress, or issuing a permit under the provisions of Rule 17-2.17 (repealed), 17-2.510, or 17-2.650, which permit is in effect when the increase in emissions of the modification occurs.

b. An increase or decrease in the actual emissions or in the quantifiable fugitive emissions of sulfur dioxide or particulate matter which occurs before the applicable baseline date is

creditable only to the extent that it must be considered in calculating the amount of any maximum allowable increase in ambient concentration remaining available.

c. A decrease in the actual emissions or in the quantifiable fugitive emissions of a facility is creditable only if:

(i) The old level of actual emissions, the old level of federally enforceable allowable emissions, or the old level of allowable emissions under Rule 17-2.650, whichever is lowest, exceeds the new level of actual emissions;

(ii) It is federally enforceable on and after the date that the owner or operator obtains from the Department a permit to construct the new or modified facility; and

(iii) It has approximately the same qualitative significance for public health and welfare as that attributed to the increase in the emissions of the modification.

Please refer specifically to Rules 17-2.500(2)(e)4.a.(i), 17-2.500(2)(e)4.a.(ii) and 17-2.500(2)(e)4.c.(ii). Please document that with copies of the construction and current operation permits for these sources. List the maximum emissions (lb/hr and ton/year) you are requesting from existing sources at this facility.

In addition, the following data needs some clarification and/or response:

1. Is the 285.8 x 10^6 Btu/hr the lower heating value of the fuel (LHV)?

2. Is the 12.87 kilojoules/watt-hr the actual manufacturer's rated heat rate at manufacturer's rated load, or actual measured heat rate based on LHV of fuel as measured at actual peak load for the turbine? Please refer to 40 CFR, Subpart GG. The efficiency factor must be based on the gas turbine efficiency itself, not the overall efficiency of the gas turbine combined with other equipment.

3. What is the maximum heat input to the boiler based on operating data?

4. What is the maximum hours a year that fuel oil No. 2 will be used in the proposed equipment?

We will resume reviewing your application after receipt of the requested information.

Please call Teresa Heron at (904)488-1344 or write to me if you have any questions on this matter.

Sincerely,

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/TH/s

cc: S. Brooks
L. Stebbins

P 274 010 115

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to
Harry Schindehette, Dir.
~~Ft. Pierce Utilities Authori.~~
Street and No.
P.O. Box 3191
P.O., State and ZIP Code
Ft. Pierce, FL 33448

Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$

Postmark or Date
Mailed: 02/12/88
Permit: AC 56-141460

PS Form 3800, June 1985 ★ U.S.G.P.O. 1985-480-794

RETURN

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.
Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fee and check box(es) for additional service(s) requested.
1. ☐ Show to whom delivered, date, and addressee's address. 2. ☐ Restricted Delivery

3. Article Addressed to:
Mr. Harry Schindehette, Director
Ft. Pierce Utilities Authorities
P.O. Box 3191
Ft. Pierce, FL 33448

4. Article Number
P 274 010 115

Type of Service:
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Addressee
X L. Daughtry

6. Signature — Agent
X

7. Date of Delivery
FEB 17 1988

8. Addressee's Address (ONLY if requested and fee paid)

PS Form 3811, Feb. 1986 DOMESTIC RETURN RECEIPT

FORT PIERCE UTILITIES AUTHORITY
UTILITIES ENGINEERING DEPARTMENT
P. O. BOX 3191
FORT PIERCE, FLORIDA 33448
(305) 464-5600

LETTER OF TRANSMITTAL

DATE	JOB NO.
10-30-87	

ATTENTION

RE: Application to Construct Air Pollution Source @ Combined Cycle Power Plant - Ft. Pierce, FL.

TO Clair H. Fancy, P.E. Deputy Chief
Bureau of Air Quality Management
Florida Department of Environmental Regulations
2600 Blair Stone Road
Twin Towers Office Building
Tallahassee, FL 32301

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
4	10-28-87		Subject Report
1	10-30-87		Check for $1,000

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO _____

SIGNED: Victor F. Garrions P.E.

VENDOR COPY

PURCHASE ORDER

ORDER NO. 21171

Date 10-30-87

FT. PIERCE UTILITIES AUTHORITY

P.O. BOX 3191
FT. PIERCE, FLORIDA 33454
PHONE (305) 464-5600

2090

BILL TO →

FOLD →

SHIP TO →

- ☐ Ft. Pierce Utilities - Warehouse
  25th Street & Florida Avenue
- ☐ Ft. Pierce Utilities – Warehouse
  Savannah Road
- ☐

Not to exceed $5000

Bureau of Air Quality Management
Fla. Dept. of Environmental Regulation
2600 Blair Stone Road -Twin Towers Bldg.
Tallahassee, FL 32301

DIRECTOR OF UTILITIES

REQUIRED DELIVERY DATE:

FOLD →

QUANT.	ACCOUNT CODE	CATALOG NO. & DESCRIPTION	UNIT PRICE	TOTAL
		Permit Application Fee		1,000.00
		for No. 9 Combined Cycle Gas		
		Turbine.		

1987 NOV -2 AM 11:19

RECEIVED
DER - MAIL ROOM

1031

☐ Verbal Quote ☐ Informal Written Quote (U.A. No. _____) ☐ Formal Written Quote (U.A. Bid No. _____)

TERMS & CONDITIONS

1. C.O.D Shipments are not accepted under any circumstance.
2. Prepay & add freight on all orders which are not specified-F.O.B. Ft. Pierce, Florida.
3. Invoices must bear purchase order number.
4. The Ft. Pierce Utilities Authority is exempt from payment of Excise Tax in Accordance with Title 26 United States Code Annotated, and is exempt from the payment of Fla. State Tax.

TAX EXEMPT CERTIFICATE #
66-02-05279-84

Federal Express
055456240
PM
10.30.87
Ft. Pierce, FL

File Copy

APPLICATION TO CONSTRUCT

AIR POLLUTION SOURCE

COMBINED CYCLE POWER PLANT

FORT PIERCE UTILITIES AUTHORITY
FORT PIERCE, FLORIDA

Ft. Pierce Utility Authority
AC 56-141460

Date Complete: Dec. 18, 1987
TE/PD Mailed: Feb. 12, 1988 } 57 days
Proof of PIN Rec'd: Feb. 22, 1988 } 14 day P/N Req.
Mar. 06, 1988
Mar. 07, 1988 = 58 day } 82 days
Mar. 31, 1988
Day 90 = Apr. 08, 1988

Prepared by:

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.

October 28, 1987

Subcode - 01

P2093

WATER GAS
ELECTRIC SEWER

FORT PIERCE UTILITIES AUTHORITY

206 S. SIXTH STREET * P. O. BOX 3191 * FORT PIERCE, FLORIDA 33450 * PHONE (305) 464-5600

October 28, 1987

Clair H. Fancy, P.E., Deputy Chief
Bureau of Air Quality Management
Florida Department of Environmental Regulation
2600 Blair Stone Road
Twin Towers Office Building
Tallahassee, Florida 32301

DER
NOV 2 1987
BAQM

Subject: **Construction Permit Application**
No. 9 Combined Cycle Gas Turbine

Dear Mr. Fancy:

The Fort Pierce Utilities Authority is currently upgrading and modernizing the H.D. King Electric Generating Plant. The major feature of this modernization program is construction of the new No. 9 Combined Cycle Gas Turbine. The installation will combine a gas turbine generator rated at 23.4 megawatts with a waste heat recovery steam generator which will repower the existing No. 5 power generator (8.2 megawatts).

The new facility will be more efficient and will require less fuel per kilowatt-hour to operate than the existing No. 7 and No. 8 Boilers. Consequently, we plan to maximize the operation of Unit No. 9 and curtail the operation of the older boilers.

We are very anxious to modernize our plant and request that you expedite the processing of this permit application package.

Very truly yours,

Harry Schindehette, P.E.
Director of Utilities

HS/cdb

Copied Teresa Heron } 11/4/87
I Goldman } 11/13/87 2nd time.

TABLE OF CONTENTS

COMBINED CYCLE POWER PLANT

FORT PIERCE UTILITIES AUTHORITY
FORT PIERCE, FLORIDA

11/13/87

Contacted I. Goldman and asked if he had received this permit, he said they do not have a copy in house so I put one in the mail to him on Nov. 13, 1987 mf

ESE
AN RSH COMPANY
ENVIRONMENTAL SCIENCE
AND ENGINEERING, INC.

October 28, 1987

Clair H. Fancy, P.E., Deputy Chief
Bureau of Air Quality Management
Florida Department of Environmental Regulation
2600 Blair Stone Road
Twin Towers Office Building
Tallahassee, Florida 32301

Subject: **Application to Construct Air Pollution Source**
No. 9 Combined Cycle Gas Turbine
Fort Pierce Utilities Authority
Fort Pierce, Florida

Dear Mr. Fancy:

We have prepared this construction permit application package on behalf of the Fort Pierce Utilities Authority (FPUA). When issued, the permit will allow FPUA to upgrade the H.D. King Electric Generating Plant by constructing a new combined cycle unit.

Enclosed is a check for $1,000.00 payable to the Florida Department of Environmental Regulation as required by FAC 17-4.050(4)(a)1, for the application review fee.

This application package contemplates the construction of a combined cycle unit consisting of:

- A gas turbine and generator (23.4 megawatts),
- A waste heat recovery steam generator (HRSG), and
- All auxiliary equipment.

The waste heat recovery steam generator will repower the existing No. 5 generator (8.2 megawatts) as well as provide steam injection to control NO_x emissions from the gas turbine.

The combined cycle unit is more efficient and will require less fuel per kilowatt-hour to operate. Use of the more efficient No. 9 generator will allow FPUA to substantially reduce the operating hours of the less efficient Units 7 and 8.

Since the project is a modification of a major source in an attainment area, we have appended a contemporaneous emissions calculation to this permit application package. By using the increased efficiency from the new combined cycle unit, the steam injection for control of NO_x

emissions and a reduction in operating hours for Units 7 and 8, it is clear that the projected emissions will not exceed any of the significant emissions increase limits. Consequently, a new source review is not required.

We are understandably anxious to proceed on this project and will appreciate any effort by your office to expedite its processing.

Please feel free to call me at (904) 739-2007 if you have any questions or require additional information.

Very truly yours,

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.

Lloyd H. Stebbins, P.E.
Manager
Industrial Environmental Department
Jacksonville Regional Office

LHS/cdb

Enclosures

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DATE: 10-30-87

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1 From (Your Name): Victor E. Garrison, P.E. | Your Phone Number (Very Important): (305)464-5600

F

Company: FT PIERCE UTILITIES AUTHORITY | Department/Floor No.

00

Street Address: 206 S 6TH ST

City: FT PIERCE | State: FL

ZIP® Zip Code Required For Correct Invoicing: 3 3 4 5 4

2 To (Recipient's Name): Clair H. Fancy, P.E. | Recipient's Phone Number (Very Important): 904 488-8163

Company: Fla. Dept. Environ. Regulation | Department/Floor No.

Exact Street Address (Use of P.O. Boxes or P.O.® Zip Codes Will Delay Delivery And Result in Extra Charge.): 2600 Blair Stone Rd-Twin Towers Bldg

City: Tallahassee, | State: FL

ZIP Street Address Zip Required (No P.O. Box® Zip Code): 3 2 3 0 1

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4 [ ] Overnight Tube 38"x 6"x 6"x 6" B [ ]

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8 [ ]
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Receipt 76191
$1000.00
AC 56-141460

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

DER

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

NOV 2 1987

BAQM

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

APPLICATION TO ~~OPERATE~~/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Combined Cycle Power Plant [X] New[1] [ ] Existing[1]

APPLICATION TYPE: [X] Construction [ ] Operation [ ] Modification

COMPANY NAME: Fort Pierce Utilities Authority COUNTY: St. Lucie

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) Gas Turbine/Waste Heat Boiler

SOURCE LOCATION: Street 311 North Indian River Drive City Fort Pierce

UTM: East 566.8 North 3,036.3

Latitude 27 ° 27 ' 00 "N Longitude 80 ° 19 ' 26 "W

APPLICANT NAME AND TITLE: Harry Schindehette, Director

APPLICANT ADDRESS: FPUA, P.O. Box 3191, Fort Pierce, Florida 33448

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Fort Pierce Utilities Authority

I certify that the statements made in this application for a Construction permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

REFER TO ATTACHMENT 1

Signed: [signature]

Harry Schindehette, Director
Name and Title (Please Type)

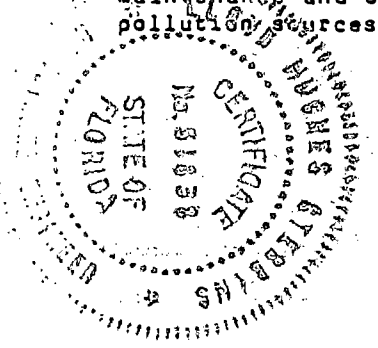
Date: 10-30-87 Telephone No. (305)464-5600

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.



Signed _____

Lloyd H. Stebbins

Name (Please Type)

Environmental Science and Engineering, Inc.

Company Name (Please Type)

P.O. Box 4943, Jacksonville, Florida 32201

Mailing Address (Please Type)

Florida Registration No. 31838 Date: 10/29/87 Telephone No. (904)739-2007

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

Refer to Attachment 2, Process Description, and Attachment 8, Process Flow Diagram

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction November 1, 1987 Completion of Construction December 1, 1988

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Steam injection for reduction of NO_x emissions is an integral part of the gas turbine.

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

N/A

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 40 ;

if power plant, hrs/yr 6720; if seasonal, describe: N/A

F. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? NO

   a. If yes, has "offset" been applied? NO

   b. If yes, has "Lowest Achievable Emission Rate" been applied? NO

   c. If yes, list non-attainment pollutants. N/A

2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. NO

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. NO

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? YES

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? NO

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? NO

   a. If yes, for what pollutants? N/a

   b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted.

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

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SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
Water	(N/A - NO EMISSIONS FROM WATER)			

B. Process Rate, if applicable: (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr): 101,276 (Water)

2. Product Weight (lbs/hr): 87,000 (Steam)

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

REFER TO ATTACHMENT 4

Name of Contaminant	Emission[1]		Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Potential[4] Emission ***		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr*			lbs/yr	T/yr	
Particulates	4.0	13.44	N/A	N/A	26,880	13.44	A
SO_x	0.17	0.576	0.015%by vol **	275.8	1,853,376	926.69	A
NO_x	51.3	172.5	0.168%byvol **	110.9	745,248	372.62	A
VOC	3.6	12.1	N/A	N/A	24,192	12.1	A
CO	32.85	110.4	N/A	N/A	220,752	110.4	A

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard.

[4]Emission, if source operated without control (See Section V, Item 3).

*Calculated. Refer to Attachment 4.

** Rule 17-2.660(2)(a), F.A.C. - Standards of Performance for New Stationary Sources

***Since there are no external control devices, the potential emissions will be the same as the allowable emissions for SO_x and NO_x. Since the rule does not prescribe allowable emissions for particulates, VOC and CO, the actual emissions have arbitrarily been used for this purpose.

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
NO_x emissions control by steam injection is an integral part of the gas turbine.				

E. Fuels REFER TO ATTACHMENT 5.

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Natural Gas	0.2858	0.396	396
No. 2 Distillate Fuel Oil (Emergency Back-Up)	2047	3000	415.3

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis: Natural Gas

Percent Sulfur: 0.0288% Percent Ash: N/A

Density: 0.0468 lb/SCF Typical Percent Nitrogen: 0.78%

Heat Capacity: 21,369 BTU/lb 1000 Btu/SCF

Other Fuel Contaminants (which may cause air pollution): REFER TO ATTACHMENT 4

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average N/A Maximum N/A

G. Indicate liquid or solid wastes generated and method of disposal.

N/A

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: 60 ft. Stack Diameter: 9'3" x 10' 7 1/8" * ft.

Gas Flow Rate: 353,500** ACFM 172,000** DSCFM Gas Exit Temperature: 450 °F.

Water Vapor Content: 10.06 % Velocity: 60 FPS

*Rectangular Stack **Calculated REFER TO ATTACHMENT 6

SECTION IV: INCINERATOR INFORMATION N/A

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated							
Uncontrolled (lbs/hr)							

Description of Waste _____

Total Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____

Approximate Number of Hours of Operation per day _____ day/wk _____ wks/yr. _____

Manufacturer _____

Date Constructed _____ Model No. _____

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: _____ ft. Stack Diamter: _____ Stack Temp. _____

Gas Flow Rate: _____ ACFM _____ DSCFM* Velocity: _____ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner

[ ] Other (specify) _____

Brief description of operating characteristics of control devices:

N/A

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

N/A

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]

   REFER TO ATTACHMENT 3.

2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.

   REFER TO ATTACHMENT 4.

3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).

   REFER TO ATTACHMENT 4.

4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)

   REFER TO ATTACHMENT 4.

5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).

   REFER TO ATTACHMENT 4.

6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.

   REFER TO ATTACHMENT 7.

7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).

   REFER TO ATTACHMENT 8.

8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

   REFER TO ATTACHMENT 9.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.
ATTACHED.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.
N/A

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY N/A

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

[X] Yes [ ] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

[ ] Yes [ ] No

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:

*Explain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device:

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

[1]Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION N/A

A. Company Monitored Data

1. _____no. sites _____ TSP _____( ) SO^2* _____ Wind spd/dir

Period of Monitoring ____/____/____ to ____/____/____
month day year month day year

Other data recorded _____

Attach all data or statistical summaries to this application.

*Specify bubbler (B) or continuous (C).

2. Instrumentation, Field and Laboratory

a. Was instrumentation EPA referenced or its equivalent? [ ] Yes [ ] No

b. Was instrumentation calibrated in accordance with Department procedures?

[ ] Yes [ ] No [ ] Unknown

B. Meteorological Data Used for Air Quality Modeling

1. _____ Year(s) of data from ____/____/____ to ____/____/____
month day year month day year

2. Surface data obtained from (location)_____

3. Upper air (mixing height) data obtained from (location)_____

4. Stability wind rose (STAR) data obtained from (location)_____

C. Computer Models Used

1. _____ Modified? If yes, attach description.

2. _____ Modified? If yes, attach description.

3. _____ Modified? If yes, attach description.

4. _____ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate	
TSP	_____	grams/sec
SO^2	_____	grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description of point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

ATTACHMENT 1

SECTION I A

AUTHORIZATION

RESOLUTION NO. U.A. 81-2

A RESOLUTION AUTHORIZING THE DIRECTOR OF UTILITIES TO EXECUTE AND FILE CERTAIN PERMIT APPLICATION FORMS, AND EXECUTE AND FILE PETITIONS FOR FEDERAL ASSISTANCE AND/OR GRANTS; AND SETTING AN EFFECTIVE DATE.

WHEREAS, it is necessary from time to time for the Fort Pierce Utilities Authority of the City of Fort Pierce, Florida, to secure certain permits from certain agencies for certain construction, and file petitions for federal assistance and/or grants; and

WHEREAS, the permit application forms require the signature of an official authorized by law to act for said Authority;

NOW, THEREFORE, BE IT RESOLVED BY THE FORT PIERCE UTILITIES AUTHORITY OF THE CITY OF FORT PIERCE, FLORIDA:

SECTION 1. That the Director of the Fort Pierce Utilities Authority be, and is hereby directed to execute and file on behalf of the Fort Pierce Utilities Authority, all forms necessary for permission to construct, operate and maintain various facilities when said work pertains to any of the following agencies:

(a) The State Department of Transportation of the State of Florida

(b) The State Board of Health of the State of Florida

(c) The Central and Southern Florida Flood Control District of the State of Florida.

(d) The Florida East Coast Railway Company

(e) The Corps of Engineers, U. S. Department of the Army

(f) Florida Department of Environmental Regulation

(g) Environmental Protection Agency

(h) Department of Urban Development

SECTION 2. The Director of Utilities be, and is hereby directed, to execute and file petitions for federal assistance and/or grant applications for the study, planning, designing and construction, and other affidavits associated with such filings, of various facilities of the Fort Pierce Utilities Authority of the City of Fort Pierce, Florida.

SECTION 3. That the within resolution shall supercede Resolution U. A. 72-5 and shall become effective as of January 1, 1981.

PASSED AND ADOPTED this 3rd day of February, 1981.

ATTEST:

Secretary

Chairman

ATTACHMENT 2

PROCESS DESCRIPTION

COMBINED CYCLE UNIT

FORT PIERCE UTILITIES AUTHORITY
FORT PIERCE, FLORIDA

The new facility will consist of a combustion turbine-generator, a heat recovery steam generator (HRSG), cooling tower, and a steam turbine-generator. This configuration (Attachment 8-Process Flow Diagram) is commonly called a combined cycle facility because two separate energy producing cycles are combined to achieve greater overall efficiency.

Electrical energy will be produced directly from the combustion turbine-generator (23.4 MW). A significant portion of the waste heat from the products of combustion will be captured by passing the hot gas stream through a heat recovery steam generator (boiler). The steam produced will drive a smaller (8.2 MW) condensing turbine-generator.

Power produced by the facility will be transferred to the Authority's transmission system via step-up transformers and the existing 69kV substation at the powerplant.

The combined cycle unit will provide baseload power to the Fort Pierce community and the regional grid.

The new unit will use natural gas as the primary fuel and No. 2 fuel oil as an emergency secondary fuel.

Emissions control will be provided by steam injection into the turbine, which will reduce NO_x emissions by 65%.

23.4
8.2
31.6

ATTACHMENT 3
SECTION III.B., PROCESS RATE

FORT PIERCE UTILITIES AUTHORITY
FORT PIERCE, FLORIDA

Calculate total process input rate and product weight.

III.B.1. Total Process Input Rate (lbs/hr)

The only raw material in this process is the feedwater to the heat recovery steam generator (HRSG).

Consider a mass balance around the boiler:

Total Process Input Rate =
Product Steam + NO_x Control Steam + Blowdown

Evaluating the right side of the equation,

Product Steam = 87,000 lbs/hr [vendor guarantee]

NO_x Control Steam = 12,250 lbs/hr [vendor guarantee]

Assuming that blowdown is 2% of the HRSG feedwater flow (Total Process Input Rate),

Blowdown = 0.02 (Total Process Input Rate)
= 0.02 (87,000 + 12,250 + Blowdown)
= 0.02 (99,250 + Blowdown)
= 1985 + 0.02 (Blowdown)
= 2,026 lbs/hr

Therefore,

Total Process Input Rate = 87,000 + 12,250 + 2026 = **101,276 lbs/hr**

III.B.2. Product Weight (lbs/hr)

The only product measurable by weight is net steam to service.

Total Product Weight = **87,000** lbs/hr steam [vendor guarantee]

ATTACHMENT 4

SECTION III C

EMISSIONS CALCULATIONS
NO. 9 COMBINED CYCLE GAS TURBINE

Since no representative test data is available, the following emissions calculations are based on the "National Emissions Data System (NEDS) Source Classification Codes (SCC) and Emission Factor Listing," EPA, October 1985.

Calculated Emissions (Tons/Year) =

$$\frac{\text{Annual Operating Rate for SCC} \times \text{Emission Factor from SCC File} \times \text{Fuel Parameter if applicable}}{(2{,}000\ \text{lb/ton})} \times \frac{100 - \text{Control Eff}}{100}$$

where:

Annual Operating Rate = Millions of Cubic Feet of Natural Gas Burned/Year

Emission Factor = Pounds of Pollutant/Million Cubic Feet of Gas Burned

Fuel Parameter = Ash or Sulfur Content of Fuel on a Weight Percent (%) Basis [Not Applicable for Combustion of Natural Gas]

Control Efficiency = Pollution Control Device Percent (%) Efficiency [Since No External Control Devices Are Included, This Factor Only Applies To NO_x]

EMISSIONS

A. ANNUAL OPERATING RATE

Using 40 wks/yr baseloading, the total annual operating time becomes,

24 hr/day x 7 days/wk x 40 wks/yr = 6720 hrs/yr

From Attachment 5,

Fuel Consumption Rate = 0.2858×10^6 CF/hr

Consequently, the Annual Operating Rate is,

$$6720 \text{ hrs/yr} \times 0.2858 \times 10^6 \text{ CF/hr} = 1920.58 \times 10^6 \text{ CF/yr}$$
$$= 1920.58 \text{ Million Cubic Feet Burned/Yr}$$

B. EMISSION FACTORS

From NEDS SCC 2-01-002-01 [Internal Combustion Engines - Electric Generation - 4911]

Natural Gas Emissions,

Pounds Of Pollutant Emitted Per Million CF Burned

Particulates	SO_x	NO_x	VOC	CO
14	0.6	413	12.6	115

C. FUEL PARAMETERS

Not applicable for natural gas.

D. CONTROL EFFICIENCY

Based on information from the turbine manufacturer (Refer to Attachment 7), Figure 17 on page 11 indicates the relationship of the ratio of NO_x with water/NO_x dry to the water/fuel mass ratio.

From Attachment 3, Steaming Rate for NO_x Control = 12,250 lb/hr
From Attachment 5, Fuel Consumption Rate = 285,800 CF/hr

Since,

Density of Air = 0.0808 lb/CF (from Perry's Chemical Engineers Handbook, 4th Ed., 1963)
Specific Gravity of Natural Gas = 0.579 (from fuel specifications)

Then,

Fuel Consumption Rate (Weight Basis)
= 285,800 CF/hr x 0.0808 lb/CF x 0.579 = 13,371 lb/hr

Consequently, the steam/fuel ratio becomes,

12,250 lb/hr steam/13,371 lb/hr fuel = 0.916 steam/fuel mass ratio

However, the vendor also reports that:

For a given NO_x reduction, approximately 1.62 times as much steam as water on a mass basis is required for NO_x Control.

Therefore, the steam/fuel ratio can be converted to the water/fuel ratio as follows:

$$\frac{0.916}{1.62} = 0.565 \text{ lbs/hr water/lbs/hr fuel}$$

A water/fuel mass ratio of 0.565 is equivalent to a NO_x with water/NO_x dry ratio of 0.435 (Attachment 7 - Page 11, Figure 17). Consequently, equivalent NO_x reduction efficiency is,

$$(1.00 - 0.435) \times 100 = 56.5\%$$

The control efficiency factor then becomes,

$$\frac{100 - 56.5}{100} = 0.435$$

EMISSIONS CALCULATIONS

The total annual emissions of each pollutant can readily be determined by finding the product of the values in paragraphs A, B, C, and D divided by the conversion factor, 2000 lbs/ton.

PARAMETER	A	x	B	x	C	x	D	=	ANNUAL EMISSIONS (T/Y)
Particulate	$\frac{1920.58}{2000}$		14						= 13.44
SO_x	$\frac{1920.58}{2000}$		0.6						= 0.576
NO_x	$\frac{1920.58}{2000}$		413			x	0.435		= 172.52
VOC	$\frac{1920.58}{2000}$		12.6						= 12.10
CO	$\frac{1920.58}{2000}$		115						= 110.4

ALLOWABLE EMISSIONS

According to the New Source Performance Standards (NSPS), 40 CFR 60, Subpart GG - Standards of Performance for Stationary Gas Turbines:

Standard for SO_2 = 0.015 percent by volume of stack gases at 15% oxygen on a dry basis, 40 CFR 60.333(a).

Standard for NO_x = [0.0150 (14.4/Y)] + F

where STD = Allowable NO_x emissions (percent by volume at 15% oxygen and on a dry basis.

Y = mfr's rated peak load (kilojoules per watthour, not to exceed 14.4 kilojoules per hour.

F = NO_x emission allowance for fuel-bound nitrogen.

ALLOWABLE SULFUR DIOXIDE EMISSION LIMIT

From Attachment 6, the dry stack gas flow rate at standard conditions is 10.32 x 10^6 DSCFH.

Applying the regulatory emission limit allows calculation of the volumetric flow of SO_2,

$$0.00015 \times (10.32 \times 10^6 \text{ DSCFH @ } 32°F) = 1548 \text{ DSCFH } SO_2$$

Converting to a lb mol/hr emission rate,

$$1548 \text{ DSCFH}/(359 \text{ CF/lb mol}) = 4.31 \text{ lb mol/hr}$$

Since the mol density of SO_2 is,

$$SO_2 = 64 \text{ lb/lb mol}$$

Then,

$$4.31 \times 64 = 275.8 \text{ lb/hr } SO_2$$

The total allowable annual emissions become,

$$275.8 \text{ lb/hr} \times 6720 \text{ hr/yr}/2000 \text{ lb/ton} = 926.69 \text{ T/Y } SO_2$$

ALLOWABLE NITROGEN OXIDES EMISSION LIMIT

Use the above formula to determine the NO_x emission limit. Since "Y" is expressed in kilojoules per watt hour, the heat input rate must first be converted to kilojoules per hour.

Heat Input Rate of Gas Turbine = 285.8 x 10^6 Btu/hr.

Since There are 1054 joules in a Btu,

$$285.8 \times 10^6 \text{ Btu/hr} \times 1.054 \text{ kilojoules/Btu} = 301.2 \times 10^6 \text{ kilojoules/hr.}$$

The gross power output of the turbine generator is 23,410 KWH.

Therefore,

$$Y = \frac{301.2 \times 10^6 \text{ kilojoules/hr}}{23.4 \times 10^6 \text{ watt hr}} = 12.87 \text{ kilojoules/watt hr.}$$

Typically, natural gas has virtually no fuel-bound nitrogen.

Consequently,

$$F = 0$$

Therefore,

Allowable emissions =

$$STD = 0.0075 \times (14.4/12.87) = 0.00839\% \text{ by volume.}$$

Using the dry stack gas flow rate from Attachment 6, find the standard volumetric flow rate of NO_x.

$$0.0000839 \times (10.32 \times 10^6 \text{ DSCFH @ } 32°F) = 865.8 \text{ DSCFH } NO_x.$$

Converting to a lb mol/hr emission rate,

$$865.8 \text{ DSCFH}/(359 \text{ CF/lb mol}) = 2.41 \text{ lb mol/hr } NO_x.$$

Since the mol density of NO_x is,

$$NO_x = 46 \text{ lb/lb mol as } NO_2.$$

Then,

$$2.41 \times 46 = 110.9 \text{ lb/hr } NO_x.$$

The total allowable annual emissions become,

$$110.9 \text{ lb/hr} \times 6720 \text{ hr/yr}/2000 \text{ lb/ton} = 372.6 \text{ T/Y } NO_x \text{ as } NO_2.$$

POTENTIAL EMISSIONS

Since there are no external control devices, the potential emissions will be the same as the allowable emissions.

ATTACHMENT 5

SECTION III E

FUELS

NATURAL GAS

Fuel Consumption

Based on Specifications and Manufacturers Guarantees:

Base Load Conditions:

Gross Output = 23,410 KW

Heat Input Rate = 285.8×10^6 Btu/hr

From the Fuel Specification,

Heat content of the natural gas = 1000 Btu/CF

Therefore,

$$\frac{285.8 \times 10^6 \text{ Btu/hr}}{1{,}000 \text{ Btu/CF}} = 0.2858 \times 10^6 \text{ CFH at Base Load Conditions}$$

$$= \underline{\textbf{0.2858 MMCF/hr at Base Load}}$$

Heat Input

Maximum design flow rate = 6,600 CFM

Consequently,

$$6{,}600 \text{ CFM} \times 1{,}000 \text{ Btu/CF} \times 60 \text{ min/hr} = 396 \times 10^6 \text{ Btu/hr Maximum}$$

$$= \underline{\textbf{396 MMBtu/hr Maximum}}$$

Percent Sulfur

Based on specifications, the natural gas contains

0.1 gr H_2S/SCF Natural Gas

0.1 gr/SCF = 0.0000143 lb/SCF Natural Gas

Therefore,

$$\frac{0.0000143 \text{ lb } H_2S/\text{SCF Natural Gas}}{0.0468 \text{ lb Natural Gas/SCF Natural Gas}} = 0.000306 \text{ lb } H_2S/\text{lb Natural Gas}$$

$$= 0.0306\% \ H_2S$$

Since the relative weights of sulfur and hydrogen sulfide can be expressed as,

$$\frac{S}{H_2S} = \frac{32}{34}$$

Then the weight percent of sulfur in natural gas becomes,

$$0.0306\% \ H_2S \times \frac{32}{34} = \underline{\underline{\mathbf{0.0288\%S}}}$$

Density

Based on specifications, the molecular weight of natural gas is 16.8 lb/lb mol.

Therefore,

$$\text{Density} = \frac{16.8 \text{ lb/lb mol}}{359 \text{ SCF/lb mol}} = \underline{\underline{\mathbf{0.0468 \text{ lb Natural Gas/SCF Natural Gas}}}}$$

Heat Capacity

Based on specifications, the natural gas has 1,000 Btu/SCF.

Therefore,

at 1,000 Btu/SCF, and
at 16.8 lb/lb mol, and
359 SCF/lb mol

the heat capacity of natural gas =

$$\frac{359 \text{ SCF/lb mol} \times 1000 \text{ Btu/SCF}}{16.8 \text{ lb/lb mol}} = \underline{\underline{\mathbf{21{,}369 \text{ Btu/lb}}}}$$

NO. 2 FUEL OIL

Based on Specification and Manufacturers Guarantees:

Base Load Conditions:

Gross Output = 22,930 KW

Heat Input Rate = 283.4×10^6 Btu/hr

From the fuel specifications,

Heat content of the fuel oil = 138,441 Btu/gal

Therefore,

$$\frac{283.4 \times 10^6 \text{ Btu/hr}}{138{,}441 \text{ Btu/gal}} = \underline{\textbf{2,047 gal/hr at Base Load Conditions}}$$

Maximum design flow rate = 50 gpm

Converting to a per hour basis,

50 gpm x 60 min/hr = 3,000 gph

Consequently,

3,000 gph x 138,441 Btu/gal = 415.3×10^6 Btu/hr Maximum

= **415.3 MMBtu/hr Maximum**

SECTION 01005

FUEL SPECIFICATION

PART 1 - NATURAL GAS AND NO. 2 FUEL OIL

1-01 GAS ANALYSIS BY FLORIDA GAS TRANSMISSION CO.:

GAS ANALYSIS ID NUMBER 86 0135 MEAS. DIST. 07

METER STATION NAME FLA HYDROCARBON - OUTLET STATION NO. 47188

FIELD DATA TAKEN BY A. Kattawar DATE TAKEN 02-24-86

PRESSURE	630	TEMPERATURE	0	SPEC GRAV	0.5790
BTU	1016	WATER	0.0000	H_2S	0.1 gr

DATA ANALYZED BY Michael P. Campo DATE ANAL. 03-06-86

COMPONENT	MOLE %	B.T.U.	SPEC GRAV.
OXYGEN	0.0000	0.0000	0.0000
NITROGEN	0.7800	0.0000	0.0075
CARBON DIOXIDE	0.9240	0.0000	0.0140
METHANE	95.6260	951.0000	0.5298
ETHANE	2.4310	42.3500	0.0252
PROPANE	0.1990	4.9300	0.0030
I BUTANE	0.0170	0.5400	0.0003
N BUTANE	0.0130	0.4200	0.0003
I PENTANE	0.0030	0.1200	0.0001
N PENTANE	0.0020	0.0800	0.0000
HEXANE PLUS	0.0050	0.2600	0.0002
TOTALS	100.0000	999.7000	0.5804

BTU/CU FT AT 14.73 PSIA 60 DEG F CORRECTED FOR Z

CALCULATED	SATURATED 1002	DRY 1020	0.0000 LB/MMCF 1020
CALORIMETER	SATURATED 1005	DRY 1023	
SPECIFIC GRAVITY - AIR = 1.0000		CALC 0.5804	RANAREX 0.5800

COMPRESSIBILITY FACTOR - Z = 0.9979

SUPERCOMPRESSIBILITY FACTOR CALC AT	0.5800 SP GR	600 PSIG	90 DEG
BY TEST WITH BURNETT APPARATUS	1.0362		
CALC AGA-NX-19 NO DILUENTS	1.0369		
CALC AGA-NX-19 ADJUSTED FOR DILUENTS	1.0352		

NOTES PHYSICAL CONSTANTS FROM AGA 3
GPM FROM NGPA PUB NO. 2145-84
HEXANE PLUS DERIVED FROM PHILLIPS REF STANDARD

REMARKS: Percent difference with respect to Burrnett Apparatus for calculated value using AGA-NX-19 formula and adjusted for diluents equals (- 0.097).

1-02 NO. 2 FUEL OIL:

CERTIFICATE OF ANALYSIS OIL TESTS

		Date/Time	Analyst
A.P.I. Gravity @ 60°F	34.9	04/04/86 - 1100	RK
Sulphur, % by weight	0.355	04/07/86 - 0900	RK
BTU/lb	19,551	04/04/86 - 1300	RK
BTU/gal	138,441	04/04/86 - 1325	RK

PART 2 - (Not Used)

PART 3 - (Not Used)

END

ATTACHMENT 6

SECTION III H

EMISSION STACK GEOMETRY AND FLOW CHARACTERISTICS

The stack geometry calculation is based on the following project design conditions:

Turbine exhaust temperature: 924°F

Steam generator exhaust temperature: **450°F**

Turbine exhaust flow: 897,260 lb/hr

Using a typical turbine exhaust gas composition provided by the vendor, the pound molecular weight can be determined,

	VOLUME PERCENT	x	MOLECULAR WEIGHT	=	MOLE FRACTION
CO_2	2.617		44		1.151
H_2O	**10.059**		18		1.811
O_2	14.207		32		4.546
N_2	72.252		28		20.231
Ar	0.864		40		0.346
SO_2	0.00045		64		0.000
SO_3	0.00003		80		0.000
	99.99948				28.08 lb/lb mol

Using the mol density, calculate the stack gas flow rate at standard and actual conditions.

$$\frac{897{,}260 \text{ lb/hr}}{28.08 \text{ lb/lb mol}} = 31{,}954 \text{ lb mol/hr}$$

At standard conditions (32°F and 14.7 psia), the volume of 1.0 lb mol of any ideal gas equals 359 cubic feet.[1] Since the gases in the exhaust stream are similar to an ideal gas at standard conditions, the flow rate can be approximated as follows:

$$31{,}954 \text{ lb mol/hr} \times 359 \text{ CF/lb mol} = 11.47 \times 10^6 \text{ SCF/hr @ } 32°F$$

Correcting the exhaust gas flow rate for moisture and reducing to a per minute basis,

$$11.47 \times 10^6 \times [1.0 - 0.100597] = 10.32 \times 10^6 \text{ DSCFH @ } 32°F$$

Then,

$$10.32 \times 10^6 \text{ DSCFH}/60 \text{ min/hr} = \underline{\underline{\mathbf{172{,}000\ DSCFM}}}$$

At actual conditions,

$$31{,}954 \text{ lb mol/hr} \times 359 \text{ CF/lb mol} \times \frac{910° \text{ R}}{492° \text{ R}} = 21.21 \times 10^6 \text{ ACFH @ } 450°F$$

On a per minute basis, the actual exhaust gas flow rate becomes,

$$21.21 \times 10^6 \text{ ACFH}/60 = \underline{\underline{\mathbf{353{,}500\ ACFM}}}$$

Determine the velocity of the exhaust gases.

Design Stack Area: **9'3" x 10' 7 1/8"** (9.25 ft x 10.59 ft) = 97.96 ft^2

Since,

$$353{,}500 \text{ ACFM}/60 = 5{,}892 \text{ ACFS}$$

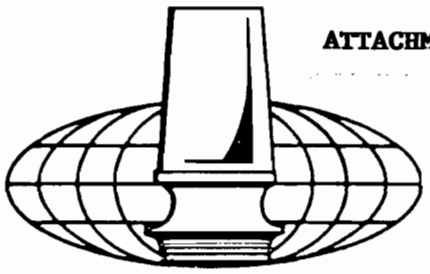
Then,

$$\frac{5892 \text{ CFS}}{97.96 \text{ ft}^2} = \underline{\underline{\mathbf{60.15\ FPS}}}$$

[1] "Introduction to Chemical Engineering," Anderson and Wenzel, McGraw-Hill Book Company, 1961, pg 126.

GAS TURBINE REFERENCE LIBRARY

ATTACHMENT 7



General Electric Gas Turbine Multiple-Combustion System

Edward J. Walsh

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Gas Turbine Engineering and
Manufacturing Department
Gas Turbine Division
Schenectady, New York

CONTENTS

A TABLE OF CONVERSION FACTORS IS INCLUDED AT THE END OF THIS PUBLICATION

INTRODUCTION

All gas turbine power plants require a mechanism for releasing chemical energy in fuel to do work on the turbine. This generally requires a combustion system for burning fuel gas or liquid petroleum hydrocarbons. The design of the combustor is governed by the overall objective of the power plant and the design base of the manufacturer. Initially, the basis for all General Electric gas turbine power plants, whether heavy-duty industrial and electrical applications or aircraft engines. was the multiple-combustor concept. Because of space and height requirements, aircraft combustors have evolved from can-annular systems to very short annular combustors used in modern jet-powered aircraft.

On the other hand, heavy-duty gas turbines have continued to use the multiple-combustor concept. This is due to a better fit with our industrial gas turbine requirements of packaged power units, ease of inspection

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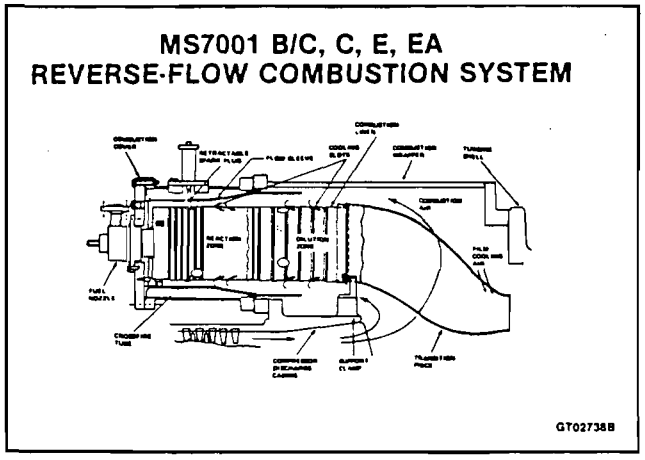

Figure 1

and maintenance, applicability for multiple fuels, and adaptability to low emission requirements. This provides the best opportunity for growth in future generations of gas turbines with increased firing temperatures and compressor pressure ratios.

As with most forms of energy conversion, the gas turbine affects the environment. The complex set of reactions that release the fuel energy also result in undesirable combustion emissions. The combustion system sustains, contains, and controls these reactions. The effects of gas turbine combustion exhaust emissions upon the environment is discussed in this paper, as well as the characteristics of these emissions, methods of measurement, and reduction techniques used to minimize adverse impact upon the environment. **The data presented are based upon specific tests; however, General Electric should be contacted for the values of emissions in a given application.**

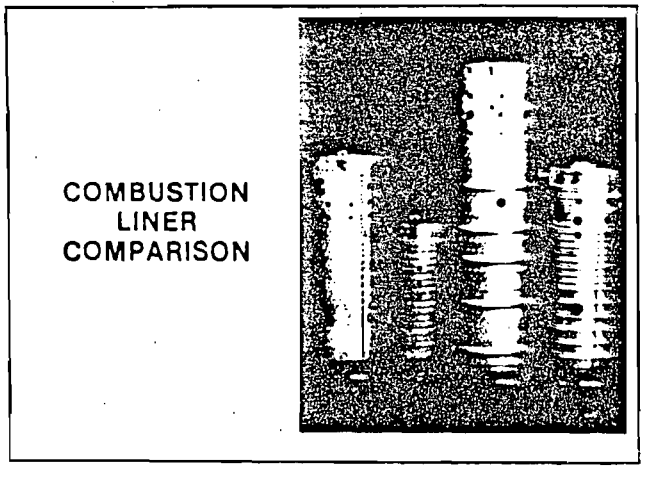

Figure 2

The commitment to continuous improvement of the reliability of the General Electric combustion systems is a very strong one. As the environmental requirements and fuels change, and as the machine ratings and efficiencies increase, General Electric is making changes in the combustion hardware to accommodate the aerodynamic and mechanical factors in order to maintain a reliable combustion system. This reliability not only includes the ability of the hardware to survive high temperature and vibration, but the combustor must ignite, crossfire and suppress smoke over a wide-operating range plus meet increasingly stringent environmental codes.

MULTIPLE-COMBUSTION SYSTEM

A typical reverse-flow multiple-combustion system, similar to those in most of the General Electric heavy-duty gas turbines, is shown in Figure 1. This system is a product of years of intensive development. In the combustor, a highly turbulent reaction occurs at temperatures above 3600 °F. The essential feature of the combustor is to stabilize the flame in a high velocity stream where sustained combustion is difficult. The combustion process must be stable over the wide range of fuel flows required for ignition, start-up, and full power. It must perform within desirable ranges of emissions, exit temperatures and fuel properties, and must minimize the parasitic pressure drop between compressor and turbine. General Electric's reverse-flow, multiple-combustion system adequately meets all these goals. The system is short, compact, lightweight and is mounted within the flange-to-flange machine on the same turbine base.

Only two basic combustion liner diameters are used for the entire heavy-duty product line. The number of liners is adjusted according to the machine airflow and pressure ratio. The liners for MS5001P, MS6001B, MS7001B, and MS7001E/MS9001E are shown in Figure 2. This standardization improves reliability and reduces the amount of development testing required.

The combustor ignition system uses spark plugs, crossfire tubes, and flame detectors. For reliability, two spark plugs and four (with Mark IV SPEEDTRONIC™) flame detectors are used. Ignition in one of the chambers produces a pressure rise which forces hot gases through the crossfire tubes, thereby propagating ignition to all other chambers within one second. Flame detectors, located diametrically opposite the spark plugs, signal the control system when the ignition process has been completed. Because of the relative simplicity and reliability of this technique, it is used in all General Electric-designed gas turbines.

Fuel is distributed into the combustion chambers by fuel nozzles. For gas, the fuel nozzle is a simple cap with accurately drilled metering holes. Liquid fuels are metered by a positive displacement gear element flow divider. Liquids are either pressure atomized or, if better smoke per-

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formance is required, air atomized. Residual fuel and crudes generally require atomizing air to achieve acceptable smoke performance.

The size of the combustion liners has been selected to provide the space required to completely burn residual fuel. Lighter fuels are easily burned in these liners. Smaller diameter combustors allow penetration of air jets into the combustor at acceptable pressure drops. This jet penetration is necessary to mix air with the fuel quickly to complete combustion without forming soot in fuel-rich pockets. The highly stirred flame produced by these jets also reduces radiation to the liner walls, benefiting liner life.

The combustion liners are made of a high-temperature material (Hastelloy-X) and carefully air cooled to tolerate high-temperature gases a few millimeters from the combustor liner wall. As firing temperatures have increased, more air is needed to combine with the fuel for adequate combustion and less air is available for liner wall cooling. This penalty has been offset by providing a more efficient cooling system and by reducing the surface area (length) of the liner. Louver cooling, which has been highly successful and reliable over the years, has been replaced by slot cooling in the turbines with the highest firing temperatures. The slot cooling method reduces liner material temperatures by 250 °F compared to an equivalent louver system.

The length of the combustor is selected to provide residence time to complete the combustion reaction for the variety of fuels burned in the turbine and to dilute the combustion products with excess air, forming a gas temperature profile acceptable to the turbine. The temperature profile of hot gases entering the turbine section is carefully developed to provide maximum life for the nozzles and buckets. The average radial profile from the combustors will produce lower temperatures near the bucket root where the centrifugal stress is maximum.

In the reverse-flow multiple-combustor arrangement, the transition piece (which channels the high-temperature gas from the combustion liner exit to the first-stage nozzle inlet) is cooled by air flowing from the compressor discharge. This provides effective convective cooling of the transition piece for firing temperatures up to 1850 °F. The radial outer wall of the transition piece near the first-stage nozzle is less effectively cooled, and at firing temperatures above 1850 °F, jet film cooling is added.

By virtue of its smaller size and weight, the multiple-combustor system has an inherent advantage over other systems in handling, shipping, erection, and material usage. Table 1 highlights some of the details of the General Electric multiple-combustion system.

Design Criteria

The combustion system is designed for a given application and machine series using analytical and experimental techniques. Much emphasis is placed upon tailoring the design to follow past practices and to take advantage of General Electric's many years of successful experience in the gas turbine field. Analytical techniques include sophisticated computer programs to determine airflow splits, heat transfer coefficients, flame temperature, flame radiation, estimated emissions, required equivalence ratios, structural loads, metal temperatures, operating stresses, and estimated dynamic pressure performance.

Once the general design of the combustor has been defined, conceptual layouts are made, analyzed, and modified. Hardware is procured, instrumented, and then tested in the Gas Turbine Development Laboratory. The gas turbine combustion system is evaluated on the basis of specific design parameters for which criteria are well established. Some of these parameters are listed in Table 2. After development testing, final detailed drawings are made.

Table 1

HIGHLIGHTS OF THE GEOMETRIC CONSTRUCTION OF THE GENERAL ELECTRIC MULTIPLE-COMBUSTION SYSTEM

	5001P	5002B	6001B	7001B	7001E	9001B	9001E
Number of Combustors	10	12	10	10	10	14	14
Liner Length/Diameter	40.5/10.7	44/10.7	29.0/10.7	56.6/14.3	38.6/14.3	56.6/14.3	38.6/14.3
Liner Weight	35	35	25	55	40	55	40
Transition Piece Length	34	26.5	19.7	36.2	36.7	43.3	23.75
Transition Piece Weight	47	36	61	100	120	84	65

NOTE: All dimensions in inches and weights in pounds

Table 2

COMBUSTION SYSTEM DESIGN PARAMETERS

- Ignition
- Low-and High-Flow Blowout
- Crossfiring
- Emissions
  - NO_x
  - CO^x
  - UHC
  - SO_x
  - Smoke
  - Particulates
- Efficiency
- Combustor Exit Temperature Profile
- Pressure Drop
  - -Stress Field
- Metal Temperatures
  - -Creep
  - -Gradients
- Dynamic Pressures
  - -Wear -LCF
  - -HCF
- Hardware Life
  - -Wear -Creep
  - -HCF -LCF

GAS TURBINE DEVELOPMENT LABORATORY

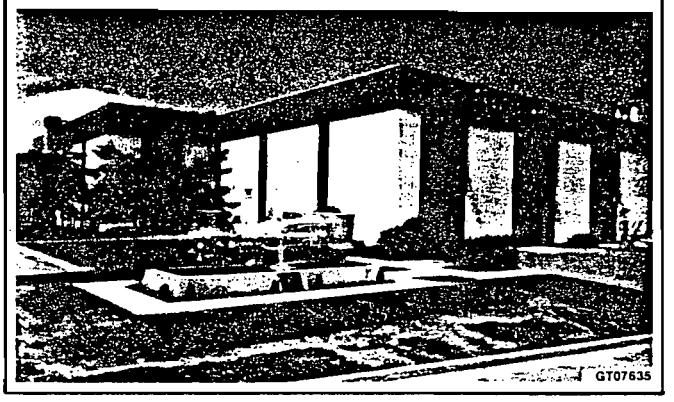


Figure 3

Ability to Test at Full Scale

Neither mathematical nor geometric modeling has been satisfactory for combustion development because a scale model does not reproduce the chemical reactions, heat release rates, and aerodynamic mixing of the completed design. Aerodynamic mixing, achieved by jet penetration from the walls of the combustor, is more difficult in a larger diameter combustor. For this reason, good smoke performance, which depends strongly on aerodynamic mixing, cannot be predicted from scale model tests. A practical combustor can be developed only in full-scale tests.

The predominant role of laboratory testing in combustor development underscores the desirability of the multiple-combustor approach. Almost all of the development work can be done on a full-size single burner test stand at full machine operating conditions, with only a fraction of the fuel and air in a full gas turbine.

As a result, all General Electric heavy-duty gas turbines with their fully-developed combustion systems are shipped from the factory with the system fully tuned. This precludes the need for any start-up adjustments and minimizes the need for running tests in the field at the customer's site. The erection of the gas turbine is simple and quick.

Development Laboratory

The General Electric Gas Turbine Division Development Laboratory is a multimillion dollar facility dedicated to the advancement of heavy-duty gas turbines. A major portion of this facility is configured to handle the various combustion development programs. Although component test rigs are used for fuel-nozzle design and development and selective screening tests are conducted using small atmospheric-type burners, all of the combustion systems designed by the Division are tested using full-scale hardware at machine airflow, pressure, and temperature.

The Development Laboratory shown in Figure 3 has a process air supply capable of delivering over 60 lb/sec of air, which is equivalent to a single combustion chamber for the largest General Electric gas turbine. The single-burner test stand can be linked to a pie-shaped cut from the gas turbine combustion system surrounded by a pressure vessel. The test rig is configured aerodynamically to simulate the flow passages within the gas turbine. Figure 4 shows a typical single-burner combustor test stand located in the Gas Turbine Development Laboratory. Instrumentation is placed strategically in and around the test rig to measure inlet airflow and fuel flow rates, combustion inlet and discharge temperatures, pressure drops, metal temperatures, emissions, and dynamic pressures.

TYPICAL COMBUSTION SINGLE-BURNER TEST STAND

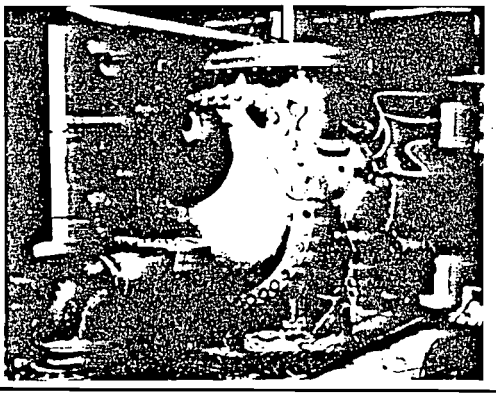


Figure 4

Table 3

GAS TURBINE EMISSIONS
BURNING CONVENTIONAL FUELS

Major Species	Typical Concentration (vol %)	Source	Comments
Nitrogen (N_2)	66-72	Inlet Air	—
Oxygen (O_2)	12-18	Inlet	—
Carbon Dioxide (CO_2)	1-5	Oxidation of Fuel Carbon	Greenhouse Effect Potential Concern
Water Vapor (H_2O)	1-5	Oxidation of Fuel Hydrogen	—
Pollutants	**Typical Concentration (pmmv)**	**Source**	**Comments**
Nitric Oxide (NO)	20-220	Oxidation of Atmosphere Nitrogen	U.S. EPA NSPS California—Some areas 140 lbm/hr
Nitrogen Dioxide (NO_2)	2-20	Oxidation of Fuel-Bound Organic Nitrogen	Other Local Areas More Stringent than NSPS
Carbon Monoxide (CO)	5-330	Incomplete Oxidation of Fuel Carbon	
Sulfur Dioxide (SO_2)	Trace-100	Oxidation of Fuel-Bound Organic Sulfur	U.S. EPA NSPS—Fuel Limitation
Sulfur Trioxide (SO_3)	Trace-3		California—Some Areas Include SO_3 in Particulates as $H_2SO_4 \cdot N H_2O$
Unburned Hydrocarbons (UHC)	5-300	Incomplete Oxidation of Fuel or Intermediates	Local Areas Because of Nonattainment or No Significant Deterioration
Particulate Matter Smoke	Trace-25	Inlet Ingestion, Fuel Ash, Hot-Gas-Path Attrition, Incomplete Oxidation of Fuel or Intermediates	California—Some Areas 10 lbm/hr Including SO_3 as H_2SO_4 Other Local Areas More Stringent

The Development Laboratory has various fuel supplies including propane, methane, distillate, residual, and special liquid fuels. In addition, it is possible to blend combustible gases with nitrogen to simulate low-Btu coal-derived fuels from either an air-blown gasifier or air/oxygen-blown gasifier. Special process gases can also be simulated. Each combustion system design is tested using the Laboratory facilities to verify performance. Hardware is modified and retested to ensure that all design goals established in the conceptual design phase are met.

EMISSIONS CHARACTERISTICS OF CONVENTIONAL COMBUSTION SYSTEMS

Emissions from the stationary gas turbine are listed in Table 3. As shown, there are two distinct categories. The major species CO_2, N_2, H_2O, and O_2 are present in percent concentrations. The minor species, or pollutants, such as CO, UHC, NO_x, SO_x, and particulates are present in parts per million concentrations. In general, given the fuel composition and machine operating conditions, the major species emissions can be calculated. The minor species, with the exception of total sulfur oxides, cannot. Characterization of the pollutants requires careful measurement and semitheoretical analysis.

The pollutants in Table 3 are a function of gas turbine operating conditions and fuel composition. In the following sections, each pollutant will be considered as a function of operating conditions under the broad subdivisions of gaseous and liquid fuels.

Nitrogen Oxides

Nitrogen oxides (NO_x = NO + NO_2) must be divided into two classes according to their mechanism of formation. Nitrogen oxides formed from oxidation of the free nitrogen in the combustion air or fuel are called

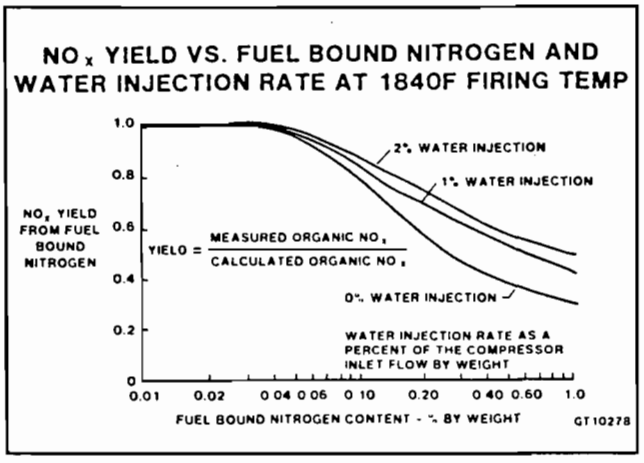


Figure 5

"thermal NO_x." They are mainly a function of the stoichiometric adiabatic flame temperature of the fuel which is the temperature reached by burning a theoretically correct mixture of fuel and air in an insulated vessel.

The following is the relationship between combustor operating conditions and thermal NO_x production:

- NO_x increases directly with fuel-to-air ratio
- NO_x increases exponentially with combustor inlet temperature
- NO_x increases with the square root of the combustor inlet pressure ratio
- NO_x decreases exponentially with increasing water or steam injection or increasing specific humidity

Emissions which are due to oxidation of organically bound nitrogen in the fuel (fuel-bound nitrogen) are called "organic NO_x". Only a few parts per million of the available free nitrogen are oxidized to form nitrogen oxide, but the oxidation of fuel-bound nitrogen (FBN) to NO_x is very efficient. As shown in Figure 5 for conventional combustion systems, the efficiency of conversion of FBN into nitrogen oxide is 100% at low FBN contents. At higher levels of FBN, the efficiency falls off to approximately 20% as shown.

Organic NO_x formation is less well understood than thermal NO_x formation. One important point is the reductions of flame temperatures to abate thermal NO_x have little positive, or even an adverse effect on organic NO_x. For liquid fuels, water and steam injection actually increases organic NO_x yields as shown in Figure 5.

Because of the lower hydrogen content of residual oils, the flame temperature for these fuels is, in general, lower that the flame temperature for No. 2 distillate. This property implies that they have the same or lower thermal NO_x production. Thus, the main feature of NO_x emissions for residual fuels containing significant FBN is the much greater contribution from organic NO_x and these fuels must be discussed on a case-by-case basis.

In general, gaseous fuels are classified according to their volumetric heating value. This value is useful in computing flowrates needed for a given heat input, sizing fuel nozzles and combustion chambers, and the like. However, the stoichiometric adiabatic flame temperature is a more important parameter for characterizing NO_x emission. Figure 6 shows relative thermal NO_x production plotted versus the stoichiometric adiabatic flame temperature of the fuel. The intermediate-Btu gases are of particular interest. Although their volumetric heating value is about 30% of that of natural gas, they produce one to four times as much NO_x. Data comparing No. 2 distillate and natural gas NO_x emission from a field test of an MS7001B confirm the importance of the flame temperature. The levels of emissions for natural gas are a very nearly constant fraction of those for No. 2 distilllate oil over the operating range of turbine inlet temperatures (see Figures 7, 8, and 9).

The low-Btu gases have, in general, flame temperatures below 3500 °F and correspondingly low thermal NO_x production. However, depending upon the fuel-gas clean-up train, these gases may contain significant quantities of ammonia. In a conventional combustion system, this contaminant is predicted to be converted, with a high efficiency, to NO_x. NO_x control measures such as water injection or steam injection which reduce flame temperature are predicted to have no effect on or to increase these organic NO_x emissions.

The NO_x performance of the MS7001E, MS6001B. and MS5001P gas turbines burning No.2 distillate and

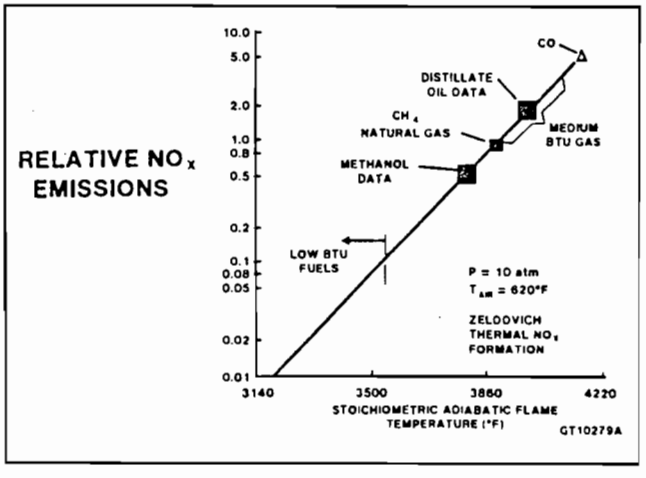


Figure 6

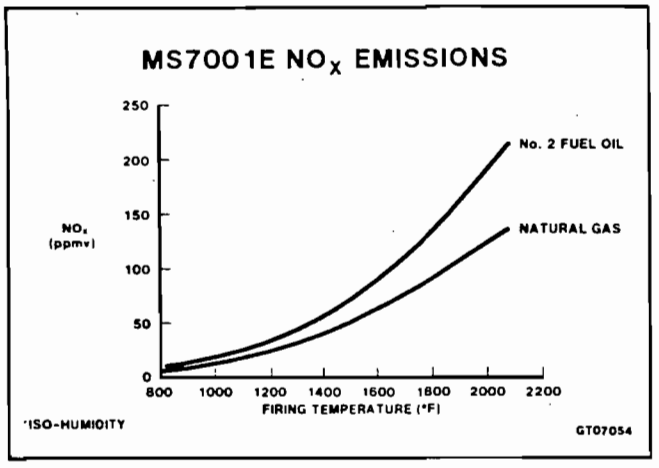


Figure 7

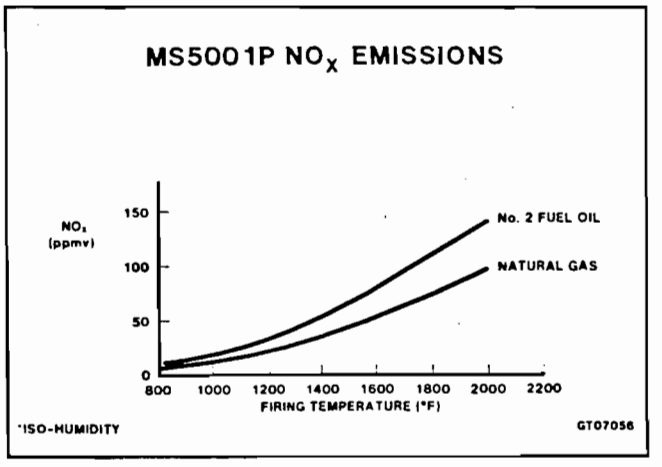


Figure 9

natural gas fuel is shown in Figures 7, 8, and 9 as a function of firing temperature (first-rotating stage turbine inlet). For any given model of General Electric single-shaft constant-speed gas turbine, NO_x correlates very well with this one parameter. Exhaust oxygen concentration, which is a direct measure of heat release may also be used to characterize NO_x emissions.

Carbon Monoxide

Carbon monoxide emissions from a conventional General Electric gas turbine combustion system are less than 10 ppmv at all but very low loads for steady-state operation. During ignition and acceleration, there may be transient emission levels higher than those presented here. Because of the very short loading sequence of gas turbines, these levels make a negligible contribution to the integrated emissions. The emissions of carbon monoxide for the MS7001E are shown in Figure 10 plotted versus firing temperature. This characteristic curve is typical of all heavy-duty machine series.

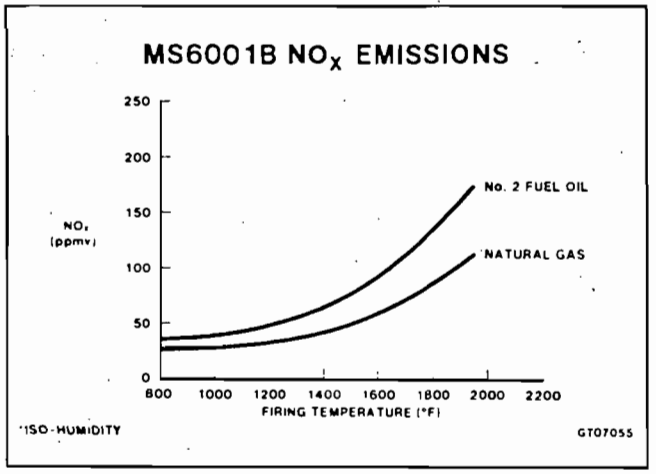


Figure 8

Unburned Hydrocarbons

Unburned hydrocarbons (UHC) like cabon monoxide, are associated with combustion inefficiency. When plotted versus firing temperature, the emissions from heavy-duty gas turbine combustors show the same type of hyperbolic curve (Figure 11). At all but very low loads, the UHC emission levels for No. 2 distillate and natural gas are less than 10 ppmv.

Sulfur Oxides

Sulfur oxides emissions from conventional General Electric gas turbines are a one-to-one function of the sulfur input in the fuel; that is, sulfur in the fuel equals $SO_2 + SO_3$ in the exhaust. Within the experimental error, a constant fraction (3.1% by weight) of the input sulfur is converted to SO_3 as shown in Figure 12. Depending upon the exhaust conditions, some or all of this SO_3 will be present as H_2SO_4. The combustor exit temperatures and pressures characteristic of modern gas turbines favor much higher

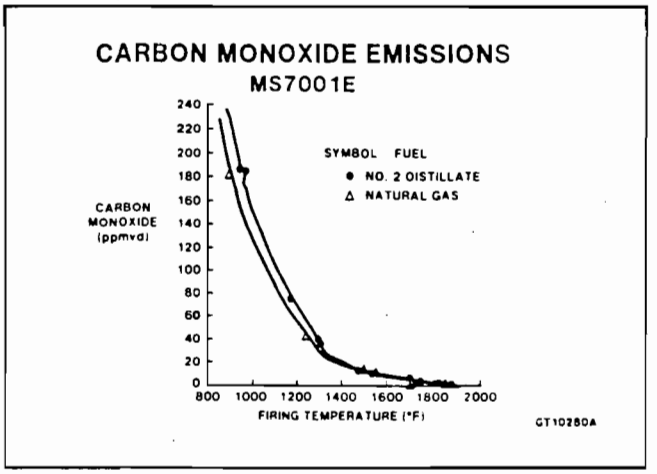


Figure 10

conversion efficiencies at equilibrium. Therefore, the low observed conversions are a result of diffusion flame burning and kinetic or mixing limitations.

Essentially, zero sulfur oxides are emitted when pipeline natural gas is burned in a gas turbine. Well-head gases, coal gases, process waste gases, and the like may contain significant quantities of sulfur generally in the form of H_2S. As in the case of No. 2 distillate this sulfur will be converted to sulfur oxides on a one-to-one basis. However, the fraction of this sulfur converted to SO_3 must be determined by test.

Particulates

Gas turbine exhaust particulate emission rates are influenced by the design of the combustion system, fuel properties, and combustor operating conditions. The principal components of the particulates are smoke, ash, ambient noncombustibles, and erosion and corrosion products. Two additional components that could be considered particulate matter in some localities are unburned hydrocarbons that are liquid at standard conditions and sulfuric acid mist (H_2SO_4).

Over a period of years General Electric has evaluated particulate emissions from GE Gas Turbines using a variety of sampling methods including the wet impinger method and USEPA Method Five. Several conclusions result from this experience.

- "Particulate matter" is a term defined only by the test method — there is no known analytical test that can demonstrate that the chemical compounds trapped in a filter, absorber, bubbler, or similar device actually existed in the gas turbine effluent. A particular example of this is SO_3 (which exists in the stack as a gas, but is trapped in a wet collection medium as H_2SO_4).

- Existing sampling methods, which were developed for sources such as residual oil or coal-fired boilers, paper mill recovery and bark boilers and the like, were not reliable when applied to gas turbines. In particular, stainless steel probes gave erratic test-to-test results even on the same gas turbine burning the same fuel.

- The errors due to sample loss in handling were comparable to the total sample catch for a gas turbine.

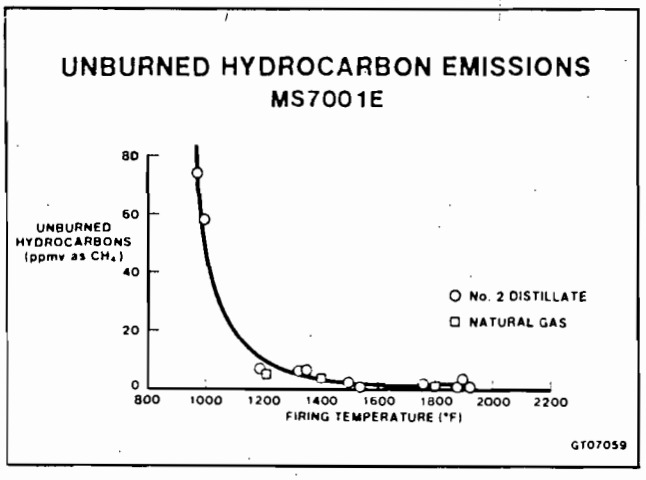


Figure 11

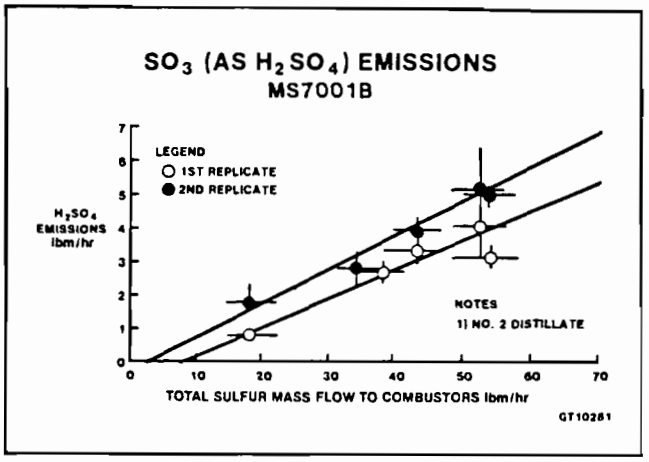


Figure 12

- The results of using this method on an MS7001B burning No. 2 distillate are displayed in Figure 13. In some California localities, the H_2SO_4 emissions from Figure 12 must be added to the probe and filter catch to determine total particulate. Particulate emissions when burning natural gas fuel are below the detection and analysis limits of the method. Process off-gases, coal-derived gases, and the like may have detectable filterable particulate emissions if tars, noncombustible particulate, or other trace contaminants are found in the fuel gas. At present, there are insufficient data on actual operating systems to assess the magnitude of the problem.

Smoke

Smoke is the visible portion of filterable particulate material. The General Electric combustor design coupled with air atomization of liquid fuels has resulted in a nonvisible plume over the gas turbine load range for a wide variety of fuels. The General Electric Gas Turbine Division smoke measuring unit is the Von Brand Reflective Smoke Number (GEVBRSN). If this number is greater than 93 to 95 for the M7001E, then the plume will not be visible. For liquid fuels, the GEVBRSN is a function of the hydrogen content of the fuel (Figure 14). For natural gas fuel, the smoke number is essentially 99 to 100 over the load range.

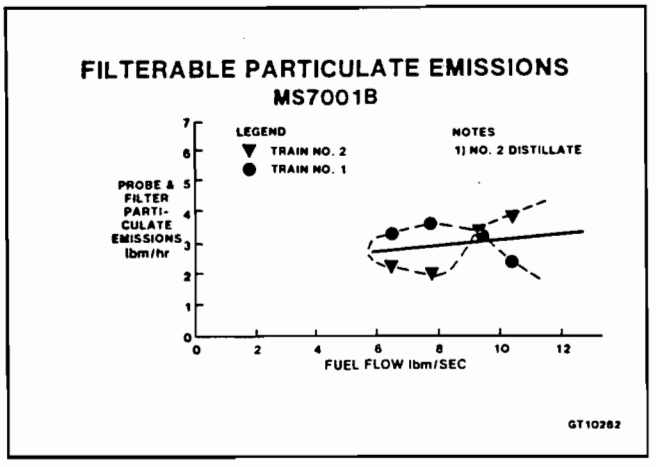


Figure 13

EMISSION REDUCTION TECHNIQUES

The gas turbine, in general, is a low emitter of exhaust pollutants because the fuel is burned with ample excess air to ensure complete combustion at all but the minimum load conditions or during start-up. However, regulations passed during the past 6 to 12 years have made it necessary to reduce the level of certain pollutants by more than a factor of three.

Most regulations today consider nitrogen oxides and sulfur dioxide to be the prime contributors to air pollution from stationary gas tubines. Some localities and states add particulates to the list of source emissions governed by the law, and it may be necessary to consider ground level concentration effects from carbon monoxide and unburned hydrocarbons (non-methane). Although nearly all regulation limits governing visible smoke emissions are much less stringent than those achievable from the gas turbine combustor, there are, nevertheless, isolated areas where extremely stringent standards exist.

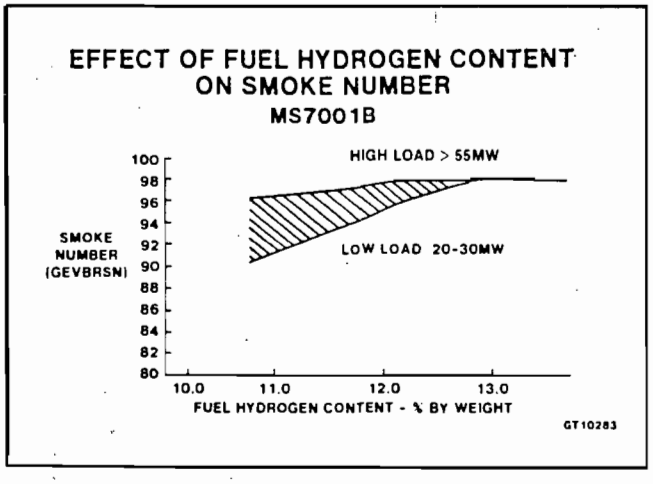


Figure 14

Because of the requirements dictated by environmental considerations, the General Electric Gas Turbine Division has developed techniques to reduce emissions to acceptable levels during the past 10 to 12 years. Emission control technologies can be divided into several categories, shown in Table 4.

Nitrogen Oxides Abatement

In order to reduce the oxides of nitrogen (NO_x) in the exhaust of the gas turbine, it is necessary to take into account the formation mechanism of NO_x in the combustor.

The earliest approach to reducing thermal NO_x from the gas turbine recognized the requirement for minimizing flame temperatures within the combustor. Examination of Figure 15 shows that the rate of NO_x formation can be significantly reduced by operating the reaction zone of a combustor at either very lean or very rich equivalence ratios. Prior to the advent of NO_x emission controls, gas turbine combustors were designed so that the reaction zone fuel/air ratio was near stoichiometric. A brief examination of Figure 15 shows that the rate of NO_x formation tends to a maximum at this condition, and that the rate can be significantly reduced by moving the reaction zone equivalence ratio toward either lean or rich operation.

Since the overall combustion system equivalence ratio must be lean (to limit turbine inlet temperature), it was natural that the first efforts to lower NO_x emissions were directed toward designing a combustor with a leaner reaction zone.

It quickly became apparent that the reduction in primary zone equivalence ratio at full operating conditions was lim-

Table 4

EMISSION CONTROL TECHNIQUES

NO_x	— Water or Steam Injection Selective Catalytic Reduction (SCR) Dry Low NO_x Catalytic Combustion
CO	— Combustor Design
UHC	— Combustor Design
SO_x	— Control Sulfur in Fuel
Particulates	— Fuel Composition
Smoke Reduction	• Combustor Design — Fuel Composition — Air Atomization
Particulate Reduction	• Fuel Composition — Sulfur — Ash

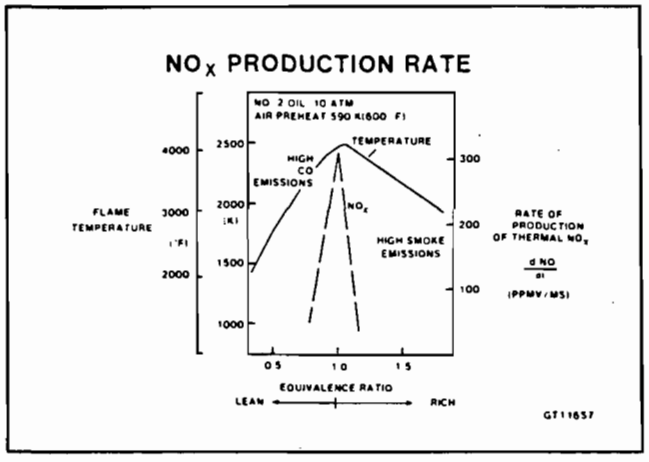


Figure 15

ited because of the large turndown in fuel flow (40 to 1), air flow (30 to 1), and fuel/air ratio (5 to 1) on industrial gas turbines. Further, the flame in a gas turbine is a diffusion flame since the fuel and air are injected directly into the reaction zone. Combustion occurs at or near stoichiometric conditions, and there is substantial recirculation within the reaction zone. The initial efforts to reduce NO_x by making the reaction zone of a conventional combustor lean gave about a 20% reduction in NO_x, but further efforts along this line did not prove fruitful.

Another approach to reducing NO_x formation is to reduce the flame temperature by introducing a heat sink into the flame zone. Water or steam are extremely effective at achieving this goal. Of course, a penalty in overall efficiency must be paid for the additional fuel required to heat the water to combustor temperature, although gas turbine output is enhanced because of the additional mass flow through the turbine. The water must, by necessity, be of boiler feedwater quality to prevent deposits and corrosion in the hot turbine gas path area downstream of the combustor. There are practical limits to the amount of water or steam that can be injected into the combustor before serious problems occur. This has been experimentally determined and must be taken into account in all applications if the combustor designer is to ensure long hardware life for the gas turbine user.

The General Electric Gas Turbine Division designed and developed a water injection system for NO_x control in the early 1970s. The system reduced the oxides of nitrogen to 225 ppmv at 3% O_2 on oil fuel and 125 ppmv at 3% O_2 on gas fuel to satisfy San Diego County Air Pollution Control District (SDAPCD) Rule 68. Although refinements such as staged H_2O flow and fuel/water monitoring equipment have been made to the system to satisfy the US Environmental Protection Agency New Source Performance Standards (NSPS), the basic system remains unchanged from its initial design. In fact, the SDAPCD regulation became the basic model for the NSPS.

Water injection is an extremely effective means for reducing NO_x formation; however, the combustor designer must observe certain cautions when using this reduction technique. To maximize the effectiveness of the water used, the fuel nozzle has been designed with additional passages to inject water into the combustor via the vortex generator in the combustor head end. The water is thus effectively mixed with the incoming combustion air and reaches the flame zone at its hottest point. Figure 16 shows schematically the General Electric heavy-duty H_2O injection system. The NO_x reduction achieved by water injection is plotted as a function of water-to-fuel ratio in Figure 17 for an MS7001E machine. The other machine series have similar NO_x abatement performance with water injection.

Two main factors can be observed with the use of H_2O injection for NO_x control:

- *Dynamic Pressure Activity within the Combustor.* Dynamic pressures can be defined as pressure oscillations within the combustor driven by the unsteady heat release rate inherent in any diffusion flame or by the weak coupling between heat release rate, turbulence, and acoustic modes. An example of the latter is selective amplification of combustion roar by the acoustic modes of the duct. Frequencies range from near zero to several hundred hertz.

  Figure 18 shows dynamic pressure activity for both water injection and steam injection. Water injection tends to excite the dynamic activity more than steam injection. Steam enters the combustor mixed with the air better than water does and thus has less impact on quenching the recirculating flame.

  The oscillating pressure loads on the combustion hardware act as vibratory forcing functions and therefore must be minimized to ensure long hardware

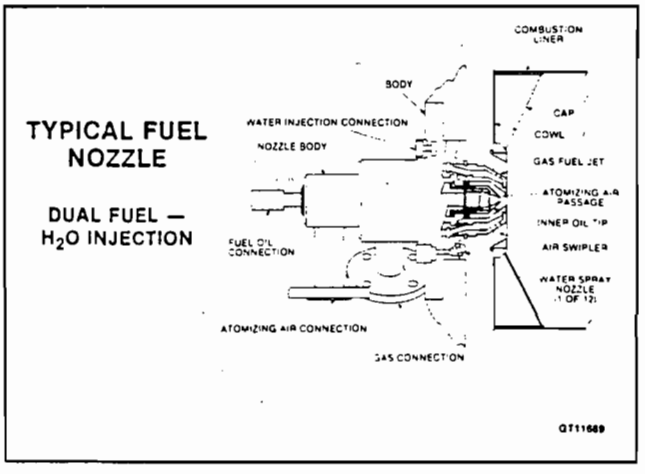


Figure 16

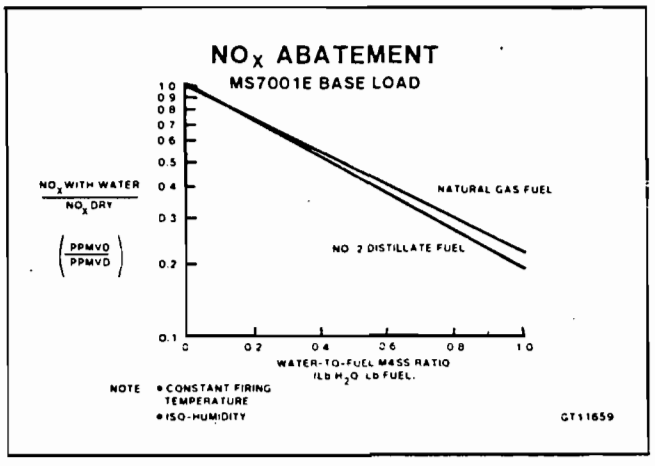


Figure 17

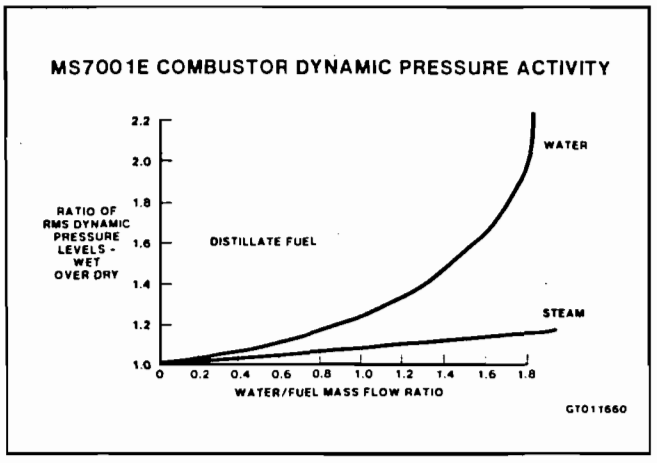


Figure 18

life. Water injection tends to increase (Figures 18 & 22) the dynamic pressure activity within the combustor.

Through combustor design modifications such as the addition of a multinozzle fuel system, significant reductions in dynamic pressure activity are possible — combustors have been designed that are capable of operating with no decrease in reliability while still complying with the most stringent codes to date.

- *Carbon Monoxide Emissions.* As more and more water is added to the combustor, a point is reached at which a sharp increase in carbon monoxide is observed. This point has been dubbed the "knee of the curve" and serves as a useful tool in defining maximum water injection levels for a given combustion system. Once the knee has been reached for any given turbine inlet temperature, one can expect to see a rapid increase in carbon monoxide emissions with the further addition of water. Obviously, the higher the turbine inlet temperature, the more tolerant the combustor is to the addition of water for NO_x control. Figure 19 shows the relationship of carbon monoxide emissions to water injection for a given combustion system for natural gas fuel.

A recent development to reduce NO_x is the use of head-end steam injection. Steam follows essentially the same path as water; however, experience in the laboratory has shown that the combustor dynamic pressures are much less sensitive to steam (Figure 18) than to water injection. This is due to the improved mixing characteristics of a gas (compared to liquid) when injected into the combustor. For a given NO_x reduction, approximately 1.62 times as much steam as water on a mass basis is required for control.

A system was designed and developed to inject steam into the reaction zone air via the end cover of the combustor (Figure 20) for three MS7001 machines placed into utility service in 1981. Extensive field meaurements have been made on one of these units burning both natural gas and distillate oil fuel with excellent results. As mentioned earlier, the dynamic pressure response is much lower when steam injection is used for NO_x abatement rather than water injection and this was confirmed in the field test program.

A similar combustion system was designed for an MS6001 machine used in a cogeneration industrial application. Test results are similar to the MS7001 machine. Identical steam injection configurations have been designed for gas-fired MS9001E machines used for electrical power generation. The NO_x performance has been thoroughly mapped out in the single burner test stand in the Development Laboratory with performance similar to the MS7001/6001 results.

Particulate and Smoke Reduction

Control techniques for particulate emissions with the exception of smoke are limited to control of the fuel composition.

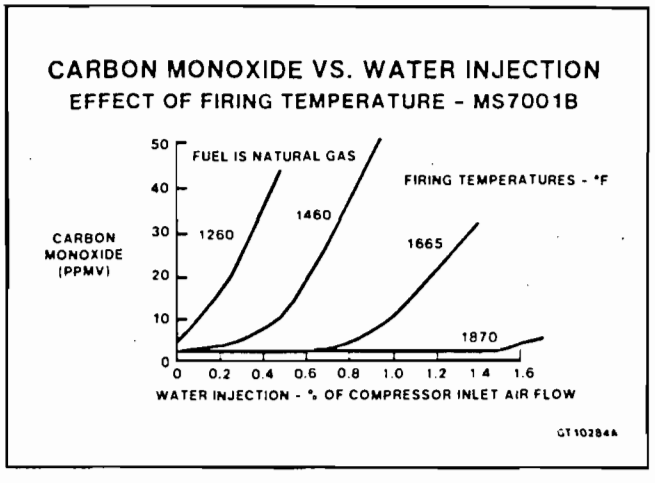


Figure 19

MS7001 STEAM INJECTION END COVER

GT11668

Figure 20

Although smoke can be influenced by fuel composition, combustors can be designed which minimize emission of this pollutant. Heavy fuels such as crude oil and residual oil have low hydrogen levels and high carbon residue which increase smoking tendencies. General Electric has designed heavy-fuel combustors that have smoke performance comparable with those which burn distillate fuel.

Crude and residual fuel oil generally contain alkali metals (Na, K) in addition to vanadium and lead which cause hot corrosion of the turbine nozzles and buckets at the elevated firing temperatures of today's gas turbine. If the fuel is washed, oil-insoluble compounds containing the contaminants are removed. Filtration, centrifuging, or electrostatic precipitation is also effective in reducing the solid contaminants in the combustion products.

The contaminants that cannot be removed from the fuel can be controlled through the use of inhibitors. This process generally requires control and removal of added ash deposits from the turbine. The additional ash will contribute to the exhaust particulate emissions. Generally, the expected increase can be calculated from an analysis of the particular fuel being burned.

In some localities, condensible compounds such as SO_3 and condensible hydrocarbons are considered particulates. Sulfur trioxide, like SO_2, can best be minimized by controlling the amount of sulfur in the fuel. The major problem associated with sulfur compounds in the exhaust comes from the difficulty of measurement, as has been previously mentioned. Emissions of unburned hydrocarbons which are a liquid or solid at room temperature are very low and only make a minor contribution to the exhaust particulate loading.

HARDWARE TECHNOLOGY

The growth in compressor air flow and pressure ratio and the increased turbine output have required innovations in the combustion system mechanical design to provide for the higher turbine inlet temperature, while maintaining long life for the combustor parts. There has also been continuing development of combustion systems that will reduce the emission of nitrogen oxides and unburned hydrocarbons in order to meet the increasingly stringent environmental standards that are being applied throughout the world.

Slot-Cooled Liner

With the introduction of the MS7001 Model C turbine in 1974, the design of the combustion liner underwent a dramatic change. Borrowing General Electric Aircraft Engine combustion construction and cooling technology, the heavy-duty brazed ring construction, slot-cooled liner evolved. The construction details of the slot-cooled liner are depicted in the cutaway view shown in Figure 21. Note that the liner construction uses round holes (instead of sharp-ended louvers) which flood a continuous slot with air to provide a more efficient uniform cooling scheme. The advantage of slot cooling is to more efficiently cool the liner wall resulting in low metal temperatures. The slot-cooled liner developed in 1974 is basically the same liner that will be used in the uprated MS7001EA machine shipping in early 1985. Minor structural changes have been made around the combustion holes, spark plug/flame detector holes to improve resistance to cracking. Additional cooling has also been introduced to locally reduce metal temperatures around these large holes.

Over 1400 of these brazed-ring, slot-cooled liners have been installed into MS7001 machines over the past 10 years giving, on the whole, trouble free, reliable operation. Some liners have more than 40,000 hours of operation on them under all types of operating conditions and fuels. Some repairable cracking has occurred in the combustion zone of the liner and corrective action has been taken to eliminate this situation by improved mechanical reinforcement around the combustion holes and spark plug/flame detector holes. A liner reinforcing sleeve has been designed that will decrease operating stress at the edge of these large holes by a factor of two. Additional film cooling has also been added on the downstream side of these reinforced holes to minimize the possiblity of "hot streaks." Further reduction of bulk liner metal temperature and a smoothing out of thermal gradients is possible by the use of Thermal Barrier Coating (TBC).

The MS7001 slot-cooled liner is also used in the MS9001E machine — there being 14 combustion liners on the MS9001 versus 10 liners on the MS7001. A smaller diameter (Table 1) brazed-ring, slot-cooled liner has been standard on the MS6001 machine since introduction in 1978.

Quiet Combustor

The dynamic pressure oscillation activity within the combustor has increased with time as the gas turbine

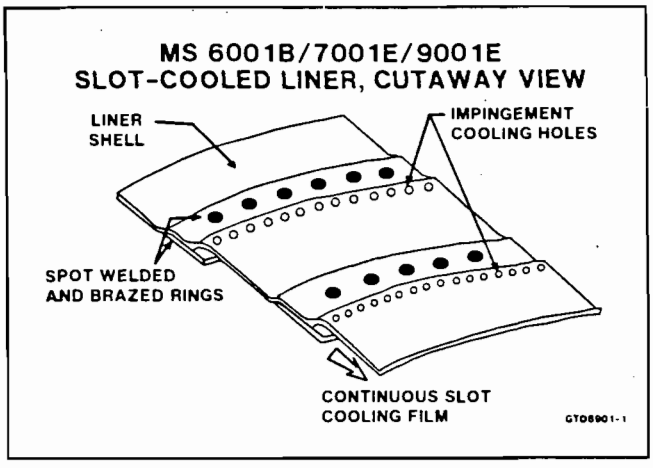


Figure 21

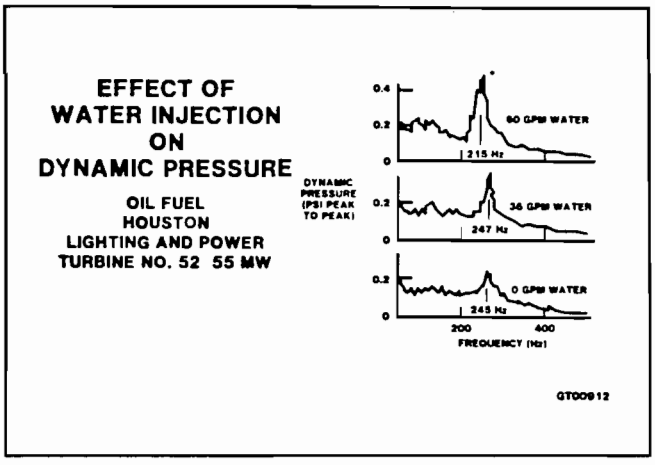


Figure 22

combustion system design has evolved. First with combustion design changes to reduce the visible smoke emissions, and then more recently to reduce the levels of nitrogen oxide emissions from the gas turbine exhaust. The injection of water (or steam) to reduce NO_x to even lower levels further increases the dynamic pressure oscillation as indicated in Figures 18 and 22. These changes, coupled with the increased combustor loading associated with higher firing temperatures, have led to increased maintenance.

A multiphase program was conducted in our Gas Turbine Development Laboratory from 1974 through 1980 with the goal of reducing the dynamic pressure activity in the combustor. Although many different concepts were built and tested, no design produced reduction in this dynamic activity comparable to that of a multi-fuel nozzle combustion system. Figure 23 shows an MS7001 multi-fuel nozzle cap arrangement for the combustion liner. The addition of water injection to this system design did not cause a significant increase in dynamic pressure activity. The benefits of this mutiple-fuel nozzle system are: low noise, low wear, decreased operating cost, increased availability, and combustor design that is retrofitable to the entire fleet of MS7001 machines.

A three-year program sponsored in part by Electric Power Research Institute (EPRI) was initiated in September 1980 to field endurance test a water-injected dual-fuel multi-nozzle quiet combustion system on an MS7001B combined cycle unit. The objective of this program was to improve the wear life of combustion liners, transition pieces, and seals, with the primary goal of increasing combustion inspection intervals.

The 12,268-hour (96 starts) endurance test began April 15, 1981 at the Houston Lighting and Power Company Wharton utility site and continued until November 27, 1983. In April 1982, a full set of combustor dynamic pressures were again recorded for comparison to the April 1981 data. For all practical purposes the dynamic data from 1981 to 1982 were identical, indicating that the system remains quiet. The field endurance program demonstrated the major wear reduction benefits, and inspection/repair interval lengthening was achieved by the quiet multi-nozzle combustion system. Inspection intervals of 10,000 hours are clearly achievable for water injected machines, more than doubling prior experience with conventional systems.

Dry Low NO_x Combustor

As mentioned previously, the combustion system design must have the reduction of nitrogen oxide (NO_x) emission as a major objective in addition to the requirement of operating over the load range in a smokeless manner.

General Electric has developed a Dry Low NO_x combustion system that will meet the United States Environmental Protection Agency (EPA) NO_x requirements. The combustion system utilizes two stages of fuel injection and two

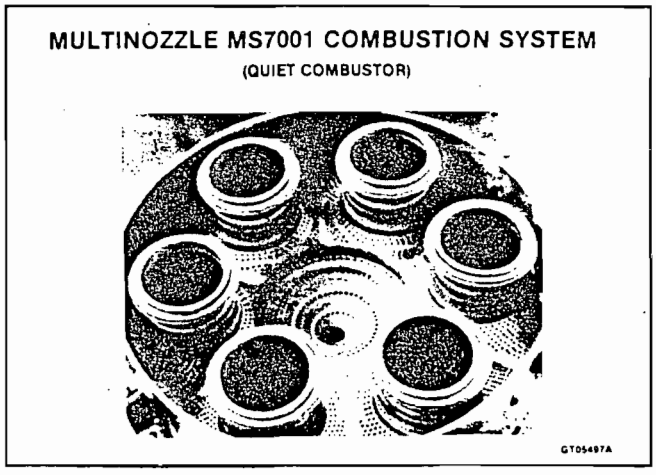


Figure 23

separate combustion zones. The combustor is shown in Figure 24 and utilizes a multi-nozzle primary stage and a single-nozzle secondary stage. No_x reduction is obtained, as with water or steam injection, by significantly lowering the peak flame temperature that occurs within the main reaction zone of the combustor. By using two stages of fuel injection, the combustor can be made to operate satisfactorily at fuel flows ranging from those at ignition conditions to those required for full load operation of the machine.

In 1980, field tests of the Dry Low NO_x combustion system were completed, utilizing an MS7001C gas turbine at the Houston Lighting and Power Company Wharton Station. These tests successfully demonstrated that the two-stage Dry Low No_x combustor was a practical arrangement and that the USEPA NO_x requirements can be met without the use of water or steam. Development is continuing on advanced versions of this system with the objective of achieving still lower dry NO_x levels.

Transition Piece Cylinder Mount

A new improved method of attaching the combustion transition piece aft bracket has been designed. The approach, using a cylinder-mount as shown in Figure 25 minimizes discontinuities between the colder bracket support and the hotter transition piece body. The cylinder mount bracket design significantly reduces the thermal stresses normally associated with a fin-type bracket common to most earlier transition piece designs.

The cylinder-mount concept has been tested extensively in the Gas Turbine Development Laboratory and on selected MS7001 field units. It is standard on all new production MS7001E machines being shipped in 1984. It is currently standard on all new production MS6001B and MS9001E units. Our plan for the MS5001 calls for the cylinder-mount transition piece to be introduced in limited quantities in late 1983 for field evaluation with full production by late 1984. The cylinder-mount attachment will improve the MS5001 transition piece cyclic life at the body attachment point such that the transition piece should withstand 10,000 thermal cycles at today's MS5001 turbine inlet temperature.

Thermal Barrier Coating

Over the years, the louvered liner has proven to be very reliable at moderate firing temperatures. Heat is radiated from the flame to the combustor walls which are cooled by air flow over the outside of the combustor, and by the thin film of air which is formed on the inside of the combustor wall by cooling louvers. Wear and thermal fatigue cracking of the louvers have occurred and require repair at normal inspection intervals.

A recent redesign of the MS5001 louvered liner consists of a new crossfire tube collar that incorporates splash plate cooling. A series of round holes around the collar impinge cooling air onto a splash plate on the inside of the liner which provides a cooling film to more efficiently cool the collar region and reduce the tendency for cracking.

Adapting from our Aircraft Engine Combustion Construction technology, a 10-12 mil ceramic thermal barrier coating (TBC) will be added to the inside surface of the liner wall. The best performing TBC coating has been a yttria-stabilized zirconia ceramic top coat over a NiCrAlY metal alloy bond coat. Use of shadowing techniques, which is commonly used on aircraft engine parts, keeps the TBC out of the cooling louvers as shown in Figure 26. Laboratory tests have shown that a temperature decrease of 27 °C to 116 °C (80 °F to 240 °F) is possible. Use of TBC on aircraft engine combustors has shown a smoothing of temperature gradients with a significant improvement in thermal fatigue life. Our plan calls for a number of sets of MS5001 TBC liners to be field endurance tested during 1983/84 with full production beginning late in 1984. For 1984 production turbines, TBC also been specified on MS7001 and MS9001 slot-cooled combustion liners used in high-firing temperature base load applications.

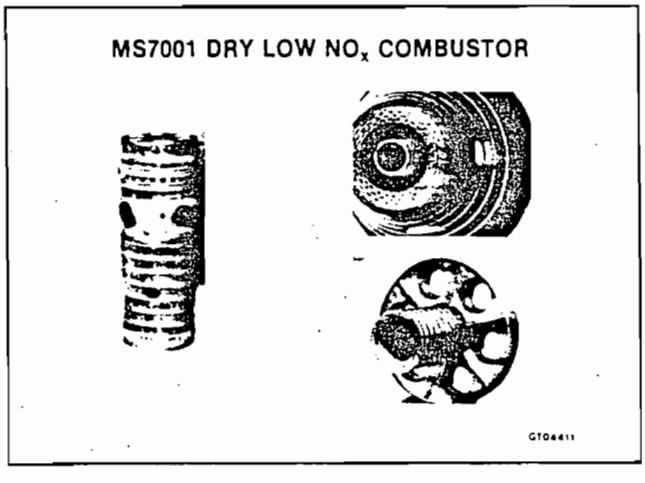


Figure 24

Figure 25

Transition Piece Improvement

A particular objective of all product improvement projects at General Electric is the enhancement of parts life and extension of service intervals. All 1984 MS7001E shipments have an improved transition piece design incorporated. This improvement is being brought about through material, design and cooling changes which have been the subject of a major development effort in 1982 and 1983. The changes have been exhaustively analyzed using three dimensional finite element computer codes and have been further evaluated in laboratory and field tests before reaching production units.

The transition piece is subject to gas flow hotter than any of the nozzles/buckets and temperature transients as rapid as fuel flow changes. At the same time, transition piece cooling is primarily accomplished by convective heat transfer to the low velocity compressor discharge air in the combustion wrapper. The transition piece is further subjected to any dynamic pressure oscillations from the combustion process which, as an energy addition device, is an inherent amplifier.

As a consequence of these conditions, transition pieces are subject to low cycle fatigue, high cycle fatigue, creep, wear and corrosion.

Early in the introduction of the MS7001 series turbine a combination of low cycle fatigue cracks and high cycle fatigue propagation led to premature transition piece failures. Both mechanical design alterations and aerodynamic changes were used to alleviate these problems. With extended life and additional firing temperature increases the problems of creep and wear became the dominant limiters of service life. It also became clear that more sophisticated analytical models were needed to support the design of this new hardware. Additionally, these analytical models have to be correlated and validated with field data since laboratory tests do not run long enough to develop satisfactory measures of service life.

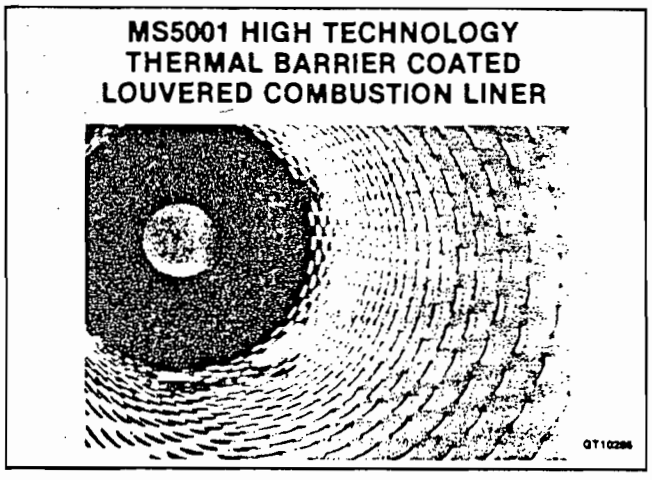


Figure 26

A major program was undertaken to generate new methodology and to develop a new transition piece design that would have extended inspection intervals and longer useful service life. A nine-point program was undertaken involving materials and process development, fluid flow analysis, performance and parts life analyses, heat transfer analyses, structural analyses, laboratory testing of designs and time dependent material behavior analyses and testing.

The materials effort involved conducting an ongoing program to evaluate more creep-resistant materials, other than the presently used Hastelloy-X, for combustion hardware applications; specifically, HS188, IN617, and Nimonic 263 (N263). These materials are very successfully used by aircraft gas turbine manufacturers for combustion hardware. The N263 was judged to be the superior transition piece material for both the current and future uprates of the MS7001 machine. The material showed a good balance of fatigue strength and creep resistance (Figure 27), significantly above Hastelloy-X and equal to or better than the more costly, less commercially available HS188. It also exhibits good fabrication qualities.

N263 is a nickel-base gamma-prime strengthened alloy with a nominal composition of 20% cobalt, 20% chromium, 6% molybdenium, 0.5% aluminum, and 2.2% titanium. The alloy can best be described as a weak nickel-base bucket alloy, primarily used in the wrought condition and was developed over 25 years ago for aircraft combustors. N263 is normally supplied in the solution heat-treated (2100 °F) condition, allowing for easy fabricability by both forming and welding operations, with a subsequent strengthening age cycle at 1475 °F for 8 hours. Although this particular cycle was recommended by the basic supplier and utilized by other gas tubine manufacturers, General Electric developed a more extensive heat treatment, following all fabrication and welding, dramatically improving the cross-weld properties, specifically stress rupture and fatigue strength. N263 material, using the General Electric processing sequence, has been successfully evaluated in field machines as both combustion liners and combustion transition pieces. All General Electric internally developed data on N263 plus our experience on manufacture and field endurance operation of N263 combustion hardware indicate it to be an excellent combustion alloy for transition pieces in higher turbine inlet temperature machines.

The new HTP784 transition piece design consists of the Block III positive curvature body shape (shown in Figure 28) made of N263 material. The picture frame will be a single piece, machined from N263 plate stock of modified Block III geometry and with improvements to reduce wear rates. An N263 external structural rib will be added to increase deflection resistance. The aft end mount will be

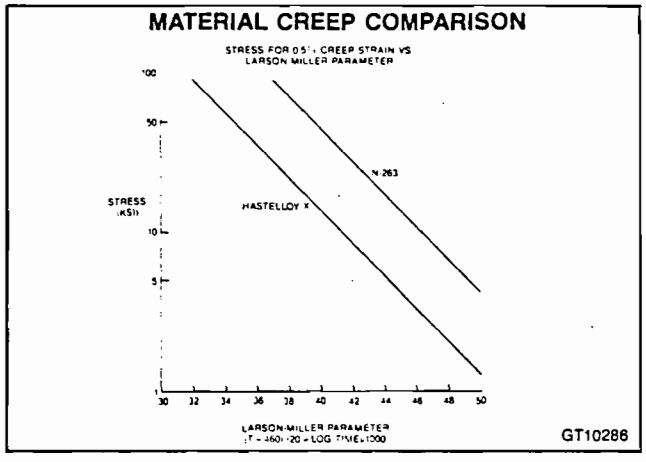


Figure 27

changed to a forged N263 cylinder mount insert welded into the body. The cylinder mount eliminates the discontinuity stresses at the body interface and improves LCF life, while the hinged aft bracket enhances torsional stability. The area under the aft bracket/cylinder is impingement cooled, with the cooling air discharging through the transition piece wall to provide jet film cooling aft of the cylinder mount insert.

The HPT784 transition piece aft end picture frame geometry has been changed to a slotted aft frame sealing system. Field experience has demonstrated that significant improvement in wear repair intervals can be had with the slotted design. The side seal had been changed to a thin, flat plate cobalt-base alloy with improved wear capability. The new side (or end) seals have small slots milled into the surface to provide air cooling for improved wear and seal life.

The aft portion of HPT784 transition piece (gas path side) is Thermal Barrier Coated (TBC) to decrease aft end

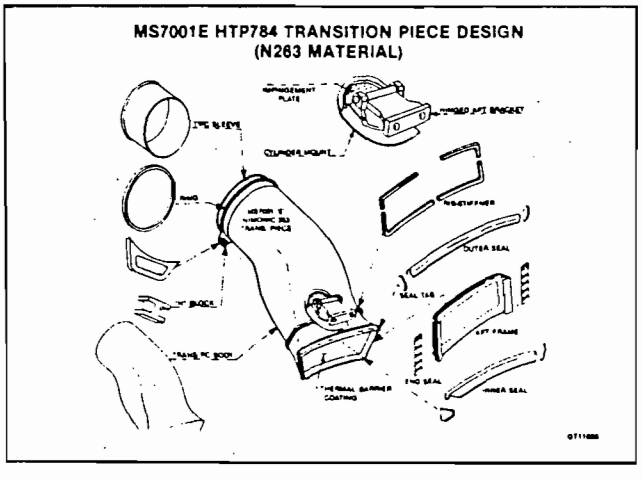


Figure 28

metal temperatures. In addition, the TBC will also smooth out thermal gradients to enhance cyclic capability. The new HPT784 transition piece has been designed to provide margin for future firing temperature uprates as well as to increase maintenance intervals and decrease repair costs.

A program is currently underway to introduce the HPT784 transition piece design concepts and material selections into the MS9001E machine. The new HTP985 transition piece for the MS9001E machine, based on current production commitments, will be available in late 1985.

Wear Resistant Materials

Combustion noise or dynamic pressure oscillations as previously discussed can cause relative motion between parts, especially at the sealing surfaces of the transition piece aft end. Wear of the transition piece picture frame is due to high frequency relative motion between the aft frame and the side seals and the inner floating seal. Oxidation debris coupled with the high frequency rubbing between two surfaces (seals and frame) causes the fretting wear that has been observed.

An effort is underway to develop a wear coating that could be applied to combustion components to improve wear resistance. The coating developed is a flame-sprayed hard surfacing that is applied to the transition piece aft frame wear surfaces. A cobalt-base alloy (Stellite) is flame sprayed on the aft frame to provide significant wear surface protection. To further enhance wear characteristics, the side (end) seals have been changed to a cast cobalt-base (Stellite) material. Laboratory wear tests and limited field experience have shown that cobalt-base alloys (Stellite) have a low rate of oxidation (and thus particulate formation) at high temperatures, thus reducing the rate of picture frame wear due to high cycle frame and seal mating surface rubbing. The cast cobalt-base end seal is sacrificial to the cobalt-base coated picture frame.

SUMMARY

General Electric has used multiple-combustion configurations on heavy-duty gas turbines since the first one was designed in the 1940s. We have used them in gas turbines that produce less than 10 MW to those greater than 100 MW. We know from experience with several thousand units that the concept works, and works well. We know what the configuration can do and we know how to apply it to the varied needs of our customers. These combustors have been used with a wide variety of fuels, firing temperatures, and emissions requirements and they have met their operating objectives.

The emission characteristics of the gas turbine have been presented, showing actual field test data. This type of baseline data is necessary if one is to design combustion systems to be environmentally acceptable in the market-

place. Obtaining field emission data is both expensive and time consuming. The Gas Turbine Division has invested in a mobile emission van, fully equipped to measure the various constituents in the exhaust gas such as NO_X, CO, UHC, SO_X, and particulates. This equipment has been employed by General Electric personnel to make numerous official emission compliance tests to satisfy both federal and state environmental agencies. Developing measurement techniques to ensure reliable, accurate data acquisition is an engineering science within itself.

Combustion hardware technology development is an ongoing activity and will continue to be so, especially in light of the environmental requirements and fuel flexibility requirement. Requirements created by leaner combustors and increased machine ratings have been dealt with, and inspection intervals have increased. Present and future design efforts continue in the area of combustor aerodynamics as well as in the mechanical design with a goal of providing the best we can while minimizing complexity, maintenance and cost.

REFERENCES

1) R.E Pavri and C.F. Wilhelm, "The Characteristics and Capabilities of the GE Multiple-Combustion System," General Electric Publication GER-3123, 1981.

2) G.L. Touchton, J.F. Savelli, and M.B. Hilt, "Emission Performance and Control Techniques for Industrial Gas Turbines," General Electric Publication GER-2486H, 1982.

3) D.C. Guthan and C. Wilkes, "Emission Control and Hardware Technology," General Electric Publication GER-3125, 1981.

4) J.R. Patterson and E.J. Walsh, "A Manufacturer's Role in Heavy-Duty Gas Turbine Future Technology," ASME Paper 83-GTJ-13.

5) R.M. Washam, "Dry Low NO_X Combustion System for Utility Gas Turbine," ASME Paper 83-JPGC-GT-13.

6) D.E. Brandt, "Advanced Developments in Performance and Reliability of a Heavy-Duty Gas Turbine Family," ASME paper 83-GTJ-14.

7) G.L. Touchton and M.B. Hilt, "Particulate and Sulfur Oxides Emissions from a 60 MW Heavy-Duty Gas Turbine Burning No. 2 Distillate Fuel-Methods Development and Test Results," ASME Paper 82-GT-136.

8) M.B. Hilt and J. Waslo, "Evaluation of NO_X Abatement Techniques through Combustion Design for Heavy-Duty Gas Turbines," ASME Paper 84-GT-48.

9) G.L. Touchton, "Influence of Gas Turbine Combustor Design and Operating Parameters on Effectiveness of NO_X Suppression by Injected Steam or Water," ASME Paper 84-JPGC-GT-3.

CONVERSION FACTORS

The following is a list of conversion factors most commonly used for gas turbine performance.

To Convert	To	Multiply By
acres	hectares	4.047×10^{-1}
atm	kg/cm^2	1.0333
atm	$lb/in.^2$	1.47×10^{1}
bars	atm	9.869×10^{-1}
bars	$lb/in.^2$	1.45×10^{1}
Btu	J (joules)	1.055×10^{3}
Btu	kcal	2.52×10^{-1}
Btu/h	kcal/h	2.520×10^{-1}
Btu/h	kJ/h	1.0548
Btu/h	W (watts)	2.931×10^{-1}
Btu/hp-h	kcal/kWh	3.379×10^{-1}
Btu/hp-h	kJ/kWh	1.4148
Btu/kWh	kcal/kWh	2.5198×10^{-1}
Btu/kWh	kJ/kWh	1.0548
Btu/lb	kcal/kg	5.555×10^{-1}
Btu/lb	kJ/kg	2.3256
°C	°F	(°C × 9/5) + 32
°C	K	°C + 273.18
cm^3	ft^3	3.531×10^{-5}
cm^3	$in.^3$	6.102×10^{-2}
°F	°C	(°F − 32) × 5/9
ft	m	3.048×10^{-1}
ft^2	m^2	9.29×10^{-2}
ft^3	l (liters)	2.832×10^{1}
ft^3	m^3	2.832×10^{-2}
ft-lb	Btu	1.286×10^{-3}
ft-lb	kg-m	1.383×10^{-1}
ft/min	km/h	1.8288×10^{-2}
ft^3/min	l/s	4.720×10^{-1}
ft^3/min	m^3/min	2.832×10^{-2}
gal	m^3	3.785×10^{-3}
gal/min	l/s	6.308×10^{-2}
hectares	acres	2.471
hp (U.S.)	kW	7.457×10^{-1}
hp (U.S.)	hp (metric)	1.014

To Convert	To	Multiply By
in.	cm	2.540
in.	mm	2.54×10^{1}
$in.^2$	mm^2	6.452×10^{2}
in. of mercury	kg/cm^2	3.453×10^{-2}
in. of water (at 4 °C)	kg/cm^2	2.54×10^{-3}
in. of water (at 4 °C)	$lb/in.^2$	3.613×10^{-2}
J	Btu	9.486×10^{-4}
kg	lb	2.2046
kg/cm^2	$lb/in.^2$	1.422×10^{1}
kg-m	ft-lb	7.233
kg/m^3	lb/ft^3	6.243×10^{-2}
km	miles (statute)	6.214×10^{-1}
kW	hp	1.341
l	ft^3	3.531×10^{-2}
lb	kg	4.536×10^{-1}
$lb/in.^2$	kg/cm^2	7.03×10^{-2}
$lb/in.^2$	Pa	6.8948×10^{3}
$lb\text{-}ft^2$	$kg\text{-}m^2$	4.214×10^{-1}
l/min	ft^3/s	5.886×10^{-4}
l/min	gal/s	4.403×10^{-3}
m	ft	3.281
m^2	ft^2	1.076×10^{1}
m^3	ft^3	3.531×10^{1}
mile (statute)	km	1.6093
tons (metric)	kg	1.0×10^{3}
tons (metric)	lb	2.205×10^{3}
W	Btu/h	3.4129
W	Btu/min	5.688×10^{-2}
W	ft-lb/s	7.378×10^{-1}
W	hp	1.341×10^{-3}

1984 GAS TURBINE REFERENCE LIBRARY

GER-3400 STAG™ Combined-Cycle Operating Experience

GER-3401 STAG™ Combined-Cycle Product Line and Performance Characteristics

GER-3402 STAG™ Combined-Cycle Plant Engineering and Construction Management

GER-3403 Steam Turbines for STAG™ Combined-Cycle Power Systems

GER-3404 Heat Recovery Steam Generators for STAG™ Combined-Cycle Plants

GER-3405 Controls for STAG™ Combined-Cycle Plants

GER-3406 STAG™ Combined-Cycle Power Systems Reliability

GER-3407 STAG™ Combined-Cycle Power Systems Operation and Maintenance

GER-3408 STAG™ Combined-Cycle Fuel Flexibility and Economic Evaluation

GER-3409 STAG™ Combined-Cycle Plants in Power Generation Planning Analysis

GER-3410 Combined-Cycle Repowering Mechanics and Economics

GER-3411 STAG™ Combined-Cycle System Economics

GER-3412 Heavy-Duty Gas Turbine Maintenance Practices

GER-3413 GE MS6001—Heavy-Duty Gas Turbine

GER-3414 Gas Turbine Parts and Performance Technology

GER-3415 Gas Turbines in Mechanical Drive Applications

GER-3416 GE Compressor Product Line Review

GER-3418 Generators for Gas Turbine Applications

GER-3419 Gas Turbine Inlet Air Treatment

GER-3421 Advanced Materials and Coatings

GER-3422 GE MS7001 Heavy-Duty Gas Turbine

GER-3423 Electric Utility Gas Turbine Applications

GER-3424 Aircraft-Derivative Gas Turbine Maintenance Practices

GER-3425 GE LM5000 Aircraft-Derivative Gas Turbine System

GER-3426 GE SPEEDTRONIC™ Mark IV Control System

GER-3427 GE DATATRONIC™ Information and Control System

GER-3428 Fuels Flexibility in Heavy-Duty Gas Turbines

GER-3429 Meeting the Quality Commitment with Experience and Technology

GER-3430 Cogeneration Application Considerations

GER-3431 GE LM2500 Aircraft-Derivative Gas Turbine System

GER-3432 GE MS9000 Heavy-Duty Gas Turbine

GER-3433 Application of Gas Turbines in the Process Industry

GER-3434 Gas Turbine Design Philosophy

GER-3435 GE Gas Turbine Multiple-Combustion System

GER-3436 Project Management Concepts

GER-3437 GE Gas Turbine Product Line and Performance Characteristics

GER-3438 Gas Turbine Applications Utilizing Solid Fuels

GER-3439 Coal-Fired STAG™ Combined-Cycle Applications

GER-3451 Legislation and Regulations Affecting Cogeneration

GER-3452 Gas Turbine Support Systems

GER-3453 Gas Turbine Compressor Testing and System Analysis

GER-3454 Integrated Turbine-Compressor Systems

GER-3455 Process Application of an Integrated Steam Turbine Compressor System

GER-3456 Cogeneration Financial Incentives

GER-3457 Combined-Cycle Cogeneration Systems Design

GER-3458 Utility Impact on Cogeneration Project Feasibility

GER-3459 Cogeneration Project Implementation

GER-3460 Natural Circulation Heat Recovery Steam Generators

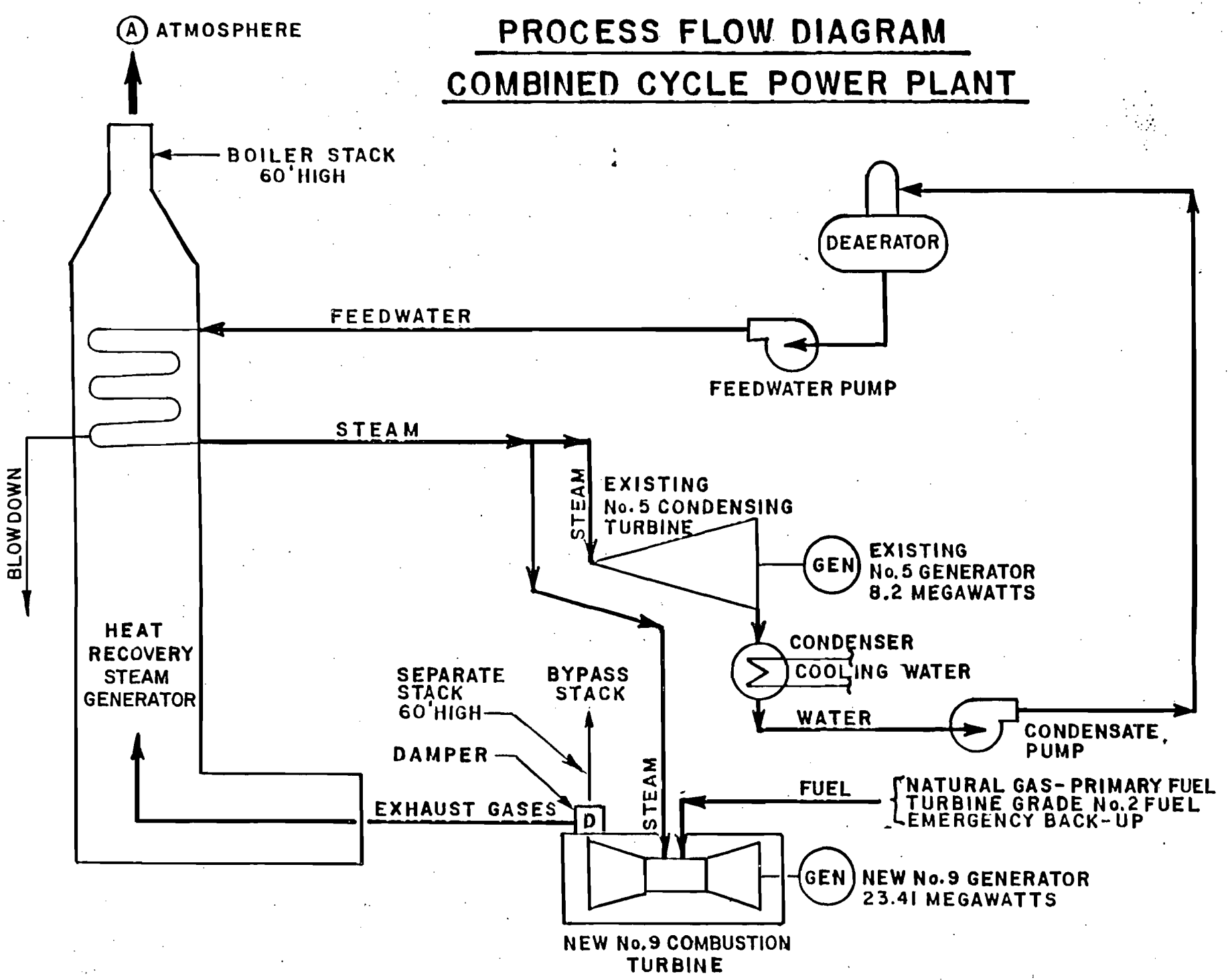
GER-3461 Geared Steam Turbine Generator Sets

GER-3462 Operating Characteristics of High-Pressure Centrifugal Compressors

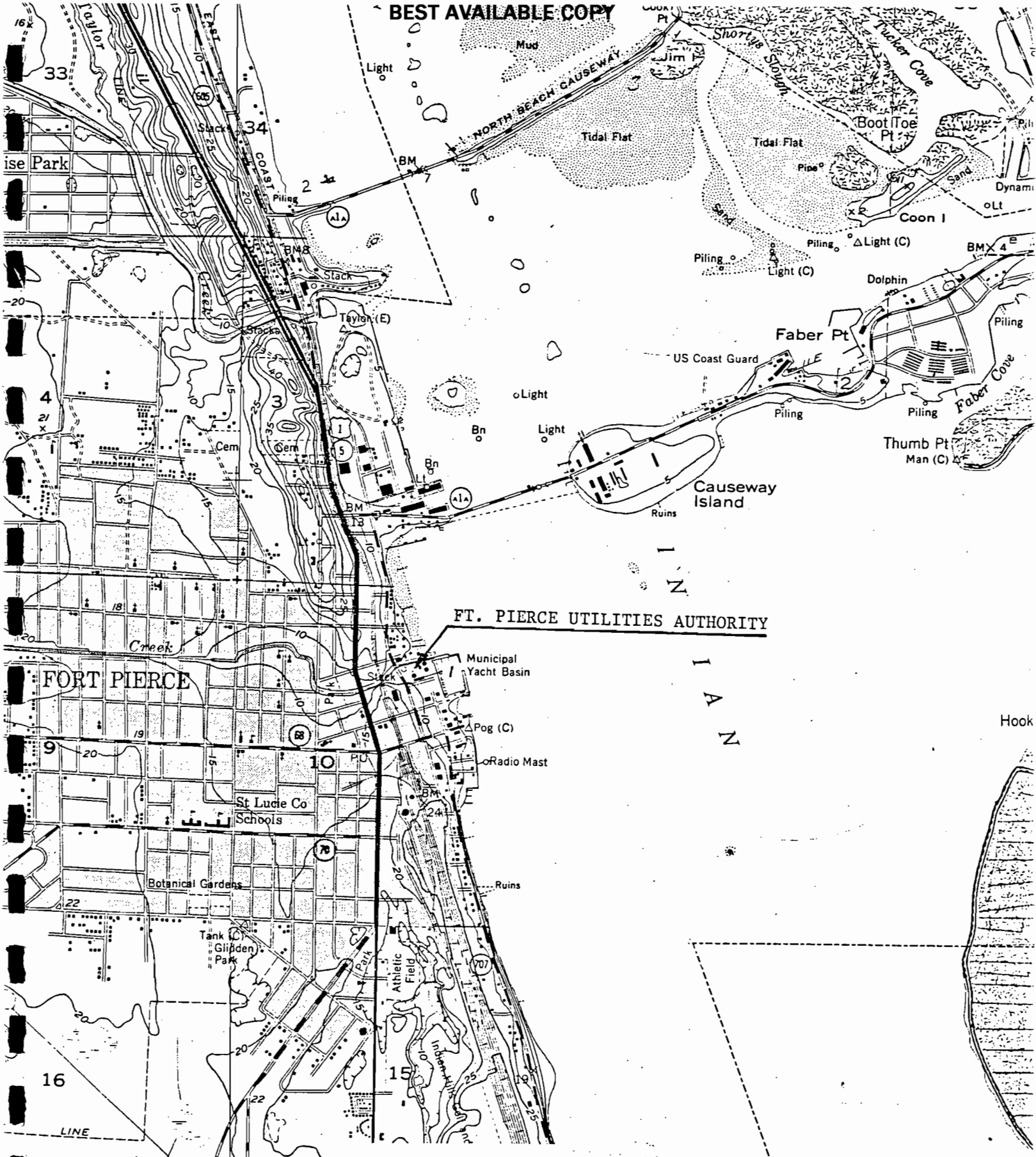
GAS TURBINE DIVISION
GENERAL ELECTRIC COMPANY
SCHENECTADY, NEW YORK 12345 USA

'84 (3M)

GENERAL ELECTRIC



ATTACHMENT 8

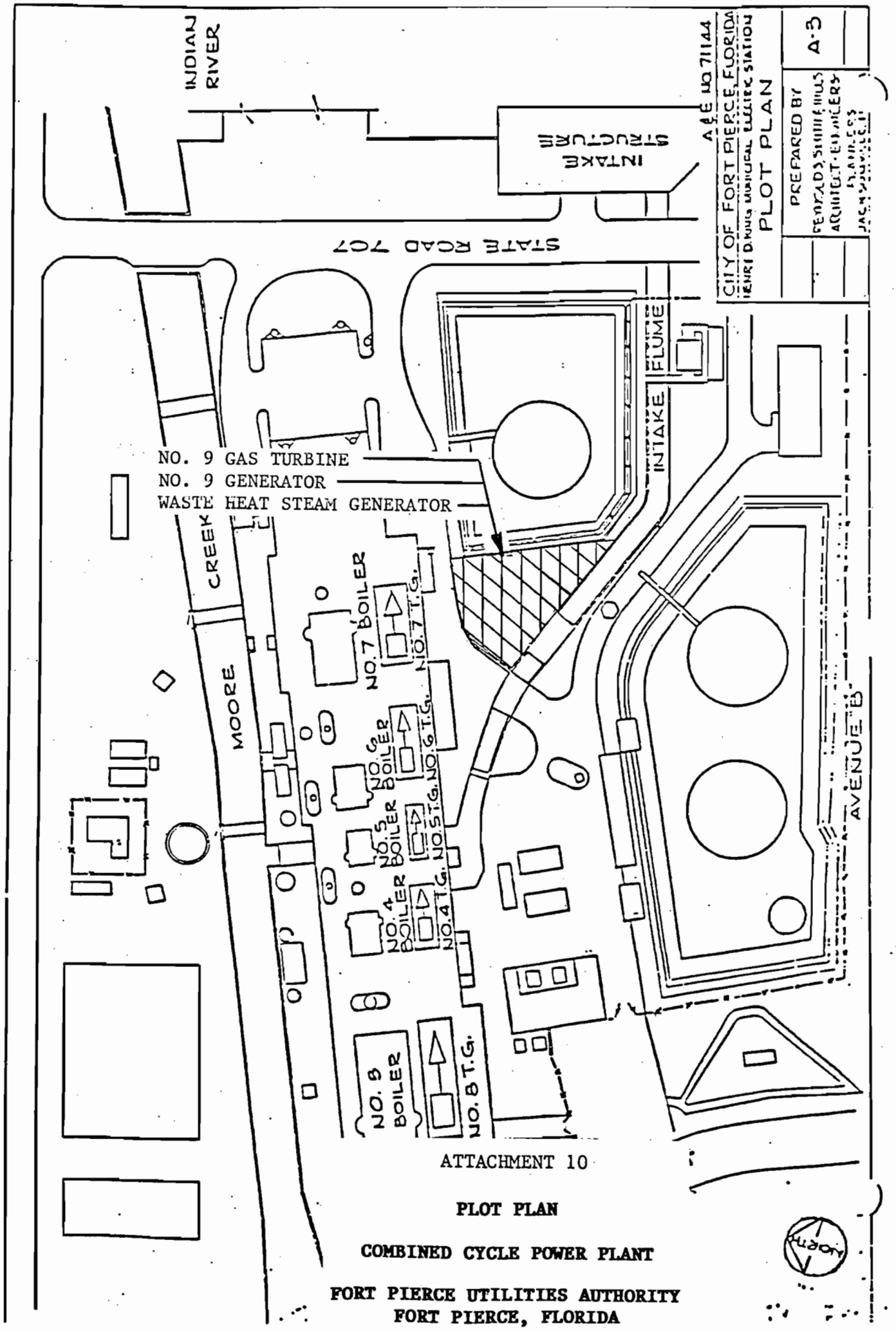


ATTACHMENT 9

LOCATION MAP

COMBINED CYCLE POWER PLANT

FORT PIERCE UTILITIES AUTHORITY
FORT PIERCE, FLORIDA



ATTACHMENT 10

PLOT PLAN

COMBINED CYCLE POWER PLANT

FORT PIERCE UTILITIES AUTHORITY
FORT PIERCE, FLORIDA

APPENDIX

FT. PIERCE UTILITIES AUTHORITY
CONTEMPORANEOUS EMISSIONS CALCULATIONS

The FPUA site is an attainment area for all criteria pollutants. Consequently, Chapter 17-2.500 FAC, "Prevention of Significant Deterioration" rules, require a New Source Review for any modification to a major facility which results in a significant net emissions increase, 17-2.500(2)(e)2. Refer to Table 500-2 FAC for singificant emission rate values. Accordingly, the NSR threshold for No. 9 Combined Cycle Gas Turbine has been evaluated by using the procedures for conducting a contemporaneous emissions calculation, 17-2.500(2)(e)3.

Since optimum opertion of Unit 9 will allow some curtailment of Units 7 and 8, the effective increase in plant efficiency can be used to limit emissions to just below the net significant emissions increase level of the controlling pollutant. Consequently, the contemporaneous emissions calculation has been conducted by comparing, on a plant-wide basis, the annual emissions from the existing facility with the projected annual emissions from the new facility.

SELECTION OF DATA FOR CONTEMPORANEOUS EMISSIONS CALCULATIONS

The year 1984 was selected, from the five year period preceding this application submittal, as the most representative year. Using actual operating data, the respective annual operating hours, fuel usage, and power production are as follows:

Boiler	ANNUAL OPERATING HOURS		FUEL USE		POWER PRODUCTION (10^6 KWH)
	Permitted	Actual	Nat Gas (10^6CF)	No. 6 Oil (10^3 Gal)	
6	840	12	0.0	0.374	.089
7	3,025	2,748.6	521.5	0.042	43.867
8	8,760	7,262.9	2,299.4	0.168	195.454

Emissions Calculations are based on the National Emissions Data System (NEDS) Source Classification Codes (SCC), according to the following formula:

Calculated Emissions (Tons/Year) =

$$\left[\left(\frac{\text{Annual Operating Rate for SCC}}{}\right) \times \left(\frac{\text{Emission Factor from SCC File}}{\text{(2,000 lb/ton)}}\right) \times \left(\frac{\text{Fuel Parameter if applicable}}{}\right) \times \left(\frac{\text{100-Control Efficiency \%}}{100}\right)\right]$$

where:

Annual Operating Rate = Millions of Cubic Feet of Natural Gas Burned/Yr

Emission Factor = Pounds of Pollutant/Million Cubic Feet of Gas Burned

Fuel Parameter = Ash or Sulfur Content of Fuel on Weight-by-Percent (%) Basis [Not Applicable for Combustion of Natural Gas]

Control Efficiency = Pollution Control Device Percent (%) Efficiency [Since No External Control Devices Are Included, This Factor Applies Only to NO_x]

A. ANNUAL OPERATING RATE

The preceeding table provides fuel consumption data for 1984.

B. EMISSION FACTORS

Emissions Factors
From NEDS SCC File

External Combustion Boilers - Electric Generation-4911

Pounds of Pollutant Emitted Per Unit Volume of Fuel Consumed		
Parameter	SCC 1-01-006-01 Natural Gas ($lb/10^6$ CF Burned)	SCC 1-01-004-04 No. 6 Oil ($lb/10^3$ gal Burned)
Particulates	3	13
SO_x	0.6	159 S
NO_x	550	42
VOC	1.4	0.76
CO	40	5

C. FUEL PARAMETERS

Not applicable for natural gas.

For No. 6 oil: Sulfur content as Percent

= 2.5% for No. 6 and No. 7 Boilers

= 0.75% for No. 8 Boiler

D. CONTROL EFFICIENCY

Not applicable.
Combining actual operating conditions with the appropriate NEDS emission factors, calculate the total actual annual emissions for each criteria pollutant.

ACTUAL EMISSIONS (T/Y)

PARAMETER		A	x	B	x	C	x	D	= ANNUAL EMISSIONS
Particulates									
No. 6	Gas	None							= 0 T/yr
	Oil	$\frac{0.374}{2000}$		13		2.5			= 0.0061 T/yr
No. 7	Gas	$\frac{521.5}{2000}$		3					= 0.78 T/yr
	Oil	$\frac{0.042}{2000}$		13		2.5			= 0.00068 T/Y
No. 8	Gas	$\frac{2299.4}{2000}$		3					= 3.45 T/yr
	Oil	$\frac{0.168}{2000}$		13		0.75			= 0.00082 T/yr
				Total Particulate Emissions					= 4.238 T/yr
Sulfur Dioxide									
No. 6	Gas	None							= 0 T/Yr
	Oil	$\frac{0.374}{2000}$		159.0		2.5			= 0.0743 T/yr
No. 7	Gas	$\frac{521.5}{2000}$		0.6					= 0.1565 T/yr
	Oil	$\frac{0.042}{2000}$		159.0		2.5			= 0.00835 T/yr

PARAMETER		A	x	B	x	C	x	D	= ANNUAL EMISSIONS
No. 8	Gas	$\frac{2299.4}{2000}$		0.6					= 0.690 T/yr
	Oil	$\frac{0.168}{2000}$		159.0		0.75			= 0.01002 T/yr
				Total SO_x Emissions					= 0.93917 T/yr

Nitrogen Oxides

No. 6	Gas	None							= 0 T/yr
	Oil	$\frac{0.374}{2000}$		42					= 0.007854 T/yr
No. 7	Gas	$\frac{521.5}{2000}$		550					= 143.4125 T/yr
	Oil	$\frac{0.042}{2000}$		42					= 0.000882 T/yr
No. 8	Gas	$\frac{2299.4}{2000}$		550					= 632.335 T/yr
	Oil	$\frac{0.168}{2000}$		42					= 0.003528 T/yr
				Total NO_x Emissions					= 775.760 T/yr

Volatile Organic Compounds

No. 6	Gas								= 0 T/yr
	Oil	$\frac{0.374}{2000}$		0.76					= 0.000142 T/yr
No. 7	Gas	$\frac{521.5}{2000}$		1.4					= 0.36505 T/yr
	Oil	$\frac{0.042}{2000}$		0.76					= 0.0000159 T/yr

PARAMETER		A	x	B	x	C	x	D	= ANNUAL EMISSIONS
No. 8	Gas	$\frac{2299.4}{2000}$		1.4					= 1.60958 T/yr
	Oil	$\frac{0.168}{2000}$		0.76					= 0.0000638 T/yr
				Total VOC Emissions					= 1.9748517 T/yr

Carbon Monoxide

No. 6	Gas								= 0 T/yr
	Oil	$\frac{0.374}{2000}$		5					= 0.000935 T/yr
No. 7	Gas	$\frac{521.5}{2000}$		40					= 10.43 T/yr
	Oil	$\frac{0.042}{2000}$		5					= 0.000105 T/yr
No. 8	Gas	$\frac{2299.4}{2000}$		40					= 45.98 T/yr
	Oil	$\frac{0.168}{2000}$		5					= 0.00042 T/yr
				Total CO Emissions					= 56.41146 T/yr

Summarizing the actual plant-wide emissions:

PRESENT ACTUAL EMISSIONS (T/Y)

	No. 6 12 hrs (0.07 wks)	No. 7 2748.6 hrs (16.3 wks)	No. 8 7262.9 hrs (43.2 wks)	**6,7,8 10023.5 hrs TOTAL**
Part	0.0061	0.781	3.451	**4.238**
SO_x	0.0743	0.16485	0.70002	**0.93917**
NO_x	0.007854	143.4134	632.338	**775.760**
VOC	0.000142	0.36507	1.6096	**1.974**
CO	0.0009	10.43	45.98	**56.41**

Following start-up of the new Unit 9, operation of the other units will be curtailed as follows:

	CURRENT OPERATING RATE (HRS/YR)	PROJECTED OPERATING RATE (HRS/YR)
Unit No. 6	12.0	12
Unit No. 7	2748.6	1344
Unit No. 8	7262.9	6384

Projected emissions for each pollutant can be calculated by multiplying present emissions, with the ratio of future total operating hours, to present operating hours.

PROJECTED EMISSIONS FOR THE MODIFIED PLANT

Unit No. 6: No change from 1984 emissions.

Unit No. 7: $\frac{1344 \text{ hrs/yr future}}{2748.6 \text{ hrs/yr present}}$ x present emissions = projected emissions for each pollutant

Unit No. 8: $\frac{6384 \text{ hrs/yr future}}{7262.9 \text{ hrs/yr present}}$ x present emissions = projected emissions for each pollutant

Unit No. 9: Refer to Attachment 4

Using the generic relationship for each unit, the projected emissions can be calculated as follows:

SUMMARY OF PROJECTED EMISSIONS (T/Y)

	No.6 12 hrs (0.07 wks)	No. 7 1344 hrs (8 wks)	No. 8 6384 hrs (38 wks)	No. 9 6720 hrs (40 wks)	**6,7,8,9 14460 hrs TOTAL**	Net Emissions Increase	**Significant Emission Rate**
Part	0.0024	0.382	3.017	13.44	**16.841**	12.607	**25**
SO_x	0.0743	0.0806	0.612	0.567	**1.334**	0.395	**40**
NO_x	0.007854	70.126	552.86	172.52	**795.51**	19.75	**40**
VOC	0.000142	0.179	1.407	12.10	**13.69**	11.72	**40**
CO	0.0009	5.100	40.20	110.4	**155.7**	99.29	**100**

By comparing the present actual emissions for Units 6, 7, and 8 with the projected emissions for Units 6, 7, 8, and 9, the net emissions increase can be calculated as indicated in the above table. Since the increase of emissions of each criteria pollutant does not exceed the significant emission rate in the last column of the table, a new source review is not required.

#6 #7 #8
3.40
0.77
622.99
1.59
45.30

T + D
17.607
1.5029
942.760
14.07
169.08

→ P5/25

Check Sheet

Company Name: Ft. Pierce Utilities Authority
Permit Number: PA 96-141460
PSD Number:
County:
Permit Engineer:
Others involved:

Application:
- [x] Initial Application
- [x] Incompleteness Letters
- [x] Responses + 1996 Modif.
- [ ] Final Application (if applicable)
- [ ] Waiver of Department Action
- [ ] Department Response
- [ ] Other

Intent:
- [x] Intent to Issue + 1996 Modif
- [x] Notice to Public + 1996 Modif.
- [x] Technical Evaluation
- [x] BACT Determination
- [x] Unsigned Permit
- [ ] Correspondence with:
  - [ ] EPA
  - [ ] Park Services
  - [ ] County
  - [x] Other
- [x] Proof of Publication
- [ ] Petitions - (Related to extensions, hearings, etc.)
- [ ] Other

Final Determination:
- [x] Final Determination
- [x] Signed Permit + 1996 Modif.
- [ ] BACT Determination
- [ ] Other

Post Permit Correspondence:
- [x] Extensions
- [x] Amendments/Modifications + 1996
- [ ] Response from EPA
- [ ] Response from County
- [ ] Response from Park Services
- [x] Other

P 274 010 115

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to: Harry Schindehette, Dir. Ft. Pierce Utilities Authori.	
Street and No. P.O. Box 3191	
P.O., State and ZIP Code Ft. Pierce, FL 33448	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date Mailed: 02/12/88 Permit: AC 56-141460	

PS Form 3800, June 1985 * U.S.G.P.O. 1985-480-794

PERMIT FILE

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.

1. ☒ Show to whom delivered, date, and addressee's address. 2. ☐ Restricted Delivery.

3. Article Addressed to: Mr. Harry Schindehette, Director Ft. Pierce Utilities Authorities P.O. Box 3191 Ft. Pierce, FL 33448	4. Article Number P 274 010 115 Type of Service: ☐ Registered ☐ Insured ☒ Certified ☐ COD ☐ Express Mail Always obtain signature of addressee or agent and DATE DELIVERED.
5. Signature — Addressee X L. Daughtry	8. Addressee's Address *(ONLY if requested and fee paid)*
6. Signature — Agent X	
7. Date of Delivery FEB 17 1988	

PS Form 3811, Feb 1986 DOMESTIC RETURN RECEIPT

UNITED STATES POSTAL SERVICE
OFFICIAL BUSINESS

SENDER INSTRUCTIONS
Print your name, address, and ZIP Code in the space below.
- Complete items 1, 2, 3, and 4 on the reverse.
- Attach to front of article if space permits, otherwise affix to back of article.
- Endorse article "Return Receipt Requested" adjacent to number.

DER

U.S.MAIL

PENALTY FOR PRIVATE USE, $300

RETURN TO

FEB 19

Print Sender's name, address, and ZIP Code in the space below.

Department of Environmental Regulation
Bureau of Air Qualit-Management
2600 Blair Stone Road
Tallahassee, FL 32399-2400

BAQM

ATTN: M. JANES

PS Form 3811, July 1983 447-845

SENDER: Complete items 1, 2, 3 and 4.

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested.

1. ☒ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to:
Harry Schindehette
311 North Indian River Drive
Ft. Pierce Utilities Authority
P.O. Box 3191
Ft. Pierce, FL 33448

4. Type of Service:
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail

Article Number
P 274 007 644

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X

6. Signature – Agent
X

7. Date of Delivery
DEC - 4 1987

8. Addressee's Address *(ONLY if requested and fee paid)*

DOMESTIC RETURN RECEIPT

P 274 007 644

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to: Mr. Harry Schindehette, Dir.
Ft. Pierce Utilities Auth.
Street and No.
P.O. Box 3191
P.O., State and ZIP Code
Ft. Pierce, FL 33448

Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date	Mailed: 12/1/87 Permit: AC 56-141460

PS Form 3800, June 1985 ★ U.S.G.P.O. 1985-480-794

PALM BEACH

UNITED STATES POSTAL SERVICE

OFFICIAL BUSINESS

SENDER INSTRUCTIONS

Print your name, address, and ZIP Code in the space below.

- **Complete items 1, 2, 3, and 4 on the reverse.**
- **Attach to front of article if space permits, otherwise affix to back of article.**
- **Endorse article "Return Receipt Requested" adjacent to number.**

QUALITY IS OUR POSTMARK - ZIP+4 WILL GIVE YOU MORE

U.S.MAIL

PENALTY FOR PRIVATE USE, $300

RETURN TO DER

Department of Environmental Regulation
(Name of Sender)

DEC 7 1987

Bureau of Air Quality Management
2600 Blair Stone Road
(No. and Street, Apt., Suite, P.O. Box or R.D. No.)

BAQM

Tallahassee, FL 32399-2400
(City, State, and ZIP Code)

ATTN: M. JANES

P 274 010 356

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to Harry Schindehette, Dir. Fort Pierce Utilities Author.	
Street and No. P.O. Box 3191	
P.O., State and ZIP Code Fort Pierce, FL 33448	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date Mailed: 03-28-88 Permit: AC 56-141460	

PS Form 3800, June 1985 ☆ U.S.G.P.O. 1985-480-794

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fee and check box(es) for additional service(s) requested.

FEE NOT PAID

1. XX Show to whom delivered, date, and addressee's address. 2. ☐ Restricted Delivery.

3. Article Addressed to:
Mr. Harry Schindehette, Director
Fort Pierce Utilities Authority
P.O. Box 3191
Fort Pierce, FL 33448

4. Article Number
P 274 101 356

Type of Service:
☐ Registered ☐ Insured
XX Certified ☐ COD
☐ Express Mail

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Addressee
X P. Daughtry

6. Signature — Agent
X

7. Date of Delivery
APR 1 1988

8. Addressee's Address *(ONLY if requested and fee paid)*

PS Form 3811, Feb 1986 DOMESTIC RETURN RECEIPT

UNITED STATES POSTAL SERVICE
OFFICIAL BUSINESS

SENDER INSTRUCTIONS
Print your name, address, and ZIP Code in the space below.
- Complete items 1, 2, 3, and 4 on the reverse.
- Attach to front of article if space permits, otherwise affix to back of article.
- Endorse article "Return Receipt Requested" adjacent to number.

PALM BEACH, FLA. PM APR 1988

RECEIVED
APR 4 1988

QUALITY IS OUR POSTMARK. ZIP+4 WILL GIVE YOU MAIL

PENALTY FOR PRIVATE USE, $300

RETURN TO

DER - BAQM
Print Sender's name, address, and ZIP Code in the space below.

Department of Environmental Regulation
~~Bureau of Air Quality Management~~
2600 Blair Stone Road
~~Tallahassee, FL 32399-2400~~

ATTN: M. JANES

P 274 007 494

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to Mr. George L. Whitmer, ESE	
Street and No. P.O. Box 4943	
P.O., State and ZIP Code Jacksonville, FL 32201	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date Permit: AC 56-141460 Mailed: 11-4-88	

PS Form 3800, June 1985 ★U.S.G.P.O. 1985-480-794

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.

Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.

1. ☐ Show to whom delivered, date, and addressee's address. *(Extra charge)*
2. ☐ Restricted Delivery *(Extra charge)*

3. Article Addressed to: Mr. George L. Whitmer Environmental Compliance Manager Environmental Science & Eng. P. O. Box 4943 Jacksonville, FL 32201	4. Article Number P 274 007 494 Type of Service: ☐ Registered ☐ Insured ☒ Certified ☐ COD ☐ Express Mail Always obtain signature of addressee or agent and DATE DELIVERED.
5. Signature – Addressee X	8. Addressee's Address *(ONLY if requested and fee paid)*
6. Signature – Agent X M. Williams	
7. Date of Delivery 11-7-88	

PS Form **3811**, Mar. 1987 ★ U.S.G.P.O. 1987-178-268 **DOMESTIC RETURN RECEIPT**

UNITED STATES POSTAL SERVICE

OFFICIAL BUSINESS

SENDER INSTRUCTIONS

Print your name, address, and ZIP Code in the space below.

- Complete items 1, 2, 3, and 4 on the reverse.
- Attach to front of article if space permits, otherwise affix to back of article.
- Endorse article "Return Receipt Requested" adjacent to number.

RECEIVED

NOV 8 1988

DER - BAQM

PENALTY FOR PRIVATE USE, $300

RETURN TO

Print Sender's name, address, and ZIP Code in the space below.

Dept. of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, FL 32399-2400
Attn: Patty Adams

P 938 762 675

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to Mr. Frederick A. Brock, Ft.	
Street and No. Pierce Utilites P. O. Box 1298	
P.O., State and ZIP Code Ft. Pierce, FL 33448	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date Permit: AC 56-141460 Mailed: 9-13-89	

PS Form 3800, June 1985

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.
Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.

1. ☐ Show to whom delivered, date, and addressee's address. *(Extra charge)*
2. ☐ Restricted Delivery *(Extra charge)*

3. Article Addressed to:

Mr. Frederick A. Brock
Supt. of Power Resources
Ft. Pierce Utilities Authority
P. O. Box 1298 (34954)
Ft. Pierce, FL 33448

4. Article Number
P 938 762 675

Type of Service:
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Address
X

6. Signature — Agent
X

7. Date of Delivery

8. Addressee's Address *(ONLY if requested and fee paid)*

FT PIERCE FL SEP 12 1989

PS Form **3811**, Mar. 1988 * U.S.G.P.O. 1988-212-865 **DOMESTIC RETURN RECEIPT**

UNITED STATES POSTAL SERVICE

OFFICIAL BUSINESS

SENDER INSTRUCTIONS

Print your name, address and ZIP Code in the space below.

- Complete items 1, 2, 3, and 4 on the reverse.
- Attach to front of article if space permits, otherwise affix to back of article.
- Endorse article "Return Receipt Requested" adjecent to number.

RECEIVED

SEP 20 1989

DER - BAQM

U.S.MAIL

PENALTY FOR PRIVATE USE, $300

RETURN TO

Print Sender's name, address, and ZIP Code in the space below.

Dept. of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, FL 32399-2400
Attn: Patty Adams

P 938 762 862

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to: Harry Schindehette	
Street and No.: Ft Pierce Utilities	
P.O., State and ZIP Code: P.O. Box 3191 - Ft Pierce Fla.	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date: 4-26-90 AC56-141460	

PS Form 3800, June 1985

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.
Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.
1. ☐ Show to whom delivered, date, and addressee's address. *(Extra charge)* 2. ☐ Restricted Delivery *(Extra charge)*

3. Article Addressed to:
Harry Schindehette
Director
Ft. Pierce Utilities Authority
P.O. Box 3191
Ft. Pierce, Fl 33450

4. Article Number
P 938 762 862

Type of Service:
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Address
X

6. Signature — Agent
X

7. Date of Delivery
MAY - 1 90

8. Addressee's Address *(ONLY if requested and fee paid)*

PS Form **3811**, Mar. 1988 * U.S.G.P.O. 1988-212-865 DOMESTIC RETURN RECEIPT

UNITED STATES POSTAL SERVICE

OFFICIAL BUSINESS

SENDER INSTRUCTIONS

Print your name, address and ZIP Code in the space below.

- Complete items 1, 2, 3, and 4 on the reverse.
- Attach to front of article if space permits, otherwise affix to back of article.
- Endorse article "Return Receipt Requested" adjacent to number.

RETURN TO

PENALTY FOR PRIVATE USE, $300

Print Sender's name, address, and ZIP Code in the space below.

Patty Adams - DER - BAR

2600 Blair Stone Rd. - Twin Towers

Tallahassee, FL 32399-2400

P 256 396 240

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to: Harry Schindehett	
Street and No.: Ft Pierce Utilities Auth.	
P.O., State and ZIP Code: Ft. Pierce, Fl	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date 11-19-90 AC 56-141460	

PS Form 3800, June 1985 ☆U.S.G.P.O. 1989-234-555

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.

Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.

1. ☐ Show to whom delivered, date, and addressee's address. *(Extra charge)*
2. ☐ Restricted Delivery *(Extra charge)*

3. Article Addressed to:
Harry Schindehett
Ft. Pierce Utilities Auth.
P.O. Box 3191
Ft. Pierce, Fl 34948

4. Article Number
P256 396 240

Type of Service:
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Addressee
X

6. Signature — Agent
X P Daughtry

7. Date of Delivery
4/26/91

8. Addressee's Address *(ONLY if requested and fee paid)*

PS Form **3811**, Apr. 1989 ★U.S.G.P.O. 1989-238-815 **DOMESTIC RETURN RECEIPT**

UNITED STATES POSTAL SERVICE

OFFICIAL BUSINESS

SENDER INSTRUCTIONS

Print your name, address and ZIP Code in the space below.

- Complete items 1, 2, 3, and 4 on the reverse.
- Attach to front of article if space permits, otherwise affix to back of article.
- Endorse article "Return Receipt Requested" adjecent to number.

RECEIVED

NOV 26 1990

DER - BAQM

U.S.MAIL

PENALTY FOR PRIVATE USE, $300

RETURN TO

Print Sender's name, address, and ZIP Code in the space below.

Patty Adams - D.E.R - BAR
2600 Blairstone Rd - Twin Towers
Tallahassee, Fl 32399-2400

P 832 539 856

Certified Mail Receipt

No Insurance Coverage Provided
Do not use for International Mail
(See Reverse)

UNITED STATES POSTAL SERVICE

Sent to Mr. Harry Schindehette, Ft.	
Street & No. Pierce Utilities P. O. Box 3191	
P.O., State & ZIP Code Fort Pierce, FL 34949	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Address of Delivery	
TOTAL Postage & Fees	$
Postmark or Date Mailed: 6-28-91 Permit: AC 56-141460	

PS Form **3800**, June 1990

SENDER:

- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece next to the article number.

I also wish to receive the following services (for an extra fee):

1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:

Mr. Harry Schindehette
Director of Utilities
Fort Pierce Utilities Authority
P. O. Box 3191
Fort Pierce, FL 34948

4a. Article Number
P 832 539 856

4b. Service Type
☐ Registered ☐ Insured
☐ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery
A 1

5. Signature (Addressee)

6. Signature (Agent)

8. Addressee's Address (Only if requested and fee is paid)

FT. PIERCE, FLD WNTOWN JUL 29 1991 USPS VIS

PS Form **3811**, October 1990 ☆U.S. GPO: 1990—273-861 **DOMESTIC RETURN RECEIPT**

United States Postal Service

Official Business

RECEIVED

JUL 0 5 1991

Division of Air
Resources Management

U.S. MAIL

PENALTY FOR PRIVATE
USE, $300

Print your name, address and ZIP Code here

Dept. of Environmental Regulation
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400
Attn: Patty Adams

Z 127 633 182

Receipt for Certified Mail
No Insurance Coverage Provided
Do not use for International Mail
(See Reverse)

Sent to	Thomas Richards
Street and No.	H.D. King PP
P.O., State and ZIP Code	Ft. Pierce, FL
Postage	$ Ft. Pierce, FL
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, and Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date	3-7-96

PS Form 3800, March 1993

AC56-141460A

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Thomas W Richards PE
H.D. King Power Plant
311 N. Indian River Dr
Ft. Pierce, Fl 34950

4a. Article Number Z 127 633 182

4b. Service Type
☐ Registered ☐ Insured
☑ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery
MAR 11

5. Signature (Addressee)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature (Agent)

PS Form 3811, December 1991 ☆U.S. GPO 1993—352-714 **DOMESTIC RETURN RECEIPT**

Is your RETURN ADDRESS completed on the reverse side?

Thank you for using Return Receipt Service.

UNITED STATES POSTAL SERVICE

Official Business

PENALTY FOR PRIVATE USE TO AVOID PAYMENT OF POSTAGE, $300

U.S.

WEST PALM BEACH, FL

RECEIVED

MAR 14 1996

BUREAU OF
AIR REGULATION

Print your name, address and ZIP Code here

Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation, NSRS
2600 Blair Stone Road, MS 5505
Tallahassee, Florida 32399-2400

Is your RETURN ADDRESS completed on the reverse side?

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Mr. Thomas Richards, PE
Director of Operations
HD King Power Plant
311 N. Indian River Dr
Ft. Pierce, Fl 34950

4a. Article Number
Z 127 633 196

4b. Service Type
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery
APR 10

5. Signature (Addressee)

6. Signature (Agent)
[signature]

8. Addressee's Address (Only if requested and fee is paid)

PS Form **3811**, December 1991 ☆U.S. GPO: 1993—352-714 **DOMESTIC RETURN RECEIPT**

Thank you for using Return Receipt Service.

Z 127 633 196

Receipt for Certified Mail

UNITED STATES POSTAL SERVICE

No Insurance Coverage Provided
Do not use for International Mail
(See Reverse)

Sent to Thomas Richards	
Street and No. HD King Power Plant	
P.O., State and ZIP Code Ft. Pierce, Fl	
Postage	$
Certified Fee Ft. Pierce	Utilities
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, and Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date 4-8-96 AC56-141460A	

PS Form 3800, March 1993