# *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


STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
NOTICE OF PERMIT

Mr. William Herrington
Orlando Utilities Commission
500 South Orange Avenue
Orlando, Florida 32802

September 1, 1988

Enclosed are permits Nos. AC 05-144482, -146749, -146750, and -146751, for Orlando Utilities Commission to construct four new simple cycle combustion turbines at the existing Indian River Plant, Brevard County, Florida. These permits are issued pursuant to Section 403, Florida Statutes.

Any Party to these permits has the right to seek judicial review of these permits 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 these permits are 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:

C. Collins, CF District
W. Aronson, EPA
M. Flores, NPS
J. Crall, OUC
S. Day, Black & Veatch

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this NOTICE OF PERMIT and all copies were mailed before the close of business on September 2, 1988.

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 J. Wise — Clerk

September 2, 1988 — Date

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. William Herrington
Orlando Utilities Commission
500 South Orange Avenue
Orlando, FL 32802

4. Article Number
P 938 762 891

Type of Service:
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X

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7. Date of Delivery SEP 7 1988

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PS Form 3811, Mar. 1987 ★ U.S.G.P.O. 1987-178-268 DOMESTIC RETURN RECEIPT

To _
Date Attachment for
W Orlando Utilities
M Kim has letter.
of Orig. - certified
Phone { Jim Crall - Fed Ex.
{ No copy
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CA Tom Sanicki - Copy
WA

Message 1089-9928-4
Orlando Utilities
1089-9928-4 Fed X

Operator

P 938 762 891

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| | |
|---|---|
| Sent to Mr. William Herrington<br>~~Orlando Utilities Commission~~ | |
| Street and No. 500 South Orange Avenue | |
| P.O., State and ZIP Code Orlando, FL 32802 | |
| Postage | $ |
| Certified Fee | |
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PERMITS: AC 05-144482, -146749, -146750 & -146751

PS Form 3800, June 1985

# Final Determination

Orlando Utilities Commission
Indian River Plant
Titusville, Brevard County, Florida

Combustion Turbine Facility
Permit Numbers:

Unit 1, AC 05-144482
Unit 2, AC 05-146749
Unit 3, AC 05-146750
Unit 4, AC 05-146751

PSD-FL-130

Florida Department of Environmental Regulation
Bureau of Air Quality Management
Central Air Permitting

August 31, 1988

# Final Determination

Orlando Utilities Commission's applications to construct four new simple cycle combustion turbines at the existing Indian River Plant, Brevard County, Florida, have been reviewed by the Bureau of Air Quality Management. Public Notice of the Department's Intent to Issue the permits was published in the Florida Today Newspaper on July 21, 1988.

Comments received from Orlando Utilities (see Attachment 13) in response to the Department's Intent to Issue are addressed below.

1. The introductory paragraph on the first page of the proposed permit will be amended to reflect that natural gas will be the primary fuel and that distillate oil will be used during periods of curtailed or uneconomical natural gas supply.

2. Specific Condition No. 2 will be clarified by deleting the second sentence.

3. Specific Condition No. 3 will be corrected to reflect the maximum heat input of 445 MMBtu/hr at sea level and 59°F. For compliance purposes, the applicant has provided performance data for the GE Frame 6 turbine showing the variation in heat input with variation in ambient temperature. A plot of temperature vs emissions will be submitted by the applicant to the DER district office prior to applying for the operation permit.

4. The reference of 59°F and sea level will be added to Specific Conditions No. 3 and 4.

5. Specific Condition No. 8, pertaining to testing requirements, will be amended as requested by the applicant.

6. Specific Condition No. 12 will be restated as requested by the applicant based on the revised start date for unit 4.

In consideration of comments from the Central Air Permitting Staff, Specific Condition No. 10 will be amended to make the wording consistent with recently issued permits.

The final action of the Department will be to issue the permits as proposed with the above mentioned changes to Specific Conditions Nos. 2, 3, 4, 8, 10, and 12.

# CAPE PUBLICATIONS, INC.

**The Times**
*Published Weekly on Wednesday*

THE TRIBUNE
*Published Weekly on Wednesday*

FLORIDA TODAY
***Published Daily***

ST☆R-ADVOCATE
*Published Weekly on Wednesday*

STATE OF FLORIDA
COUNTY OF BREVARD

Before the undersigned authority personally appeared **Linda L. Spicer** who on oath says that he/she is **Legal Advertising Clerk** of the **FLORIDA TODAY**, a newspaper published in Brevard County, Florida; that the attached copy of advertising being a Legal Notice of Intent in the matter of State of Florida Dept. of Environmental Regulation in the Court was published in the **FLORIDA TODAY NEWSPAPER** in the issues of July 21, 1988

Affiant further says that the said **FLORIDA TODAY NEWSPAPER** is a newspaper published in said Brevard County, Florida and that the said newspaper has heretofore been continuously published in said Brevard County, Florida regularly as stated above, and has been entered as second class mail matter at the post office in **COCOA**, said Brevard County, Florida for a period of one year next preceeding 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 said newspaper.

Linda L. Spicer

Sworn and subscribed to before me this

21st day of July A.D., 1988

Notary Public
State of Florida at Large
My Commission Expires March 29, 1992

**State of Florida**
**Department of**
**Environmental Regulation**
**Notice of Intent**

The Department of Environmental Regulation hereby gives notice of its intent to issue permits to Orlando Utilities Commission to construct four new simple cycle combustion turbines, each with an electrical generation capacity of about 35 MW, at the existing Indian River Plant, Brevard County, Florida. The Department is issuing this intent to issue for the reasons stated in the 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 applications are 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
Central Florida District
3319 Maguire Blvd., Suite 232
Orlando, Florida 32803-3767

Any person may send written comments on the proposed action to Mr. Bill Thomas at the department's Tallahassee address. All comments mailed within 30 days of the publication of this notice will be considered in the department's final determination.
TOPAIM—1T—7/21/88
Thursday

# 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


**PERMITTEE:**
**Orlando Utilities Commission**
**500 South Orange Avenue**
**Orlando, Florida 32802**

**Permit Numbers: AC 05-144482**
**05-146749**
**05-146750**
**05-146751**
**Expiration Date: January 31, 1992**
**County: Brevard**
**Latitude/Longitude: 28° 29' 32"N**
**80° 46' 59"W**
**Project: Combustion Turbine**
**Facility Units 1, 2, 3, & 4**

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 four simple cycle GE Frame 6 combustion turbines, each with about 35 MW capacity, at the existing Indian River Plant, Brevard County, Florida. The turbines will primarily fire natural gas. Distillate oil will be fired during periods of curtailed or uneconomical natural gas supply. Nitrogen oxide emissions will be controlled by water injection. The PSD permit number for this project is PSD-FL-130.

Construction shall be in accordance with the permit application and plans, documents, and reference material submitted unless otherwise stated in the Preliminary Determination and Technical Evaluation or the General and Specific Conditions herein.

Attachments:
1. OUC's application package dated January 18, 1988.
2. DER's letter concerning application fees dated February 15, 1988.
3. DER's letter for additional information dated March 10, 1988.
4. DER's letter containing EPA's comments dated March 18, 1988.
5. OUC's letter received April 18, 1988.
6. Black & Veatch (B & V) letter received May 5, 1988.
7. OUC letter received May 13, 1988.
8. B & V letter received May 18, 1988.
9. B & V letter received June 13, 1988.
10. B & V letter received June 16, 1988.
11. B & V letter received June 21, 1988.
12. Fish & Wildlife Service letter received July 5, 1988.
13. OUC's comments received August 18, 1988.
14. Preliminary and Final Determinations dated July 15 and August 26, 1988, respectively.

PERMITTEE:
Orlando Utilities Commission

Permit Numbers: AC 05-144482
05-146749
05-146750
05-146751

Expiration Date: January 31, 1992

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:

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

14. The permittee shall comply with the following 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. Each turbine may operate continuously (8760 hours/year).

2. Only natural gas or distillate oil shall be fired in the turbine.

3. The maximum heat input to each turbine shall not exceed 445 MMBtu/hr, at sea level and 59°F (see Attachment 13 for a plot of heat input vs temperature).

PERMITTEE:
Orlando Utilities Commission

Permit Numbers: AC 05-144482
05-146749
05-146750
05-146751
Expiration Date: January 31, 1992

SPECIFIC CONDITIONS:

4. The maximum allowable emissions from the turbine(s) in accordance with the BACT determination, shall not exceed the following, at sea level and 59°F:

| Pollutant | Fuel | Maximum Emissions Per Unit lb/h | Potential Annual Emissions 1 Unit t/yr | Potential Annual Emissions 4 Units t/yr |
|---|---|---|---|---|
| Carbon Monoxide | Gas | 10.0 | 43.8 | 175 |
| | Oil | 10.1 | 44.2 | 177 |
| Nitrogen Oxides | Gas | 75.1 | 328.9 | 1,316 |
| | Oil | 118.3 | 518.2 | 2,073 |
| Sulfur Dioxide | Gas | 0.34 | 1.5 | 6 |
| | Oil | 142.7 | 625.0 | 2,500 |
| Total Particulates | Gas | 2.5 | 11.0 | 44 |
| | Oil | 10.0 | 43.8 | 175 |
| $PM_{10}$ | Gas | 2.5 | 11.0 | 44 |
| | Oil | 10.0 | 43.8 | 175 |
| VOC | Gas | 4.0 | 17.5 | 70 |
| | Oil | 4.0 | 17.5 | 70 |
| Sulfuric Acid Mist | Oil | 10.0 | 44.0 | 176 |
| Beryllium | Oil | 0.0001 | 0.0005 | 0.0018 |

Visible emissions shall not exceed 5% opacity while burning natural gas or 10% opacity while burning distillate oil.

5. The distillate oil sulfur content shall not exceed 0.3% by weight.

6. Water injection shall be utilized for NOx control. The water to fuel ratio at which compliance is achieved shall be incorporated into the permit, and shall be monitored.

PERMITTEE:
Orlando Utilities Commission

Permit Numbers: AC 05-144482
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05-146750
05-146751

Expiration Date: January 31, 1992

SPECIFIC CONDITIONS:

7. Both start and black start capability shall be provided by a No. 2 fuel oil fired 800 HP internal combustion diesel (for each turbine), projected to run for approximately 10 minutes per start. These diesels are expected to emit minimal air emissions (15 lbs $SO_2$/year/unit).

8. Initial (I) compliance tests shall be performed using both fuels. Annual (A) compliance tests shall be performed with the fuel(s) used for more than 170 hours in the preceeding 12 month period. Tests shall be conducted using EPA methods in accordance with 40 CFR 60 Appendix A, 1987 Edition:

a. 20 for NOx (I,A)
b. ASTM D 2880-71 for sulfur content of distillate oil, and ASTM D 1072-80, D 3031-81, D 4084-82 or D 3246-81 for sulfur content of natural gas (I, and A if deemed necessary by DER)
c. 10 for CO (I)
d. 5 for PM (I, for distillate oil only)
e. 9 for VE (I,A)
f. 104 for Beryllium (I, for distillate oil only)

Test for PM, Be, and $SO_2$ are to be conducted for oil only. Compliance with $SO_2$ limits may be demonstrated by testing all oil shipments for sulfur content less than 0.30 percent using ASTM D2880-71.

Any unit which has accumulated 170 hours burning fuel oil during the preceding 12 month period shall conduct an annual test using fuel oil.

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

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

10. DER's Central Florida District Office shall be notified in writing a minimum of 15 days prior to source testing. Written reports of the tests shall be submitted to the DER district office within 30 days of test completion.

SPECIFIC CONDITIONS:

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 a minimum of 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).

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 DER district office a minimum of 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).

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).

11. Any change in the method of operation, fuels, equipment or operating hours shall be submitted for approval to the DER district office.

12. If construction does not commence on all four units within 18 months of issuance of this permit, then the permittee shall obtain from DER a review and, if necessary, a modification of the control technology and allowable emissions for the unit(s) on which construction has not commenced (40 CFR 52.21(r)(2)). The proposed schedule indicates construction commencement dates of October 1988 for units 1 and 2, and November 1989 for units 3 and 4.

PERMITTEE:
Orlando Utilities Commission

Permit Numbers: AC 05-144482
05-146749
05-146750
05-146751
Expiration Date: January 31, 1992

Issued this 1 day of Sept., 1988

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL REGULATION

Dale Twachtmann

Dale Twachtmann, Secretary

Best Available Control Technology (BACT) Determination
Orlando Utilities Commission
Brevard County

The applicant proposes to install up to four new simple cycle combustion turbines at the Indian River Plant located about 10 km south of Titusville, Florida. The project includes the installation of two 35 MW (approximate rating at site conditions) combustion turbine generators, with provisions for the installation of up to two additional combustion turbine generators of similar size in the future. This application was reviewed for the total proposed installation of four 35 MW units.

The combustion turbines are being designed for firing on either natural gas or No. 2 fuel oil. The applicant has indicated the annual tonnage of regulated air pollutants emitted from the four turbines based on 100 percent capacity and type of fuel firing to be as follows:

| Pollutant | Maximum Potential Emissions (tons/year) Natural Gas | Diesel Fuel | PSD Significant Emission Rate (tons/year) |
|---|---|---|---|
| NOx | 1,320 | 2,070 | 40 |
| $SO_2$ | 6 | 2,500 | 40 |
| PM | 44 | 175 | 25 |
| $PM_{10}$ | 44 | 175 | 15 |
| CO | 175 | 177 | 100 |
| VOC | 70 | 70 | 40 |
| Sulfuric Acid Mist | - | 176 | 7 |
| Beryllium | - | 0.0018 | 0.0004 |

Florida Administrative Code Rule 17-2.500(2)(f)(3) requires a BACT review for all regulated pollutants emitted in an amount equal to or greater than the significant emission rates listed in the previous table.

BACT Determination Requested by the Applicant

The BACT determinations requested by the applicant on a pollutant by pollutant basis are given below:

| Pollutant | Determination |
|---|---|
| $NO_x$ | 42 ppmvd @ 15% $O_2$ (natural gas firing)<br>65 ppmvd @ 15% $O_2$ (diesel oil firing) |
| $SO_2$ | Low sulfur fuel (natural gas, diesel fuel with sulfur content not to exceed 0.30%) |
| PM and $PM_{10}$ | Firing of natural gas and diesel oil |
| CO | 10 ppmvd @ 15% $O_2$ |
| VOC | 7 ppmvd @ 15% $O_2$ |
| Sulfuric Acid Mist | Firing of natural gas and diesel oil |
| Beryllium | Firing of natural gas and diesel oil |

Date of Receipt of a BACT application:

May 5, 1988

Review of Group Members:

This determination was based upon comments received from the applicant, EPA Region IV, and the Stationary Source Control Section.

BACT Determination Procedure:

In accordance with Florida Administrative Code Chapter 17-2, Air Pollution, this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department (DER), on a case-by-case basis taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that in making the BACT determination the Department shall give consideration to:

(a) Any Environmental Protection Agency determination of Best Available Control Technology pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 (Standards of Performance for New Stationary Sources) or 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants).

(b) All scientific, engineering, and technical material and other information available to the Department.

(c) The emission limiting standards or BACT determinations of any other state.

(d) The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine for the emission source in question the most stringent control available for a similar or identical source or source category. If it is shown that this level of control is technically or economically infeasible for the source in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

BACT Determined by DER:

| Pollutant | Emission Limit |
|---|---|
| NOx | 42 ppmvd @ 15% $O_2$ (natural gas firing)<br>65 ppmvd @ 15% $O_2$ (natural gas firing) |
| $SO_2$ | Emissions limited by natural gas and diesel oil firing (sulfur content not to exceed 0.30%) |
| PM & $PM_{10}$ | Emissions limited by natural gas and diesel oil firing (sulfur content not to exceed 0.30%) |
| CO | 10 ppmvd @ 15% $O_2$ |
| VOC | 7 ppmvd @ 15% $O_2$ |
| Sulfuric Acid Mist | Emissions limited by natural gas and diesel oil firing |
| Beryllium | Emissions limited by natural gas and diesel oil firing |

BACT Determination Rationale

The Department has determined that the application as submitted represents BACT for this facility. In accordance with the "top down" BACT approach, an economic analysis has indicated that the control measures which are available to provide the highest emissions reductions are prohibitively expensive and thereby are

not justified as BACT. These control options are investigated on a pollutant-by-pollutant basis as follows.

The applicant has stated that BACT for nitrogen oxides will be met by using water or steam injection necessary to limit emissions to 65 ppmvd or 42 ppmvd at 15 percent oxygen when burning distillate fuel or natural gas, respectively.

A review of the EPA's BACT/LAER Clearinghouse - A Compilation of Control Technology Determinations (1985 edition) and it's May 1986 and 1987 supplements indicates that the lowest $NO_x$ emission limit established to date for a combustion turbine is 4.5 ppmvd at 15 percent oxygen. This level of control was accomplished through the use of water injection and a selective catalytic reduction (SCR) system.

Selective catalytic reduction is a post-combustion method for control of $NO_x$ emissions. The SCR process combines vaporized ammonia with $NO_x$ in the presence of a catalyst to form nitrogen and water. The vaporized ammonia is injected into the exhaust gases prior to passage through the catalyst bed. The SCR process can achieve up to 90 percent reduction of $NO_x$ with a new catalyst. As the catalyst ages, the maximum $NO_x$ reduction will decrease to approximately 86 percent.

In order to justify the cost effectiveness of any air pollution control, the EPA has developed costing guidelines to obtain the highest reduction of emissions per dollar invested. Achievement of maximum emission reductions for capital invested is a major consideration when New Source Performance Standards (NSPS) are developed by the EPA. For $NO_x$ emissions, EPA has determined that a cost of up to $1,000 per ton of emissions controlled ($0.50/lb) is reasonable for NSPS. The cost guideline can be used as a screening technique for justifying BACT since federal regulations require that BACT determinations be at least as stringent as NSPS.

The applicant has stated that the installation and operation a SCR system designed to reduce post-combustion emissions by 86 percent would result in an annualized cost of approximately $4.4 million. Based on continuous full load operation, the amount of $NO_x$ reduction achieved by the SCR system would be a maximum of 1,780 tons per year (emissions based on oil firing). Taking this reduction into consideration with the annualized cost of $4.4 million, the cost per ton of $NO_x$ controlled is approximately $2,472. This cost is well above the $1,000 per ton guideline and does not appear to be reasonable as BACT.

For sulfur dioxide emissions, a review of the BACT/LAER Clearinghouse indicates that BACT has been represented by the firing of low sulfur content fuel. These sulfur content

limitations are typical for the firing of fuel oil only, since the sulfur content of natural gas is inherently very low.

As part of the "top down" BACT process the applicant has completed an economic analysis of using a flue gas desulfurization (FGD) system which would provide the maximum possible level of control for $SO_2$ even though it has not been a BACT requirement previously. According to the applicant, the annualized cost of a wet limestone (FGD) system which is capable of reducing $SO_2$ emissions by 70 percent would be approximately $11.8 million. Based on continuous full load operaton, the amount of $SO_2$ reduction achieved by the FGD system would be a maximum of 1,750 tons per year for oil fuel operation. In addition to the $SO_2$ control, a FGD system would also provide control for the pollutants beryllium and sulfuric acid mist, which require BACT for this facility, and several other pollutants. These pollutants have been identified as being emitted from gas/oil fired turbines as contained in the EPA publications entitled, "Compiling Air Toxics Emission Inventories" and "Control Technologies for Hazardous Air Pollutants."

The total tonnage of pollutants which would be controlled by the FGD system amount to approximately 1,905 tons per year for oil fired operation. Taking this reduction in consideration with the annualized cost of $11.8 million the cost per ton of pollutants controlled is approximately $6,194. This cost is well above the $2,000 per ton guideline (NSPS guideline for $SO_2$ emissions) and does not appear to be reasonable as BACT.

As the BACT alternative for $SO_2$ emissions, the applicant has proposed to use fuel oil with a sulfur limitation of 0.30 percent. Limiting the oil's sulfur content is the common method of establishing BACT for $SO_2$ emissions from oil fired turbines.

The BACT/LAER Clearinghouse lists sulfur content limitations for burning oil in turbines that range from 0.1 to 0.5 percent. The applicants request that the turbine be allowed to burn fuel oil with a sulfur content of 0.30 percent maximum is consistent with the majority of the sulfur content limitations, and is thereby judged to be reasonable for BACT.

With regard to the pollutants carbon monoxide, volatile organic compounds and particulate matter, the BACT/LAER Clearinghouse documents do not list any combustion turbine projects with more stringent emission requirements than what has been proposed by the applicant.

The emissions of CO, VOC and PM are minimized by ensuring as complete combustion as possible. The equipment manufacturer has guaranteed that the CO and VOC emissions will not exceed 10 ppmvd and 7 ppmvd at 15 percent oxygen, respectively. These levels are consistent with previous BACT determinations and are judged to

represent BACT for this facility. These good combustion practices will also ensure that the toxic organic compounds will be minimized.

The emissions of particulates (TSP and $PM_{10}$) will be minimized by the inherent qualities of the fuel. Both natural gas and distillate oil contain only trace quantities of particulate. As is the case, BACT for particulates is satisfied by the use of these fuels in the combustion turbine.

Dispersion modeling indicates that the maximum predicted impacts from the facility with the level of control proposed by the applicant will be well below the Ambient Air Quality Standards for all of the averaging periods. As is the case, the impacts associated with firing either natural gas or distillate fuel in the combustion turbines are not perceived to be a threat to air quality.

Conclusion

The Department has determined that the level of control proposed by the applicant for the gas turbine facility represents BACT in all cases. The "top down" BACT approach has indicated that the more efficient than proposed control measures are too costly to warrant as being BACT for this facility. The control level as proposed is as efficient as any previous controls required for gas/oil fired turbines with the exception of units in California which were required to utilize selective catalytic reduction. Although additional $NO_x$ control could be achieved by further increasing the water/steam injection rate, it has been demonstrated that higher than proposed levels would be detrimental to the combustor and are not appropriate. In addition it should be noted that the maximum emission rates and the economic analysis have been based on operating the turbines with distillate oil as the combustion fuel. It is anticipated that natural gas will be the primary fuel, thereby resulting in actual emissions rates which are well below the maximum projections.

Details of the Analysis May be Obtained by Contacting:

Barry Andrews, P.E., BACT Coordinator
Department of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

(Orlando Utilities Commission)

Recommended by:

C.H. Fancy, P.E.
Deputy Bureau Chief, BAQM

31 AUG 1988
Date

Approved by:

Dale Twachtmann, Secretary

1 Sept 1988
Date