

Florida Department of Environmental Regulation

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

Bob Martinez, Governor

Dale Twachtman, Secretary

John Shearer, Assistant Secretary

July 18, 1988

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

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

Dear Mr. Herrington:

Attached is one copy of the Technical Evaluation and Preliminary Determination and proposed permit for Orlando Utilities Commission to construct a four unit combustion turbine project at the Indian River Plant, Brevard 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/pr

Attachments

cc: T. Sawicki, Central Florida District
W. Aronson, EPA
M. Flores, NPS
J. Crall, OUC
S. Day, Black & Veatch.

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. Registered (Extra charge) 4. Insured 5. COD 6. Express Mail

3. Article Addressed to:
Mr. William Herrington
Orlando Utilities Commission
500 South Orange Avenue
Orlando, Florida 32802

4. Article Number
P 702 175 481

Type of Service:
 Registered Insured
 Certified COD
 Express Mail

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature - Addressee
X *William Herrington*

6. Signature - Agent
X

7. Date of Delivery

8. Addressee's Address (if requested and fee paid)
P.O. Box 31
Orlando, FL 32802

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

P 702 175 481
RECEIPT FOR CERTIFIED MAIL
 NO INSURANCE COVERAGE PROVIDED
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 (See Reverse)

Sent to Mr. William Herrington, OUC	
Street and No. 500 South Orange A.e.	
P.O., State and ZIP Code Orlando, FL 32802	
Postage	\$
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Postmark or Date Mailed: 7-18-88 Permit: AC 05-144482 AC 05-146749, AC 05-146750 AC 05-146751	

PS Form 3800, June 1985

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

In the Matter of
Applications for Permits by:

Orlando Utilities Commission
500 South Orange Avenue
Orlando, Florida 32802

DER File No. AC 05-144482
05-146749
05-146750
05-146751

INTENT TO ISSUE

The Department of Environmental Regulation hereby gives notice of its intent to issue permits (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, Orlando Utilities Commission, applied on January 20, 1988 to the Department of Environmental Regulation for permits 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 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 permits were needed for the proposed work.

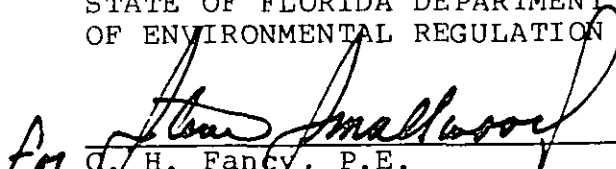
Pursuant to Section 403.815, F.S. and DER Rule 17-103.150, FAC, you (the applicant) are required to publish at your own expense the enclosed Notice of Proposed Agency Action on permit applications. The notice must be published one time only in a section of a major local newspaper of general circulation 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

For 
C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

Copies furnished to:

T. Sawicki, Central Florida District
W. Aronson, EPA
M. Flores, NPS
J. Crall, OUC
S. Day, Black & Veatch.

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 7-18-88.

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 Jane Wise 7-18-88
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 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 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
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.

Technical Evaluation
and
Preliminary 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

July 15, 1988

I. Application

A. Applicant

Orlando Utilities Commission (OUC)
500 South Orange Avenue
Orlando, Florida 32802

B. Project and Location

The applicant proposes to install four new simple cycle combustion turbines, each with an electrical generation capacity of about 35 MW, at the existing Indian River Plant.

The UTM coordinates of this facility are Zone 17, 521.5 km East and 3151.6 km North.

OUC applied on January 20, 1988, and the application was deemed complete on June 21, 1988.

C. Facility Category

Orlando Utilities Indian River Plant is classified in the Standard Industrial Classification (SIC) Code as Group No. 49, Electric, Gas and Sanitary Services; Group No. 493, Electric, Gas and Sanitary Services; Industry No. 4931, Electric Services. In accordance with the NEDS Source Classification Code (SCC) the source is classified as 2-01-001-01, Distillate Oil Fired Turbine; and 201-002-01, Natural Gas Fired Turbine.

II. Project Description

A. Project

Four identical GE Frame 6 combustion turbines are being proposed for the project. Two will be installed in the near future while two more will be installed later. Natural gas will be the main fuel, but the turbines will be capable of burning distillate oil. The units are being proposed to help meet peak demands readily. The project at present does not include provisions for heat recovery from turbine exhausts.

The applicant proposes to control emissions by firing low sulfur content fuels to reduce sulfur dioxide (SO₂) emissions and sulfuric acid mist, the use of water injection to reduce nitrogen oxides (NO_x) emissions, and good combustion practices for controlling emissions of carbon monoxide (CO), particulate matter (PM), volatile organic compounds (VOCs), and beryllium.

B. Operating Rates

The facility will be permitted based on continuous operation at full load. The projected emissions are listed in Table 1, (attached) based on emission estimates submitted by the applicant and confirmed by a Best Available Control Technology (BACT) determination (attached).

III. Rule Applicability

The proposed project will emit the pollutants NO_x, SO₂, sulfuric acid mist, beryllium, PM, CO and VOCs and is subject to a preconstruction review in accordance with Chapters 17-2 and 17-4 of the Florida Administrative Code (FAC) and Chapter 403 of the Florida Statutes.

The proposed project will be located in Brevard County, an area designated as attainment for all criteria pollutants, in accordance with FAC Rule 17-2.420.

The proposed project will be subject to Prevention of Significant Deterioration (PSD) Review Requirements since there will be a net significant emissions increase (see Table in FAC 17-2.500-2), in accordance with FAC Rule 17-2.500.

The proposed project will also be subject to New Source Performance Standards (NSPS) for Gas Turbines in accordance with 40 CFR 60 Subpart GG.

The emission limitations will be determined by a BACT review, in accordance with FAC Rule 17-2.630.

Compliance testing and reporting will be conducted in accordance with 40 CFR 60 and FAC Rule 17-2.700. EPA methods to be used for compliance testing will be as follows:

- a) EPA Method 5/17 for PM
- b) EPA Method 20 for NO_x and SO₂
- c) EPA Method 9 for visible emissions (VE)
- d) EPA Method 10 for CO
- e) EPA Method 104 for Beryllium

IV. Source Impact Analysis

A. Emission Limitations

As determined by the attached BACT, the emission limits for the proposed project will be as listed in Table 1.

B. Air Quality Impact Analysis

1. Introduction

The Orlando Utilities Commission proposed addition of four new simple cycle combustion turbines, each with an electrical generation capacity of about 35 megawatts, at the Indian River Plant, will emit in PSD-significant amounts five pollutants. These are the criteria pollutants particulate matter (PM) (including PM-10), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), and volatile organic compounds (VOC).

The air quality impact analysis required by the PSD regulations for the pollutants PM (PM-10), SO₂, NO₂, CO, and VOC includes:

- o An analysis of existing air quality;
- o A PSD increment analysis (for SO₂ and PM only);
- o An Ambient Air Quality Standards (AAQS) analysis;
- o An analysis of impacts on soils, vegetation, and visibility and growth-related air quality impacts; and
- o A "Good Engineering Practice" (GEP) stack height determination.

The analysis of existing air quality generally relies on preconstruction monitoring data collected in accordance with EPA-approved methods. The PSD increment and AAQS analysis depend on air quality dispersion modeling carried out in accordance with EPA guidelines.

Based on these required analyses, the Department has reasonable assurance that the proposed sources at the OUC Indian River facility, as described in this report and subject to the conditions of approval proposed herein, will not cause or contribute to a violation of any PSD increment or ambient air quality standard. The discussion of the modeling methodology and required analysis follows.

2. Modeling Methodology

The EPA-approved Industrial Source Complex Short-Term (ISCST) dispersion model was used in the air quality impact analysis. This model determines ground-level concentrations of inert gases or small particles emitted into the atmosphere by point, area, and volume sources. The model incorporates elements for plume rise, transport by the mean wind, Gaussian dispersion, and pollutant removal mechanisms such as deposition and transformation. The ISCST model also allows for the separation of sources, building wake downwash, and various other input and output features. A series of specific model features, recommended by the EPA, are referred to as the regulatory options. These features were used to address the air quality impacts of the proposed combustion turbines.

The modeling used a radial receptor grid with the center of the grid coinciding with the location of the proposed turbines. Radials were spaced at 10-degree increments from 10 to 360 degrees. Receptors were located along each radial at distances of 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.5, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0 and 14.0 kilometers.

The meteorological data used in the ISCST model consisted of five years (1981-1985) of hourly surface data taken at Orlando, Florida. Mixing heights used in the modeling were based on upper air data from Tampa, Florida for the same period.

Emission data (Table 1) are the maximum allowable emissions which are based on the fuel that each source is capable of firing and that produced the higher emission rate. For modeling purposes, the higher emissions from firing distillate oil, as compared to firing natural gas, were used to assess impacts.

3. Analysis of Existing Air Quality

Preconstruction ambient air quality monitoring is required for all pollutants subject to PSD review. In general, one year of quality-assured data using an EPA-reference, or the equivalent, monitor must be submitted. Sometimes less than one year of data, but no less than four months, may be accepted when Department approval is given.

An exemption to the monitoring requirement can be obtained if the maximum air quality impact, as determined through air quality modeling, is less than a pollutant-specific "de minimus" concentration. In addition, if current monitoring data already exist and these data are representative of the proposed source area, then at the discretion of the Department, these data may be used.

The predicted maximum air quality impacts for the proposed turbines for those pollutants subject to PSD review are given in Table 2. As shown in the table, the maximum impacts for all such pollutants are below their respective "de minimus" levels. Therefore, preconstruction monitoring is not required for any pollutant.

4. PSD Increment and Ambient Air Quality Standards Analysis

If the dispersion modeling demonstrates that a pollutant does not produce a significant impact, further air quality assessment of this pollutant is not required.

Table 2 compares the air quality significant impact levels with the maximum predicted concentrations. The table shows that no pollutant impacts exceed the significant impact criteria. Therefore, no further ambient air quality assessment is required.

As such, the emissions from the proposed turbines are not expected to cause or contribute to a violation of any PSD increment or ambient air quality standard.

5. Additional Impacts Analysis

a. Impacts on Soils and Vegetation

The maximum ground-level concentrations predicted to occur for the criteria pollutants as a result of the proposed project will be below all applicable AAQS including the national secondary standards developed to protect public welfare-related values. As such, these pollutants are not expected to have a harmful impact on soils and vegetation.

b. Impact on Visibility

An analysis of possible adverse visibility impairment at the nearest PSD Class I area using the EPA's visibility screening methods was performed by the applicant. The nearest PSD Class I area is the Chassahowitzka Wilderness Area along the west coast of Florida, at a distance of approximately 175 kilometers from the proposed combustion turbines. The results of the Level-1 screening showed that it is highly unlikely that such impairment might occur.

c. Growth-Related Air Quality Impacts

The proposed turbines are not expected to significantly change employment, population, housing or commercial/industrial development in the area to the extent that an air quality impact will result.

d. GEP Stack Height Determination

Good Engineering Practice (GEP) stack height means the greater of: (1) 65 meters or (2) the maximum nearby building height plus 1.5 times the building height or width, whichever is less. For the proposed project, stack heights of 10.97 meters are proposed. The proposed stack height is well below the GEP limit of 65 meters.

V. Conclusion

Based on the information submitted by OUC, the Department has reasonable assurance that the installation of the four turbine facility at the Indian River Plant, as described in this evaluation, and subject to the conditions proposed herein, will not cause or contribute to a violation of an ambient air quality standard or PSD increment, or any other provisions of Chapter 17-2, FAC.

TABLE 1

SUMMARY OF AIR POLLUTANT EMISSIONS FROM PROPOSED
COMBUSTION TURBINES

Pollutant	Fuel	Maximum Emissions Per Unit lb/h	Potential Annual Emissions*		PSD Significant Emission Rate t/yr
			1 unit t/yr	4 Units t/yr	
Carbon Monoxide	Gas	10.0	43.8	175	100
	Oil	10.1	44.2	177	100
Nitrogen Oxides (as NO ₂)	Gas	75.1	328.9	1,316	40
	Oil	118.3	518.2	2,073	40
Sulfur Dioxide	Gas	0.34	1.5	6.0	40
	Oil	142.7	625.0	2,500	40
Total Particulates	Gas	2.5	11.0	44	25
	Oil	10.0	43.8	175	25
PM ₁₀	Gas	2.5	11.0	44	15
	Oil	10.0	43.8	175	15
VOC	Gas	4.0	17.5	70	40
	Oil	4.0	17.5	70	40
Sulfuric Acid Mist	Oil	10.0	44	176	7
Beryllium	Oil	0.0001	0.0005	0.0018	0.0004

*Based on 8,760 hours of full load operation per year.

NOTE: The emissions are for operation at sea level and 59 F.

TABLE 2

QJC Indian River Plant Combustion Turbines
 Maximum Air Quality Impacts for Comparison
 To the De minimus Ambient Levels and the
 Significant Impact Levels

Pollutant and Averaging Time	Predicted Impact (ug/m ³)	De minimus Ambient Impact Level (ug/m ³)	PSD Significant Impact Level (ug/m ³)
PM (24-hour)	0.4	10	5
PM (Annual)	<0.1	--	1
SO ₂ (3-hour)	20.3	--	25
SO ₂ (24-hour)	5.0	13	5
SO ₂ (Annual)	0.4	--	1
NO ₂ (Annual)	0.3	14	1
CO (1-hour)	1.6 (1)	--	2000
CO (8-hour)	1.4 (2)	575	500

- (1) 1-hour concentration is based on (3-hour impact)/0.9.
 (2) 8-hour concentration is based on the 3-hour impact.

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 is being 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)		PSD Significant Emission Rate (tons/year)
	Natural Gas	Diesel Fuel	
NO _x	1,320	2,070	40
SO ₂	6.0	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:

<u>Pollutant</u>	<u>Determination</u>
NO _x	42 ppmvd @ 15% O ₂ (natural gas firing) 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 will be 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 10 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) 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 its 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 SO₂ 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 SO₂ emissions by 70 percent would be approximately \$11.8 million. Based on continuous full load operation, the amount of SO₂ reduction achieved by the FGD system would be a maximum of 1,750 tons per year for oil fuel operation. In addition to the SO₂ 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 SO₂ emissions) and does not appear to be reasonable as BACT.

As the BACT alternative for SO₂ 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 SO₂ 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 PM₁₀) 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:

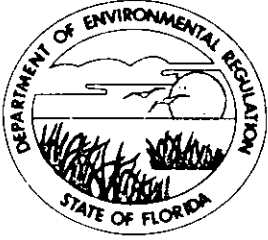
C.H. Fancy, P.E.
Deputy Bureau Chief, BAQM

Date 1988

Approved by:

Dale Twachtmann, Secretary

Date 1988



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 be capable of being fired by both natural gas and distillate oil. 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.

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.

PERMITTEE:
Orlando Utilities Commission

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

Expiration Date: January 31, 1992

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:
Orlando Utilities Commission

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

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.

PERMITTEE:
Orlando Utilities Commission

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

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. Distillate oil shall be used in periods of curtailed natural gas supply.

3. The maximum heat input to each turbine shall not exceed 112 MMBtu/hr.

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:

Pollutant	Fuel	Maximum Emissions	Potential Annual Emissions	
		Per Unit lb/h	1 unit t/yr	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
05-146749
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 eg. 15 lbs SO₂/year per unit.

8. Initial (I) and annual (A) compliance tests shall be conducted with the fuel(s) used in the preceeding 12 month period using EPA method:

- a. 20 for NOx and SO₂ (I,A)
- b. 10 for CO (I)
- c. 5/17 for PM (I)
- d. 9 for VE (I,A)
- e. 104 for Beryllium (I)

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 15 days prior to source testing. Written reports of the tests shall be submitted to the Central Florida District Office within 45 days of test completion.

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).

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 Central Florida District 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).

PERMITTEE:
Orlando Utilities Commission

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

SPECIFIC CONDITIONS:

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's Central Florida District Office.

12. The control technology and allowable emission limits for turbines 3 and 4 shall be reviewed and modified, if necessary, by the Bureau of Air Quality Management, at the latest reasonable time which occurs no later than 18 months prior to commencement of construction of the unit. The proposed schedule indicates construction commencement dates of November 1988 for units 1 and 2, November 1989 for unit 3, and November 1990 for unit 4.

Issued this _____ day of _____, 1988

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL REGULATION

Dale Twachtmann, Secretary