

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
NOTICE OF PERMIT

In the matter of an
Application for Permit by:

DER File No. AC 48-206720
PSD-FL-184
Orange County

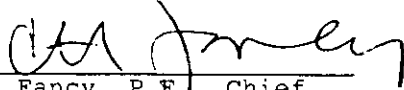
Mr. John P. Jones, President
Orlando CoGen (I), Inc.
Orlando CoGen Limited, L.P.
7201 Hamilton Boulevard
Allentown, PA 18195-1501

Enclosed is Permit Number AC 48-206720 to construct a 128.9 megawatt cogeneration facility located in the Orlando Central Park, Orange County, Florida. This permit is issued pursuant to Section(s) 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 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 Notice is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION


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

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF PERMIT and all copies were mailed before the close of business on August 17, 1992 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.

 8/17/92
(Clerk) (Date)

Copies furnished to:

C. Collins, CD
K. Kosky, P.E., KBN
J. Harper, EPA
C. Shaver, NPS
D. Nester, OCEPD
P. Cunningham, Esq. HBG&S

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 Fee will provide you the signature of the person delivered to and the date of delivery.		I also wish to receive the following services (for an extra fee): 1. <input type="checkbox"/> Addressee's Address 2. <input type="checkbox"/> Restricted Delivery Consult postmaster for fee.	
3. Article Addressed to: Mr. John P. Jones, President Orlando CoGen (I),--Inc. 7201 Hamilton Blvd. Allentown, PA 18195-1501		4a. Article Number P 062 921 987	
		4b. Service Type <input type="checkbox"/> Registered <input type="checkbox"/> Insured <input checked="" type="checkbox"/> Certified <input type="checkbox"/> COD <input type="checkbox"/> Express Mail <input type="checkbox"/> Return Receipt for Merchandise	
		7 AUG 20 1992	
5. Signature (Addressee)		8. Addressee's Address (Only if requested and fee is paid)	
6. Signature (Agent) <i>[Signature]</i>			
PS Form 3811, November 1990 * U.S. GPO: 1991-287-066		DOMESTIC RETURN RECEIPT	

P 062 921 987



Receipt for Certified Mail

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

Sent to Mr. John P. Jones, Orlando	
Street and No CoGen Limited 7201 Hamilton Blvd.	
P.O., State and ZIP Code Allentow, PA 18195-1501	
Postage	\$
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 Mailed: 8-17-92 Permit: AC 48-206720 PSD-FL-184	

PS Form 3800, June 1991

Final Determination

Orlando CoGen Limited, L.P.
Orange County, Florida

Construction Permit No.
AC 48-206720
(PSD-FL-184)

Department of Environmental Regulation
Division of Air Resources Management
Bureau of Air Regulation

August 17, 1992

Final Determination

Orlando CoGen Limited, L.P.

AC 48-206720 (PSD-FL-184)

The construction permit application package and supplementary material have been reviewed by the Department. Public Notice of the Department's Intent to Issue was published in The Orlando Sentinel on June 12, 1992. The Technical Evaluation and Preliminary Determination (TE&PD) was distributed on June 8, 1992, and was available for public inspection at the Department's Central District office and the Department's Bureau of Air Regulation office.

Comments were received from the applicant during the public notice period. The comments were received on July 7, 1992. The Department's response to the comments are as follows (note: each response is numbered to correspond to each comment):

1. The Department will change the permittee's name to read "Orlando CoGen Limited, L.P." instead of "Orlando Cogen Limited, L.P."

2. Since the requested change does not affect the potential emissions, a revised TE&PD will not be required. However, the comment is acknowledged.

3. Permit No. AC 48-206720 (PSD-FL-184)

a. The request is acceptable, but the specific language will be slightly different than what was requested:

SPECIFIC CONDITION No. 1:

From: The CT (combustion turbine) is allowed to operate continuously (8,760 hours per year). The HRSG-DB (heat recovery steam generator-duct burner) is permitted to operate 3688 hrs/yr at a maximum heat input of 122×10^6 Btu/hr.

To: The CT (combustion turbine) is allowed to operate continuously (8,760 hours per year). The HRSG-DB (heat recovery steam generator-duct burner) is permitted to operate 3688 hrs/yr at a maximum heat input of 122.0×10^6 Btu/hr for a maximum heat input of $450,000 \times 10^6$ Btu/yr (note: The unit may operate at lower rates for more hours within the annual heat input limit).

Final Determination
Orlando CoGen Limited, L.P.
AC 48-206720 (PSD-FL-184)
Page 2

- b. The request is acceptable to add a clarifier to the hours of operation.

SPECIFIC CONDITION No. 4: Table 1, Note 3b:

From: DB: 3688 hrs/yr

To: DB: 3688 hrs/yr (at a maximum heat input of 122×10^6 Btu/hr)

- c. Except for minor particulate sources equipped with a baghouse control system, the Department does not have the authority, by rule, to substitute a visible emission standard for a mass emissions standard in accordance with Florida Administrative Code (F.A.C.) Rule 17-2.700(3)(d). However, the owner or operator of any source may request approval of alternate procedures and requirements in accordance with F.A.C. Rule 17-2.700(3)(a). Therefore, the request is not acceptable and SPECIFIC CONDITION No. 8 will not be altered.

- d. The request is acceptable, which alters the original wording, but not the intent.

SPECIFIC CONDITION No. 12:

From: The permittee shall leave sufficient space suitable for future installation of SCR equipment.

To: The permittee shall design the facility to allow for future installation of SCR equipment.

- e. The request is acceptable.

SPECIFIC CONDITION No. 13:

From: The permittee shall install, calibrate, maintain, and operate a continuous emission monitor in the stack to measure and record the nitrogen oxides emissions from this source. The continuous emission monitor must comply with 40 CFR 60, Appendix B, Performance Specification 2, (July 1, 1991).

To: The permittee shall install, calibrate, maintain, and operate a continuous emission monitor (CEM) in the stack to measure and record the nitrogen oxides (NOx) emissions from this source. The continuous emission monitor must comply with 40 CFR 60, Appendix B, Performance Specification 2 (July 1, 1991 version).

For the purpose of demonstrating ongoing compliance with the applicable NOx emissions limitation in Table 1, using the stack CEM, compliance is considered to occur when the NOx emissions are less than or equal to 57.4 lbs/hr when only the CT is operating and less than or equal to 69.6 lbs/hr when both the CT and DB are operating. The 24-hour rolling average compliance level is calculated based on the proportion of hours in any 24-hour period that the CT only or CT/DB are operating. Any portion of an hour that the DB operates is recognized as an hour period on the rolling average.

For example, in a given 24-hour period, with 20 hours of CT operation only and 4 hours of CT/DB operation:

Calculated Emission Limitation =

$$[(57.4 \text{ lbs/hr} \times 20 \text{ hrs}) + (69.6 \text{ lbs/hr} \times 4 \text{ hrs})] / 24 \text{ hrs} =$$

$$24\text{-hour rolling average-compliance NOx level} = 59.4 \text{ lbs/hr}$$

Compliance with the permitted NOx emission limitation is considered satisfied as long as the NOx emissions from the stack CEM are less than or equal to the calculated NOx emissions, averaged over the same 24-hour period.

- f. The request is acceptable, which alters the original wording, but not the intent.

SPECIFIC CONDITION No. 14:

From: Combustion control shall be utilized for CO control. The permittee shall leave a sufficient space suitable for future installation of an oxidation catalyst. Once performance testing has been completed, the decision to require an oxidation catalyst will be based on a cost/benefit analysis of using such control.

To: Combustion control shall be utilized to minimize CO emissions. The permittee shall design the facility to allow for the future installation of an oxidation catalyst. Once the performance test is completed and if the facility demonstrates compliance with the CO emission limits in Table 1, then an oxidation catalyst will not be required. Otherwise, the decision to require an oxidation catalyst will be based on a cost/benefit analysis of using such control.

4. BACT Determination to Permit No. AC 48-206720 (PSD-FL-184)
- a. The request is acceptable and the BACT will be revised on page 1, 1st paragraph, to reflect the product output of the combustion turbine (CT) to be 78.8 MW and the steam turbine (ST) to be 50.1 MW. Originally, the CT's output was listed as 79 MW and the ST's output as 50 MW.
- b. The request is acceptable and the sentence (i.e., page 3, 2nd paragraph under "Products of Incomplete Combustion", 2nd sentence) will be deleted. The rationale is that the applicant attests that the proposed unit is a proven operation and is being permitted for a CO level lower than other recently permitted sources. Data has been submitted to substantiate CO levels from currently operating and similar units.
- c. The request is acceptable, but the proposed language will be slightly different than what was requested. Therefore, the 2nd sentence, 1st paragraph, page 8-"BACT Determination by DER": NOx Control, will be revised to read:

Duct firing will be used for supplying steam and limited to operate at a full load equivalent of 3688 hrs/yr at a maximum heat input of 122.0×10^6 Btu/hr for a maximum heat input of $450,000 \times 10^6$ Btu/yr (note: The unit may operate at lower rates for more hours within the annual heat input limit).

- d. The request is acceptable, but the proposed language will be slightly different than what was requested. Therefore, the 2nd sentence, 2nd paragraph, page 8-"BACT Determination by DER": CO Control, will be revised to read:

The permittee shall design the facility to allow for the future installation of an oxidation catalyst. Once the performance test is completed and if the facility demonstrates compliance with the CO emission limits, then an oxidation catalyst will not be required. Otherwise, the decision to require an oxidation catalyst will be based on a cost/benefit analysis of using such control.

- e. The "Note" associated with the table "Emission Standards/Limitations", located on page 8 of the proposed BACT Determination, will be revised to read:

Final Determination
Orlando CoGen Limited, L.P.
AC 48-296720 (PSD-FL-184)
Page 5

Note: Natural gas firing will be used only for supplemental firing the DB for a full load equivalent of 3688 hrs/yr at 122.0×10^6 Btu/hr maximum heat input for a maximum heat input of $450,000 \times 10^6$ Btu/yr (note: The unit may operate at lower rates for more hours within the annual heat input limit).

5. Attachment to be Incorporated:

- o Mr. Gary D. Kinsey's letter with enclosure received July 7, 1992.

Therefore, it is recommended that the construction permit, No. AC 48-206720 (PSD-FL-184), and associated BACT Determination, be issued as drafted, with the above referenced revisions incorporated.



Florida Department of Environmental Regulation

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

Lawton Chiles, Governor

Carol M. Browner, Secretary

PERMITTEE:

Orlando CoGen Limited, L.P.
7201 Hamilton Boulevard
Allentown, PA 18195-1501

Permit Number: AC 48-206720
PSD-FL-184

Expiration Date: August 31, 1994
County: Orange
Latitude/Longitude: 28°26'23"N
81°24'28"W

Project: 128.9-MW Combined Cycle
Gas Turbine

This permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.), Florida Administrative Code (F.A.C.) Chapters 17-2 and 17-4, and 40 CFR (July, 1991 version). 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 128.9 MW (megawatt) combined cycle gas turbine cogeneration facility to be located in the Orlando Central Park, Orange County, Florida, and will supply steam to the adjacent Air Products and Chemicals Plant. The UTM coordinates are Zone 17, 459.5 km East and 3,146.1 km North.

The Standard Industrial Code: ~~4911 - Electric Generation/Distribution~~
~~4931 - Electric and Other Services~~
Combined

2-02-002-51 Industrial ^{Natural Gas} Cogeneration Turbines ^{10⁶ ft³ burned}

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

Attachments are listed below:

1. Orlando Cogen Limited, L.P.'s application received December 30, 1991.
2. Mr. C. H. Fancy's letter dated January 28, 1992.
3. Mr. Kennard F. Kosky's letter with enclosures received March 2, 1992.
4. Mr. Wayne A. Hinman's letter received via FAX May 27, 1992.
5. Mr. Kennard F. Kosky's letter with enclosure received May 27, 1992 (hand delivered).
6. Document (Table 1) received June 1, 1992, from Mr. Peter Cunningham (hand delivered).
7. 40 CFR (July, 1991 version).
8. Technical Evaluation and Preliminary Determination dated June 5, 1992.
9. Mr. Gary D. Kinsey's letter with enclosure received July 7, 1992.

PERMITTEE:
Orlando CoGen Limited, L.P.

Permit Number: AC 48-206720
PSD-FL-184
Expiration Date: August 31, 1994

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, 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.

PERMITTEE:
Orlando CoGen Limited, L.P.

Permit Number: AC 48-206720
PSD-FL-184
Expiration Date: August 31, 1994

GENERAL CONDITIONS:

7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

- a. Have access to and copy any records that must be kept under the conditions of the permit;
- b. Inspect the facility, equipment, practices, or operations regulated or required under this permit; and,
- c. Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

- a. a description of and cause of non-compliance; and,
- b. the period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

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

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

PERMITTEE:
Orlando CoGen Limited, L.P.

Permit Number: AC 48-206720
PSD-FL-184
Expiration Date: August 31, 1994

GENERAL CONDITIONS:

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

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

13. This permit also constitutes:

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

14. The permittee shall comply with the following:

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

PERMITTEE:
Orlando CoGen Limited, L.P.

Permit Number: AC 48-206720
PSD-FL-184
Expiration Date: August 31, 1994

GENERAL CONDITIONS:

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the dates analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and,
- the results of such analyses.

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

SPECIFIC CONDITIONS:

1. The CT (combustion turbine) is allowed to operate continuously (8,760 hours per year). The HRSG-DB (heat recovery steam generator-duct burner) is permitted to operate 3688 hrs/yr at a maximum heat input of 122.0×10^6 Btu/hr for a maximum heat input of $450,000 \times 10^6$ Btu/yr (note: The unit may operate at lower rates for more hours within the annual heat input limit).

2. The CT and HRSG-DB are only allowed to use natural gas.

3. The permitted materials and utilization rates for the combined cycle gas turbine shall not exceed the values as follows:

- Maximum heat input to the CT shall not exceed 856.9 MMBtu/hr at ISO conditions.
- Maximum heat input to the HRSG-DB shall not exceed 122.0 MMBtu/hr; 450,000 MMBtu/yr.

4. The maximum allowable emissions from this facility shall not exceed the emission rates listed in Table 1.

Table 1

Pollutant	Source	Allowable Emission Standard/Limitation
NOx	CT	15 ppmvd @ 15% O ₂ (57.4 lbs/hr; 251.4 TPY)
	DB	0.1 lb/MMBtu (12.2 lbs/hr; 22.5 TPY)
	CT/DB	24-hr rolling average

PERMITTEE:
Orlando CoGen Limited, L.P.

Permit Number: AC 48-206720
PSD-FL-184
Expiration Date: August 31, 1994

SPECIFIC CONDITIONS:

Table 1 cont.:

CO	CT	10 ppmvd (22.3 lbs/hr; 92.1 TPY)
	DB	0.1 lb/MMBtu (12.2 lbs/hr; 22.5 TPY)
PM/PM ₁₀	CT	0.01 lb/MMBtu (9.0 lbs/hr; 39.4 TPY)
	DB	0.01 lb/MMBtu (1.2 lbs/hr; 2.2 TPY)
VOC	CT	3.0 lbs/hr; 13.0 TPY
	DB	3.7 lbs/hr; 6.8 TPY
VE	CT/DB	≤ 10 % opacity

NOTE:

1. CT: combustion turbine
DB: duct burner
2. Natural gas usage only in the CT and DB.
3. Hours of operation:
 - a. CT: 8760 hrs/yr
 - b. DB: 3688 hrs/yr (at a maximum heat input of 122.0×10^6 Btu/hr)
4. Maximum heat input:
 - a. CT: 856.9×10^6 Btu/hr
 - b. DB: 122.0×10^6 Btu/hr; $450,000 \times 10^6$ Btu/yr
5. DB operation planned when ambient temperature is greater than 59°F.
5. Any change in the method of operation, equipment or operating hours, pursuant to F.A.C. Rule 17-2.100, Definitions-Modification, shall be submitted to the Department's Bureau of Air Regulation and Central District offices.
6. Any other operating parameters established during compliance testing and/or inspection that will ensure the proper operation of this facility shall be included in the operating permit.
7. Initial and subsequent annual compliance tests shall be performed within 10 percent of the maximum heat rate input for the tested operating temperature. Tests shall be conducted using EPA reference methods in accordance with the July 1, 1991 version of the 40 CFR 60, Appendix A.
 - a. EPA Method 5 for PM
 - b. EPA Method 10 for CO
 - c. EPA Method 9 for VE
 - d. EPA Method 20 for NOx

Note: Other test methods may be used for compliance testing only after prior Department written approval.

PERMITTEE:
Orlando CoGen Limited, L.P.

Permit Number: AC 48-206720
PSD-FL-184
Expiration Date: August 31, 1994

SPECIFIC CONDITIONS:

8. EPA Method 5 must be used to determine the initial compliance status of this unit. Thereafter, the opacity emissions test may be used unless 10% opacity is exceeded.

9. Compliance with the total volatile organic compound emission limits will be assumed, provided the CO allowable emission rate is achieved. Specific VOC compliance testing is not required.

10. During performance tests, to determine compliance with the proposed NOx standard, measured NOx emission at 15 percent oxygen shall be adjusted to ISO ambient atmospheric conditions by the following equation in accordance with 40 CFR 60.335(c)(1):

$$NO_x = (NO_{x0}) (P_r/P_o)^{0.5} e^{19(H_o-0.00633)} (288^\circ K/T_a)^{1.53}$$

where:

NO_x = Emission rate of NOx at 15 percent O₂ and ISO standard ambient conditions, volume percent.

NO_{x0} = Observed NOx emission at 15 percent oxygen, ppmv.

P_r = Reference combustor inlet absolute pressure at 101.3 kilopascals (1 atmosphere) ambient pressure, mm Hg.

P_o = Measured combustor inlet absolute pressure at test ambient pressure, mm Hg.

H_o = Observed humidity of ambient air at test, g H₂O/g air.

e = Transcendental constant (2.718).

T_a = Temperature of ambient air at test, °K.

11. Test results will be the average of 3 valid runs. The Department's Central District office shall be notified at least 30 days in advance of the compliance test in accordance with 40 CFR 60.8(c). The source shall operate between 90% and 100% of permitted capacity as adjusted for ambient temperature during the compliance test. Compliance test results shall be submitted to the Department's Central District office no later than 45 days after completion in accordance with F.A.C. Rule 17-2.700(8)(b).

12. The permittee shall design the facility to allow for future installation of SCR equipment.

13. The permittee shall install, calibrate, maintain, and operate a continuous emission monitor (CEM) in the stack to measure and record the nitrogen oxides (NOx) emissions from this source. The continuous emission monitor must comply with 40 CFR 60, Appendix B, Performance Specification 2, (July 1, 1991 version).

PERMITTEE:
Orlando CoGen Limited, L.P.

Permit Number: AC 48-206720
PSD-FL-184
Expiration Date: August 31, 1994

SPECIFIC CONDITIONS:

For the purpose of demonstrating ongoing compliance with the applicable NOx emissions limitation in Table 1, using the stack CEM, compliance is considered to occur when the NOx emissions are less than or equal to 57.4 lbs/hr when only the CT is operating and less than or equal to 69.6 lbs/hr when both the CT and DB are operating. The 24-hour rolling average compliance level is calculated based on the proportion of hours in any 24-hour period that the CT only or CT/DB are operating. Any portion of an hour that the DB operates is recognized as an hour period on the rolling average.

For example, in a given contiguous 24-hour period, with 20 hours of CT operation only and 4 hours of CT/DB operation:

Calculated Emission Limitation =

$$[(57.4 \text{ lbs/hr} \times 20 \text{ hrs}) + (69.6 \text{ lbs/hr} \times 4 \text{ hrs})] / 24 \text{ hrs} =$$

$$24\text{-hour rolling average-compliance NOx level} = 59.4 \text{ lbs/hr}$$

Compliance with the permitted NOx emission limitation is considered satisfied as long as the NOx emissions from the stack CEM are less than or equal to the calculated NOx emissions, averaged over the same 24-hour period.

14. Combustion control shall be utilized for CO control. The permittee shall design the facility to allow for future installation of an oxidation catalyst. Once performance testing has been completed, the decision to require an oxidation catalyst will be based on a cost/benefit analysis of using such control.

15. This source shall be in compliance with all applicable provisions of Chapter 403, F.S., F.A.C. Chapters 17-2 and 17-4, and the 40 CFR (July, 1991 version).

16. This source shall be in compliance with all applicable requirements of 40 CFR 60, Subparts GG and Db, in accordance with F.A.C. Rule 17-2.660(2)(a), Standards of Performance for Stationary Gas Turbines and Standards of Performance for Industrial, Commercial; and Institutional Steam Generating Units.

17. Issuance of this permit does not relieve the facility owner or operator from compliance with any applicable federal, state, or local permitting requirements and regulations (F.A.C. Rule 17-2.210(1)).

PERMITTEE:
Orlando CoGen Limited, L.P.

Permit Number: AC 48-206720
PSD-FL-184
Expiration Date: August 31, 1994

SPECIFIC CONDITIONS:

18. This source shall be in compliance with all applicable provisions of F.A.C. Rules 17-2.240: Circumvention; 17-2.250: Excess Emissions; 17-2.660: Standards of Performance for New Stationary Sources (NSPS); 17-2.700: Stationary Point Source Emission Test Procedures; and, 17-4.130: Plant Operation-Problems.

19. Pursuant to F.A.C. Rule 17-2.210(2), Air Operating Permits, the permittee is required to submit annual reports on the actual operating rates and emissions from this facility. These reports shall include, but are not limited to the following: fuel usage, hours of operation, air emissions limits, etc. Annual reports shall be sent to the Department's Central District office by March 1 of each year.

20. The permittee, for good cause, may request that this construction permit be extended. Such a request shall be submitted to the Department's Bureau of Air Regulation prior to 60 days before the expiration of the permit (F.A.C. Rule 17-4.090).

21. An application for an operation permit must be submitted to the Department's Central District office at least 90 days prior to the expiration date of this construction permit. To properly apply for an operation permit, the applicant shall submit the appropriate application form, fee, certification that construction was completed noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit (F.A.C. Rules 17-4.055 and 17-4.220).

Issued this 17th day
of August, 1992

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION


Carol M. Browner, Secretary

Best Available Control Technology (BACT) Determination
Orlando CoGen Limited, L.P.
Orange County

The applicant proposes to install a combustion turbine generator at their facility in Orange County. The generator system will consist of one nominal 78.8 megawatt (MW) combustion turbine (CT), with exhaust through a heat recovery steam generator (HRSG), which will be used to power a nominal 50.1 MW steam turbine.

The combustion turbine will be capable of combined cycle operation. The applicant requested that the combustion turbine use only natural gas. The applicant has indicated the maximum annual tonnage of regulated air pollutants emitted from the facility based on 100 percent capacity and type of fuel fired at ISO conditions to be as follows:

<u>Pollutant</u>	<u>Emissions (TPY)</u>	<u>PSD Significant Emission Rate (TPY)</u>
NO _x	273.9	40
SO ₂	12.0	40
PM/PM ₁₀	41.7	25/15
CO	114.6	100
VOC	19.8	40
H ₂ SO ₄	0.9	7
Be	Neg.	0.0004
Hg	Neg.	0.1
Pb	Neg.	0.6

Florida Administrative Code (F.A.C.) 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.

Date of Receipt of a BACT Application

December 30, 1991

BACT Determination Requested by the Applicant

<u>Pollutant</u>	<u>Determination</u>
NO _x	15 ppmvd @ 15% O ₂ (natural gas burning)--CT 0.1 lb/10 ⁶ Btu--duct burner
CO	Combustion Control
PM/PM ₁₀	Combustion Control

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, 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.

The air pollutant emissions from combined cycle power plants can be grouped into categories based upon what control equipment and techniques are available to control emissions from these facilities. Using this approach, the emissions can be classified as follows:

- o Combustion Products (e.g., particulates). Controlled generally by efficient combustion of clean fuels.
- o Products of Incomplete Combustion (e.g., CO). Control is largely achieved by proper combustion techniques.
- o Acid Gases (e.g., NO_x). Controlled generally by gaseous control devices.

Grouping the pollutants in this manner facilitates the BACT analysis because it enables the equipment available to control the type or group of pollutants emitted and the corresponding energy, economic, and environmental impacts to be examined on a common basis. Although all of the pollutants addressed in the BACT analysis may be subject to a specific emission limiting standard as a result of PSD review, the control of "nonregulated" air pollutants is considered in imposing a more stringent BACT limit on a "regulated" pollutant (i.e., particulates, sulfur dioxide, fluorides, sulfuric acid mist, etc.), if a reduction in "nonregulated" air pollutants can be directly attributed to the control device selected as BACT for the abatement of the "regulated" pollutants.

Combustion Products

The projected emissions of particulate matter and PM₁₀ from the Orlando CoGen Limited, L.P. facility surpass the significant emission rates given in Florida Administrative Code Rule 17-2.500, Table 500-2.

A PM/PM₁₀ emissions limitations of 0.01 lb/MMBtu from the CT when firing natural gas is reasonable as BACT for the Orlando CoGen Limited, L.P. facility. The duct burner PM/PM₁₀ emission rate of 0.01 lb/MMBtu is reasonable as BACT.

Products of Incomplete Combustion

The projected emissions of carbon monoxide exceed the PSD significant emission rate of 100 TPY. The applicant has indicated that the carbon monoxide emissions from the proposed turbine is based on exhaust concentrations of 10 ppmvd for natural gas firing.

A review of the BACT/LAER clearinghouse indicates that several of the combustion turbines using dry low-NOx combustion technology to control NOx to 15 ppmvd (corrected to 15 percent O₂) have been permitted with CO limitations that are higher than those proposed by the applicant. The majority of BACT emissions limitations have been based on combustion controls for carbon monoxide and volatile organic compounds. Additional control is achievable through the use of catalytic oxidation. Catalytic oxidation is a postcombustion control that has been employed in CO nonattainment areas where regulations have required CO emission levels to be less than those associated with wet injection. These installations have been required to use LAER technology and typically have CO limits in the 10-ppm range (corrected to dry conditions).

In an oxidation catalyst control system, CO emissions are reduced by allowing unburned CO to react with oxygen at the surface of a precious metal catalyst such as platinum. Combustion of CO starts

at about 300°F, with efficiencies above 90 percent occurring at temperatures above 600°F. Catalytic oxidation occurs at temperatures 50 percent lower than that of thermal oxidation, which reduces the amount of thermal energy required. For CT/HRSG combinations, the oxidation catalyst can be located directly after the CT or in the HRSG. Catalyst size depends upon the exhaust flow, temperature, and desired efficiency. The existing gas turbine applications have been limited to smaller cogeneration facilities burning natural gas.

Given the applicant's proposed BACT level for carbon monoxide of 10 ppm, a lower emission rate as BACT would not produce a significant reduction in emissions or impacts. Also, this CO concentration level is near the lowest established as BACT even with catalytic oxidation. For these reasons, it appears that the limit proposed by the applicant is reasonable as BACT.

Emission of volatile organic compounds are below the significant level and therefore do not require a BACT analysis.

Acid Gases

The applicant has stated that BACT for nitrogen oxides will be met by using dry low-NOx combustors to limit emissions to 15 ppmvd (corrected to 15% O₂) when burning natural gas.

A review of the EPA's BACT/LAER Clearinghouse indicates that the lowest NOx emission limit established to date for a combustion turbine is 4.5 ppmvd at 15% 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 NOx emissions. The SCR process combines vaporized ammonia with NOx in the presence of a catalyst to form nitrogen and water. Vaporized ammonia is injected into the exhaust gases prior to passage through a catalyst bed. The SCR process can achieve up to 90% reduction of NOx with a new catalyst. As the catalyst ages, the maximum NOx reduction will decrease to approximately 86 percent.

A review of the combined cycle facilities in which SCR has been established as a BACT requirement indicates that the majority of these facilities are also intended to operate at high capacity factors. As this is the case, the proposed project is similar to other facilities in which SCR has been established as BACT.

Given the applicant's proposed BACT level for nitrogen oxides control stated above, an evaluation can be made of the cost and associated benefit of using SCR as follows:

The applicant has indicated that the total levelized annual cost (operating plus amortized capital cost) to install SCR for natural gas firing at a 100 percent capacity factor is \$1,903,000. Taking into consideration the total annual cost, a cost/benefit analysis of using SCR can be developed.

Based on the information supplied by the applicant, it is estimated that the maximum annual NOx emissions with dry low-NOx combustors from the Orlando CoGen Limited, L.P. facility will be 274 tons/year. Assuming that SCR would reduce the NOx emissions to a level of 9 ppmvd when firing natural gas, about 141 tons of NOx would be emitted annually. When this reduction is taken into consideration with the total levelized annual cost of \$1,900,300, the cost per ton of controlling NOx is \$14,308. This calculated cost is higher than has previously been approved as BACT.

Since SCR has been determined to be BACT for several combined cycle facilities, the EPA has clearly stated that there must be unique circumstances to consider the rejection of such control on the basis of economics.

In a recent letter from EPA Region IV to the Department regarding the permitting of a combined cycle facility (Tropicana Products, Inc.), the following statement was made:

"In order to reject a control option on the basis of economic considerations, the applicant must show why the costs associated with the control are significantly higher for this specific project than for other similar projects that have installed this control system or in general for controlling the pollutant."

For fuel oil firing, the cost associated with controlling NOx emissions must take into account the potential operating problems that can occur with using SCR in the oil firing mode.

A concern associated with the use of SCR on combined cycle projects is the formation of ammonium bisulfate. For the SCR process, ammonium bisulfate can be formed due to the reaction of sulfur in the fuel and the ammonia injected. The ammonium bisulfate has a tendency to plug the tubes of the heat recovery steam generator leading to operational problems. As this the case, SCR has been judged to be technically infeasible for oil firing in some previous BACT determinations.

The latest information available indicates that SCR can be used for oil firing provided that adjustments are made in the ammonia to NOx injection ratio. For natural gas firing operation NOx emissions

can be controlled with up to a 90 percent efficiency using a 1 to 1 or greater injection ratio. By lowering the injection ratio for oil firing, testing has indicated that NOx can be controlled with efficiencies ranging from 60 to 75 percent. When the injection ratio is lowered there is not a problem with ammonium bisulfate formation since essentially all of the ammonia is able to react with the nitrogen oxides present in the combustion gases.

Based on this strategy SCR has been both proposed and established as BACT for oil fired combined cycle facilities with NOx emission limits ranging from 11.7 to 25 ppmvd depending on the efficiency of control established.

The Orlando CoGen Limited, L.P. facility has proposed not to utilize fuel oil; therefore, those consequences of SCR attributed to fuel oil firing will not likely occur. However, the small amount of sulfur in natural gas would likely form ammonium salts.

Environmental Impact Analysis

The predominant environmental impacts associated with this proposal are related to the use of SCR for NOx control. The use of SCR results in emissions of ammonia, which may increase with increasing levels of NOx control. In addition, some catalysts may contain substances which are listed as hazardous waste, thereby creating an additional environmental impact. Although the use of SCR does have some positive environmental benefits, the disadvantages may outweigh the benefits which would be provided by reducing nitrogen oxide emissions by 80 percent or greater. The benefit of NOx control by using SCR is substantiated by the fact that nearly one half of all BACT determinations have established SCR as the control measure for nitrogen oxides over the last five years.

From the evaluation of natural gas combustion, toxics are projected to be emitted in very small amounts, with the total combined emissions to be less than 0.1 tons per year. Although the emissions of toxic pollutants could be controlled by particulate control devices such as a baghouse or scrubber system, the amount of emission reductions would not warrant the added expense. Consequently, the Department does not believe that the BACT determination would be affected by the emissions of the toxic pollutants associated with the firing of natural gas.

Potentially Sensitive Concerns

With regard to controlling NOx emissions with SCR, the applicant has identified the following technical limitations:

1. SCR would reduce the output of the combustion turbines by one-half percent.

2. SCR could result in the release of unreacted ammonia to the atmosphere.
3. SCR would require handling of ammonia by plant operators. Since it is a hazardous material, there is a concern about safety and productivity of operators.
4. SCR results in contaminated catalyst from flue gas trace elements which could be considered hazardous. Safety of operators and disposal of spent catalyst is a concern.

The combustion turbines proposed for the project (ABB 11N-EV) is a heavy-frame that is highly efficient and uses advanced dry low-NOx combustion technology. Information supplied by the applicant indicates that actual emissions will be 15 ppmvd (corrected to 15% O₂) or lower on a continuous basis.

BACT Determination by DER

NOx Control

A review of the permitting activities for combined cycle proposals across the nation indicates that SCR has been required and most recently proposed for installations with a variety of operating conditions (i.e., natural gas, fuel oil, capacity factors ranging from low to high). However, the cost and other concerns expressed by the applicant are valid, and advanced NOx combustion controls have been accepted as BACT on similar projects.

The information that the applicant presented and Department calculations indicates that the incremental cost of controlling NOx (\$14,308/ton) is high compared to other BACT determinations which require SCR. Furthermore, actual NOx levels are expected to be less than the 15 ppmvd (corrected to 15% O₂), which would increase the cost of SCR. Based on the information presented by the applicant and the evaluation conducted, the Department believes that the use of SCR for NOx control is not justifiable as BACT. Therefore, the Department will accept dry low-NOx combustors as NOx control when firing natural gas for this project.

The emissions of NOx from the duct burner will be limited to 0.1 lb/MMBtu, which has been the BACT limit established for similar facilities. Duct firing will be used for supplying steam and limited to operate at a full load equivalent of 3,688 hours/year at a maximum heat input of 122.0 x 10⁶ Btu/hr for a maximum heat input of 450,000 x 10⁶ Btu/yr (note: The unit may operate at lower rates for more hours within the annual heat input limit).

CO Control

Combustion control will be considered as BACT for CO when firing natural gas. The permittee shall design the facility to allow for the future installation of an oxidation catalyst. Once the performance test is completed and if the facility demonstrates compliance with the CO emission limits, then an oxidation catalyst will not be required. Otherwise, the decision to require an oxidation catalyst will be based on a cost/benefit analysis of using such control.

Other Emissions Control

The emission limitations for PM and PM₁₀ are based on previous BACT determinations for similar facilities.

The emission limits for the Orlando CoGen Limited, L.P. project are thereby established as follows:

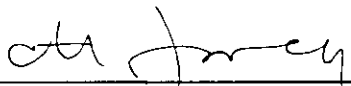
Pollutant	Emission Standards/Limitations	
	CT (Natural Gas Firing)	DB (Natural Gas Firing)
NOx	15 ppmvd @ 15% O ₂	0.1 lb/MMBtu
CO	10 ppmvd	0.1 lb/MMBtu
PM & PM ₁₀	0.01 lb/MMBtu	0.01 lb/MMBtu

Note: Natural gas will be used only for supplemental firing the DB for a full load equivalent of 3688 hrs/yr at 122.0 x 10⁶ Btu/hr maximum heat input for a maximum heat input of 450,000 x 10⁶ Btu/yr (note: The unit may operate at lower rates for more hours within the annual heat input limit).

Details of the Analysis May be Obtained by Contacting:

Bruce Mitchell, Engineer IV
Department of Environmental Regulation
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Recommended by:


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

Approved by:


Carol M. Browner, Secretary
Dept. of Environmental Regulation

August 14 1992
Date

August 17 1992
Date



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: Carol M. Browner

for FROM: Howard L. Rhodes *HLR*

DATE: August 17, 1992

SUBJ: Approval of Construction Permit No. AC 48-206720
(PSD-FL-184)
Orlando CoGen Limited, L.P.

Attached for your approval and signature is a construction permit and associated BACT Determination prepared by the Bureau of Air Regulation for the above referenced company to construct a 128.9 megawatt (MW) cogeneration facility. A combustion turbine and a steam turbine will drive an electrical generator to produce 78.8 MW and 50.1 MW, respectively. This was not a power plant siting review because the electrical steam generation will be less than 75 MW. Electricity will be generated for sale to the electrical grid and steam will be supplied to the Air Products and Chemical Plant located adjacent to the proposed facility's site.

The combustion turbine will fire natural gas and exhaust through a heat recovery steam generator, which will also fire natural gas within its duct work as necessary for heat and steam generation. Dry low-NOx combustors will be used to minimize NOx emissions. Combustion control will be used to minimize CO emissions.

The proposed facility will be located in the Orlando Central Park, Orange County, Florida. Comments were received during the public notice period from the applicant and the changes made had no adverse affect on the Department's Intent.

I recommend your approval and signature.

HLR/BM/rbm