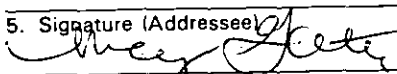


Is your RETURN ADDRESS completed on the reverse side?

<b>SENDER:</b> • Complete items 1 and/or 2 for additional services. • Complete items 3, and 4a & b. • Print your name and address on the reverse of this form so that we can return this card to you. • Attach this form to the front of the mailpiece, or on the back if space does not permit. • Write "Return Receipt Requested" on the mailpiece below the article number. • The Return Receipt will show to whom the article was delivered and the date delivered.		I also wish to receive the following services (for an extra fee): 1. <input type="checkbox"/> Addressee's Address 2. <input type="checkbox"/> Restricted Delivery Consult postmaster for fee.	
3. Article Addressed to: Mr. Robert W. Carter, Chairman Panda-Kathleen, L.P. 4100 Spring Valley, Suite 1001 Dallas, TX 75244		4a. Article Number P 872 563 680	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
5. Signature (Addressee) 		7. Date of Delivery 1-5-95	
6. Signature (Agent)		8. Addressee's Address (Only if requested and fee is paid)	

Thank you for using Return Receipt Service.

P 872 563 680



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

PS Form 3800, JUNE 1991

Sent to Mr. Robert W. Carter, Panda=	
Street and No. 4100 Spring Valley, Suite 1001	
P.O., State and ZIP Code Dallas, TX 75244	
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: 1-5-95 Permit: AC 53-251898 PSD-FL-216	

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
NOTICE OF PERMIT

In the matter of an  
Application for Permit by:

DEP File No. AC 53-251898  
PSD-FL-216  
Polk County

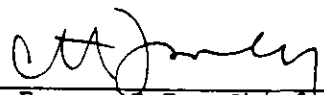
Mr. Robert W. Carter, Chairman  
Panda-Kathleen, L.P.  
4100 Spring Valley, Suite 1001  
Dallas, Texas 75244

Enclosed is Permit Number AC 53-251898 (PSD-FL-216) for the installation of a combined cycle combustion turbine (CT) generator at the proposed facility (near Lakeland) in Polk County, Florida, issued pursuant to Section 403, Florida Statutes.

Any party to this Order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, Florida Statutes, by 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 PROTECTION

  
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 1/5/95 to the listed persons.

Clerk Stamp

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

  
(Clerk)

1/5/95  
(Date)

Copies furnished to:  
B. Thomas, SWD  
T. Davis, P.E., ECT  
J. Harper, EPA  
J. Bunyak, NPS  
L. Novak, Polk County

Final Determination

Panda-Kathleen, Limited Partnership (L.P.)  
Polk County, Florida

COMBINED CYCLE COMBUSTION TURBINE  
(115 megawatts)

File No: AC 53-251898  
PSD-FL-216

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

December 20, 1994

## Final Determination

The Revised Technical Evaluation and Preliminary Determination for the permits to construct a nominal 115 megawatt combined cycle combustion turbine at an electrical power plant site in Lakeland, Polk County, Florida, was distributed on October 10, 1994. The Notice of Intent to Issue was published in the Lakeland Ledger on October 21, 1994. Copies of the Evaluation were available for public inspection at the Department offices in Tampa and Tallahassee.

No adverse comments on the evaluation and proposed permits were submitted by the National Park Service (NPS) and the U.S. Environmental Protection Agency (EPA) in their letters dated July 15 and September 15, 1994, respectively. Verbal approvals were received from both agencies on the revised evaluation and proposed permits on December 19, 1994.

The Department will modify the evaluation and proposed permits to reflect a stricter visible emissions standards for fuel oil burning. This change was based on prior BACT determinations for similar sources. The visible emissions standards will be changed from 20% opacity to 10% opacity for fuel oil burning.

The final action of the Department will be to issue the permits with the changes noted above.



# Department of Environmental Protection

Lawton Chiles  
Governor

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

Virginia B. Wetherell  
Secretary

**PERMITTEE:**  
**Panda-Kathleen, L.P.**  
**4100 Spring Valley,**  
**Suite 1001**  
**Dallas, Texas 75244**

**Permit Number: AC 53-251898**  
**PSD-FL-216**  
**Expiration Date: December 31, 1997**  
**County: Polk**  
**Latitude/Longitude: 28°02'10"N**  
**82°01'52"W**  
**Project: 115 MW Combined Cycle**  
**Combustion Turbine**

This permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.), and Chapters 62-212 and 62-4, Florida Administrative Code (F.A.C.). The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and specifically described as follows:

For the installation of a combined cycle combustion turbine (CT) generator at the proposed facility (near Lakeland) in Polk County. This generator system will consist of either one nominal 75 megawatt (MW) Asea Brown Boveri (ABB) 11N1 or General Electric (GE) 7EA (or equivalent) CT (equipped with dry low-NO<sub>x</sub> combustors for natural gas firing and water injection for fuel oil firing); and, one unfired and nominal 40 MW heat recovery steam generator (HRSG), which will be used to power a steam turbine. The ABB CT will have a maximum heat input at 59°F of 858 MMBtu/hr (natural gas) and 963 MMBtu/hr (oil). The GE CT will have a maximum heat input at 59°F of 890 MMBtu/hr (natural gas) and 971 MMBtu/hr (oil). The facility will supply steam to a distilled water plant at the same location. The facility will include a new 475,000 gallon fuel oil storage tank. The facility will be capable of producing a nominal 115 MW of electricity. The CT will be fired with natural gas and No. 2 low sulfur fuel oil with a sulfur content not to exceed 0.05 percent, by weight, as a back-up only.

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

Attachment is listed below:

1. Panda-Kathleen, L.P. application received June 6, 1994.
2. Panda-Kathleen, L.P. letter with attachments received September 19, 1994.

**PERMITTEE:**  
Panda-Kathleen, L.P.

**Permit Number:** AC 53-251898  
PSD-FL-216  
**Expiration Date:** December 31, 1997

**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 F.S. 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:  
Panda-Kathleen, L.P.

Permit Number: AC 53-251898  
PSD-FL-216  
Expiration Date: December 31, 1997

**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 F.S. 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.

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

PERMITTEE:  
Panda-Kathleen, L.P.

Permit Number: AC 53-251898  
PSD-FL-216  
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**GENERAL CONDITIONS:**

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

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

13. This permit also constitutes:

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

14. The permittee shall comply with the following:

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



PERMITTEE:  
Panda-Kathleen, L.P.

Permit Number: AC 53-251898  
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**GENERAL CONDITIONS:**

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:**

The construction and operation of the project shall be in accordance with all applicable provisions of Chapters 62-210 to 62-297, F.A.C. In addition to the foregoing, the project shall comply with the following conditions as indicated.

**A. General Requirements**

1. Pursuant to Rule 62-212.200(56), F.A.C., Potential to Emit (PTE), the maximum heat input to the ABB combustion turbine (CT) at an ambient temperature of 59°F shall neither exceed 858 MMBtu/hr while firing natural gas, nor 963 MMBtu/hr while firing fuel oil. The maximum heat rate to the GE CT at an ambient temperature of 59°F shall neither exceed 890 MMBtu/hr while firing natural gas, nor 971 MMBtu/hr while firing fuel oil. Heat input may vary depending on ambient conditions and the CT characteristics. Manufacturer's curves or equations for correction to other temperatures shall be provided to the Department for review 90 days after selection of the CT. Subject to approval by the Department for technical validity applying sound engineering principles, the manufacturer's curves shall be used to establish heat input rates over a range of temperatures for the purpose of compliance determination.

2. Pursuant to Rule 62-212.200(56), PTE, the CT may operate continuously, i.e., 8,760 hrs/year.

3. Pursuant to Rule 62-212.200(56), F.A.C., only natural gas (NG) or No. 2 fuel oil is allowed to be fired in the CT. The maximum sulfur content of the No. 2 fuel oil shall not exceed 0.05 percent, by weight.

4. Pursuant to Rule 62-212.200(56), F.A.C., the maximum No. 2 fuel oil consumption allowed to be burned in the CT is 3,890,274 gallons per year, which is equivalent to 500 hours per year of operation at full-load. The No. 2 fuel oil is to be used as a back-up fuel only.

5. Pursuant to Rule 62-296.310(3), F.A.C., Unconfined Emissions of Particulate Matter (PM), the emissions of unconfined PM shall

PERMITTEE:  
Panda-Kathleen, L.P.

Permit Number: AC 53-251898  
PSD-FL-216  
Expiration Date: December 31, 1997

**SPECIFIC CONDITIONS:**

be minimized during the construction period by covering or watering dust generating areas.

**B. Emission Limits**

1. Pursuant to Rule 62-212.410, F.A.C., BACT, the maximum allowable emissions from the CT, when firing natural gas or No. 2 fuel oil at ISO conditions, shall not exceed:

**ALLOWABLE EMISSIONS LIMITATIONS - ABB CT**

<u>POLLUTANT</u>	<u>FUEL</u>	<u>CONCENTRATION</u>	<u>lbs/hr (a)</u>	<u>TPY (b)</u>
NO <sub>x</sub>	Gas	15 ppmvd (e)	53	232
	Oil	42 ppmvd (c)	168	42
PM/PM <sub>10</sub>	Gas		5.4	24
	Oil (d)		33	8
Beryllium	Oil		0.0024	0.0007
Arsenic	Oil		0.004	0.001
Visible Emissions	Gas	10 percent opacity		
	Oil	10 percent opacity		

**ALLOWABLE EMISSIONS LIMITATIONS - GE CT**

<u>POLLUTANT</u>	<u>FUEL</u>	<u>CONCENTRATION</u>	<u>lbs/hr (a)</u>	<u>TPY (b)</u>
NO <sub>x</sub>	Gas	15 ppmvd (e)	53	232
	Oil	42 ppmvd (c)	171	43
CO	Gas	25 ppmvd	54	237
	Oil	30 ppmvd	66	17
VOC	Gas	7 ppmvd	9	39
	Oil	7 ppmvd	10	3
PM/PM <sub>10</sub>	Gas		7.4	32
	Oil (d)		23	6
Beryllium	Oil		0.0024	0.0007
Arsenic	Oil		0.004	0.001
Visible Emissions	Gas	10 percent opacity		
	Oil	10 percent opacity		

PERMITTEE:  
Panda-Kathleen, L.P.

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**SPECIFIC CONDITIONS:**

(a) Emission limitations in lbs/hr are blocked 24-hour averages (midnight to midnight). Pollutant emission rates may vary depending on ambient conditions and the CT characteristics. Manufacturer's curves for the emission rate correction to other temperatures at different loads shall be provided to the Department for review 90 days after selection of the CT. Subject to approval by the Department for technical validity applying sound engineering principles, the manufacturer's curves shall be used to establish pollutant emission rates over a range of temperatures for the purpose of compliance determination.

(b) Annual emission limits (TPY) for natural gas are based on the CT operating at full load for 8,760 hours per year (i.e.,  $\text{NO}_x$  - 53 lbs/hr X 8,760 hrs/yr X 1 ton/2,000 lbs = 232 TPY). Annual emission limits (TPY) for fuel oil are based on full-load operation for a maximum of 500 hours per year for the CT (i.e.,  $\text{NO}_x$  - 168 lbs/hr X 500 hrs/yr X 1 ton/2,000 lbs = 42 TPY).

(c) Fuel oil  $\text{NO}_x$  allowable emissions of 42 ppmvd are based on BACT at ISO conditions (ISO standard day conditions means 288 degrees Kelvin, 60 percent relative humidity and 101.3 kilopascals pressure) and 15 percent oxygen. Compliance shall be determined through the initial and annual compliance tests. The annual compliance test will be required if the fuel oil operation is more than 400 hrs/yr.

(d) PM/PM<sub>10</sub> emission includes sulfuric acid mist.

(e) Natural gas  $\text{NO}_x$  allowable emissions of 15 ppmvd are based on BACT at ISO conditions (ISO standard day conditions means 288 degrees Kelvin, 60 percent relative humidity and 101.3 kilopascals pressure) and 15 percent O<sub>2</sub>. Compliance will be determined through the initial and annual compliance tests required in Specific Condition C.1.

2. For the non-PSD pollutants, the allowable CT emissions shall not exceed at ISO conditions:

ALLOWABLE EMISSION LIMITATIONS - ABB CT

<u>POLLUTANT</u>	<u>FUEL</u>	<u>lbs/hr</u>	<u>TPY</u>
VOC	Gas(a)	4	18
	Oil(b,c)	22	6
CO	Gas(a)	12	53
	Oil(b,c)	20	5
SO <sub>2</sub>	Gas(a)	2.4	11
	Oil(b,c)	52	13

PERMITTEE:  
Panda-Kathleen, L.P.

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**SPECIFIC CONDITIONS:**

ALLOWABLE EMISSION LIMITATIONS - GE CT

<u>POLLUTANT</u>	<u>FUEL</u>	<u>lbs/hr</u>	<u>TPY</u>
SO <sub>2</sub>	Gas(a)	2.5	11
	Oil(b,c)	52	13

(a) Annual emission limits (TPY) for natural gas are based on the CT operating at full-load for 8,760 hours per year (i.e., VOC - 4 lbs/hr x 8760 hrs/yr x 1 ton/2,000 lbs = 18 TPY for ABB CT).

(b) Annual emission limits (TPY) for fuel oil are based on full-load operation for a total of 500 hours per year for the CT (i.e., VOC - 22 lbs/hr x 500 hrs/yr x 1 ton/2,000 lbs = 6 TPY for ABB CT).

(c) The No. 2 fuel oil shall have a maximum sulfur content of 0.05 percent, by weight.

3. Panda-Kathleen cogeneration facility will install a dry low-NO<sub>x</sub> combustors on the CT.

4. Within 6-months after the initial compliance test (estimated to be by June, 1997), Panda-Kathleen shall prepare and submit for the Department's review an engineering report containing, as a minimum, the following information:

The report shall include the NO<sub>x</sub> concentration achieved during the initial compliance test. It shall also include hourly NO<sub>x</sub> concentrations achieved during the 3-months subsequent to the initial compliance test and based on the continuous emissions monitoring (CEM) data. The CEM data shall meet the requirements of 40 CFR 60, Appendix F, quality assurance procedures.

The report shall also include results of the testing requirements of 40 CFR 60, Appendix F procedures, unit load (%) during the testing period (daily averages), and the actual CEM data strip chart for the 3-month period.

5. After submittal of the engineering report (estimated to be by June, 1997), the Department will make a determination and may revise the NO<sub>x</sub> emission limits. If the data demonstrates that a NO<sub>x</sub> concentration of less than 15 ppmvd @ 15% O<sub>2</sub> and ISO conditions is consistently achievable, the NO<sub>x</sub> emission limit will be adjusted to 20 percent over the demonstrated concentration, rounded to the next higher number. The adjusted NO<sub>x</sub> concentration cannot exceed 15 ppmvd @ 15% O<sub>2</sub> and ISO conditions.

PERMITTEE:  
Panda-Kathleen, L.P.

Permit Number: AC 53-251898  
PSD-FL-216  
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**SPECIFIC CONDITIONS:**

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

**C. Performance Testing**

1. Initial (I) compliance tests shall be performed on the CT using both fuels. Testing of emissions shall be conducted at 95-100% of the manufacturer's rated heat input based on the average ambient air temperature during the test. Compliance shall be determined using the turbine manufacturer's throughput rating for the average ambient temperature by multiplying the permitted emission limit at ISO conditions (59°F, 60% relative humidity and 101.3 kilopascals pressure) by the ratio of the tested heat input to the maximum heat input (MMBtu/hr) at ISO conditions. Annual (A) compliance tests shall be performed on the CT with the fuel(s) used for more than 400 hours in the preceding 12-month period. Tests at permit renewal (R) shall be performed on non-PSD pollutants. Tests shall be conducted using EPA reference methods in accordance with 40 CFR 60, Appendix A, as adopted by reference in Chapter 62-297, F.A.C.:

- a. Reference Method 5B for PM (I, A, for oil only) for either ABB or GE CT.
- b. Reference Method 9 for VE (I, A) for either ABB or GE CT.
- c. Reference Method 10 for CO (I, R) for ABB CT.
- d. Reference Method 10 for CO (I, A) for GE CT.
- e. Reference Method 20 for NOx (I, A) for either ABB or GE CT.
- f. Reference Method 18 for VOC (I, R) for ABB CT.

**PERMITTEE:**  
Panda-Kathleen, L.P.

**Permit Number:** AC 53-251898  
PSD-FL-216  
**Expiration Date:** December 31, 1997

**SPECIFIC CONDITIONS:**

- g. Reference Method 18 for VOC (I, A) for GE CT.
- h. Trace elements of Beryllium (Be) and Arsenic (As) shall be tested (I, R for oil only) for either ABB or GE CT using EMTIC Interim Test Methods. As an alternative, Reference Method 104 for Be may be used; or, Be and As may be determined from fuel analysis using either EPA SW-846 3040/7090 or 3040/7091, which are the extraction/analytical test methods contained in EPA Publication SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", 3rd Edition, Test Method 7090 or 7091.
- i. ASTM D4294 (or equivalent) for sulfur content of distillate oil (I, A), which can be used for determining SO<sub>2</sub> emissions for either ABB or GE CT.
- j. ASTM D1072-80, D3031-81, D4084-82, or D3246-81 (or equivalent) for sulfur content of natural gas (I, and R if deemed necessary by DEP) for either ABB or GE CT.
- k. No other method may be used for compliance testing without approval from DARM, in writing. In some cases other methods may be approved.

2. The maximum sulfur content of the No. 2 fuel oil shall not exceed 0.05 percent, by weight. Compliance shall be demonstrated in accordance with the requirements of 40 CFR 60.334. Testing for sulfur content of the fuel oil in the storage tanks shall be conducted upon each occasion that fuel is transferred to the storage tanks. Testing for fuel oil lower heating value shall also be conducted on the same schedule.

**D. Monitoring Requirements**

For the combined cycle unit, the permittee shall install, operate, and maintain a continuous emission monitoring system (CEMS) to monitor nitrogen oxides in accordance with 40 CFR 60, Appendix F, and, if necessary, a diluent gas (CO<sub>2</sub> or O<sub>2</sub>). The Federal Acid Rain Program requirements of 40 CFR 75 shall apply if those requirements become effective for this source/emissions unit.

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

2. CEMS data shall be recorded and reported in accordance with Rule 62-297.500, F.A.C., 40 CFR 60 and 40 CFR 75, if it becomes applicable. The record shall include periods of start up, shutdown, and malfunction.

PERMITTEE:  
Panda-Kathleen, L.P.

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PSD-FL-216  
Expiration Date: December 31, 1997

**SPECIFIC CONDITIONS:**

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

4. The procedures under 40 CFR 60.13 shall be followed for installation, evaluation, and operation of all CEMS. 40 CFR 75 shall apply if this source is or becomes subject to the Federal Acid Rain Program.

5. For purposes of the reports required under this permit, excess emissions are defined as any calculated average emission rate, as determined pursuant to Specific Condition B.6 herein, which exceeds the applicable emission limits in Specific Condition B.1.

**E. Notification, Reporting and Recordkeeping**

1. To determine compliance with the natural gas and fuel oil firing heat input limitation, the permittee shall maintain daily records of natural gas and fuel oil consumption for the turbine and the heating value for each fuel. All records shall be maintained for a minimum of two years after the date of each record and shall be made available to representatives of the Department upon request.

2. The project shall comply with all the applicable requirements of Chapter 62-297, F.A.C., 40 CFR 60, Subpart A. The requirements shall include:

a. 40 CFR 60.7(a)(1) - By postmarking or delivering notification of the start of construction no more than 30 days after such date.

b. 40 CFR 60.7(a)(2) - By postmarking or delivering notification of the anticipated date of the initial start up of the CT not less than 30 days prior to such date.

c. 40 CFR 60.7(a)(3) - By postmarking or delivering notification of the actual start up of the turbine within 15 days after such date.

d. 40 CFR 60.7(a)(5) - By postmarking or delivering notification of the date for demonstrating the CEMS performance, no less than 30 days prior to such date.

e. 40 CFR 60.7(a)(6) - By postmarking or delivering notification of the anticipated date for conducting the opacity observations no less than 30 days prior to such date.

PERMITTEE:  
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f. 40 CFR 60.7(b) - By initiating a recordkeeping system to record the occurrence and duration of any start up, shutdown or malfunction of the turbine, of any malfunction of the air pollution control equipment, and the periods when the CEMS is inoperable.

g. 40 CFR 60.7(c) - By postmarking or delivering a quarterly excess emissions and monitoring system performance report within 30 days after the end of each calendar quarter. This report shall contain the information specified in 40 CFR 60.7(c) and (d).

h. 40 CFR 60.8(a) - By conducting all performance tests within 60 days after achieving the maximum turbine firing rates, but not more than 180 days after the initial start up of the CT.

i. 40 CFR 60.8(d) - By postmarking or delivering notification of the date of each performance test required by this permit at least 30 days prior to the test date; and,

j. Rule 62-297.345, F.A.C. - By providing stack sampling facilities for the turbine.

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

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

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

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

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

a. CEMS Protocol - Within 60 days after selection of the CEMS, but prior to the initial startup, a CEMS protocol describing



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**SPECIFIC CONDITIONS:**

the system, its installation, operating and maintenance characteristics and requirements. The protocol shall meet the requirements of 40 CFR 60.13, Appendix B and Appendix F.

b. Performance Test Protocol - At least 90 days prior to conducting the initial performance tests required by this permit, the permittee shall submit to the Department's Air Program of the Southwest District office a protocol outlining the procedures to be followed and the test methods that will be used to verify compliance with the conditions of this permit. The Department shall approve the testing protocol provided that it meets the requirements of this permit.

**F. Modifications**

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

**G. No. 2 Fuel Oil Storage Tank**

The permittee shall be in compliance with the monitoring requirements specified in 40 CFR 60.116b(b), which requires maintaining a record of the dimensions of the storage vessel and an analysis showing the capacity of the storage vessel.

**H. Additional General Conditions**

1. Pursuant to Rule 62-4.090, F.A.C., 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.

2. Pursuant to Rules 62-4.055 and 62-4.220, F.A.C., an application for an operation permit must be submitted to the Department's Southwest 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

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**SPECIFIC CONDITIONS:**

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.

STATE OF FLORIDA DEPARTMENT  
OF ENVIRONMENTAL PROTECTION

  
Virginia B. Wetherell, Secretary

Best Available Control Technology (BACT) Determination  
Panda-Kathleen, L.P.  
Polk County  
AC 53-251898  
PSD-FL-216

The applicant proposes to install a combined cycle combustion turbine (CT) generator at its facility (near Lakeland) in Polk County. This generator system will consist of either one nominal 75 megawatt (MW) Asea Brown Boveri (ABB) 11N1 or General Electric (GE) 7EA (or equivalent) CT and one unfired and nominal 40 MW heat recovery steam generator (HRSG), which will be used to power a steam turbine. The facility will include a new 475,000 gallon fuel oil storage tank. The facility will be capable of producing a nominal 115 MW of electricity. The CT will be fired with natural gas and No. 2 low sulfur fuel oil with a sulfur content not to exceed 0.05 percent, by weight, as a backup only.

Construction and startup of the proposed 115 MW CC unit in Polk County will occur over a period of eighteen months. The CC unit will begin operation by July 1, 1996.

The applicant has indicated that the maximum annual air pollutant emission rates, based on 100 percent capacity factor and type of fuel fired, will be:

Emissions (TPY)

<u>Pollutant</u>	<u>CT1</u>		<u>CT2</u>		<u>Significant Emission Rate (TPY)</u>	<u>Subject to PSD review?</u>
	<u>Oil</u>	<u>Gas</u>	<u>Oil</u>	<u>Gas</u>		
NO <sub>x</sub>	42	219	46	235.4	40	Yes
SO <sub>2</sub>	13	10	14.2	11.1	40	No
PM/PM <sub>10</sub>	8.25	22	5.9	30.6	25/15	Yes
CO	5	50	17.5	239.5	100	Yes
VOC	5.5	17	2.5	41.3	40	Yes
H <sub>2</sub> SO <sub>4</sub>	2	1.5	2.2	1.7	7	No
Arsenic	0.0011	neg.	0.0011	neg.	Any	Yes
Beryllium	0.0007	neg.	0.0007	neg.	0.0004	Yes
Mercury	0.0009	neg.	0.0009	neg.	0.1	No
Lead	0.01	neg.	0.01	neg.	0.6	No

1 - ABB CT with a maximum of 500 hours on No. 2 fuel oil; and, up to 8760 hours on natural gas.

2 - GE CT with a maximum of 500 hours on No. 2 fuel oil; and, up to 8760 hours on natural gas.

Rule 62-212.400, Florida Administrative Code (F.A.C.), Stationary Source Preconstruction Review, 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:  
June 6, 1994

Date Application Complete:  
September 19, 1994

BACT Determination Requested by the Applicant:

Combined Cycle Combustion Turbine

<u>Pollutant</u>	<u>Fuel</u>	
	<u>Natural Gas</u>	<u>Fuel Oil</u>
NO <sub>x</sub>	15 ppmvd @ 15% O <sub>2</sub> and ISO conditions; Dry Low-NO <sub>x</sub> Burners	42 ppmvd @ 15% O <sub>2</sub> and ISO conditions; Water Injection and Limited Fuel Oil Operation
CO	25 ppmvd Combustion Control	30 ppmvd Combustion Control
VOC	7 ppmvd Combustion Control	7 ppmvd Combustion Control
PM/PM <sub>10</sub>	Combustion Control	Combustion Control Limited Fuel Oil Operation
Beryllium	Combustion Control	Combustion Control Limited Fuel Oil Operation
Inorganic Arsenic	Combustion Control	Combustion Control Limited Fuel Oil Operation

BACT Determination Procedure

In accordance with Rule 62-212.410, F.A.C., Best Available Control Technology Review, Stationary Source - Preconstruction Review, the 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 objection.

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., particulate matter and trace metals). Controlled generally by good combustion of clean fuels.
- o Products of Incomplete Combustion (e.g., CO and VOCs). Control is largely achieved by proper combustion techniques.
- o Acid Gases (e.g., SO<sub>2</sub>, NO<sub>x</sub>). Controlled generally by gaseous control devices and fuel quality.

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.

### BACT POLLUTANT ANALYSIS

#### COMBUSTION PRODUCTS

##### **Particulate Matter (PM/PM<sub>10</sub>)**

The design of the CT system ensures that particulate matter emissions will be minimized by combustion control and the use of clean fuels. The particulate matter emissions from the combustion turbine, when burning natural gas and No. 2 fuel oil, will not exceed 5.4 lbs/hr (gas) and 33 lbs/hr (oil) for the ABB 11N1 (or equivalent) at 100% load; and, the emissions are corrected to 15% O<sub>2</sub> and ISO conditions (ISO standard day conditions means 288 degrees Kelvin, 60 percent relative humidity and 101.3 kilopascals).

##### **Beryllium and Arsenic (Be, As)**

The Department agrees with the applicant's rationale that there are no feasible methods to control beryllium, inorganic arsenic and other trace pollutants, except by requiring good quality fuel. The limit of sulfur to 0.05%, by weight, is the requirement that assures good quality fuel.

#### PRODUCTS OF INCOMPLETE COMBUSTION

##### **Carbon Monoxide (CO) and Volatile Organic Compounds (VOC)**

The emissions of carbon monoxide exceed the PSD significant emission rate of 100 TPY with the GE 7EA CT. The applicant has indicated that the carbon monoxide emissions from the proposed

combined cycle turbines with dry low-NO<sub>x</sub> combustors are 25 ppmvd at 15 % O<sub>2</sub> for natural gas firing and 30 ppmvd at 15 % O<sub>2</sub> for fuel oil firing and water injection. Volatile organic compound emissions have been based on exhaust concentrations of 7 ppmvd for natural gas and fuel oil firing.

The majority of BACT emissions limitations have been based on combustion controls for carbon monoxide and volatile organic compounds minimization. Additional control is achievable through the use of catalytic oxidation. Catalytic oxidation is a post-combustion 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 application of oxidation catalyst is not technically feasible for gas turbines fired with fuel oil due to the oxidation of sulfur compounds and excessive formation of H<sub>2</sub>SO<sub>4</sub> mist emissions. Catalytic oxidation has not been demonstrated on a continuous basis when using fuel oil.

Use of oxidation catalyst technology would be feasible for a natural gas-fired unit; however, the cost effectiveness of \$5,297 per ton of CO/VOC removed for the GE 7EA unit would have an economic impact on this project.

#### ACID GASES

##### **Nitrogen Oxides (NO<sub>x</sub>)**

The emissions of nitrogen oxides represent a significant portion of the total emissions generated by this project and need to be controlled, if deemed appropriate. As such, the applicant presented an extensive analysis of the different available technologies for NO<sub>x</sub> control.

The applicant provided information on two different CTs by two different vendors, the GE Model 7EA and the ABB Model 11N1. The vendors indicated to the applicant that the NO<sub>x</sub> emission limit achievable by those CTs were 9 ppmvd and 15 ppmvd at ISO conditions for the GE 7EA and ABB 11N1, respectively.

The applicant stated that BACT for nitrogen oxides will be met by using dry low-NO<sub>x</sub> combustors to limit emissions when burning natural gas and water injection to limit emissions when burning fuel oil.

A review of the EPA's BACT/LAER Clearinghouse indicates that the lowest NO<sub>x</sub> emission limit established to date for a combustion turbine is 6 ppmvd at 15% oxygen. This level of control was accomplished through the use of water injection and a selective catalytic reduction (SCR) system.

SCR is a post-combustion method for control of NO<sub>x</sub> emissions. The SCR process combines vaporized ammonia with NO<sub>x</sub> 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% reduction of NO<sub>x</sub> with a new catalyst. As the catalyst ages, the NO<sub>x</sub> reduction efficiency while holding ammonia slip emissions constant will decrease.

The effect of exhaust gas temperature on NO<sub>x</sub> reduction depends on the specific catalyst formulation and reactor design. Generally, SCR units can be designed to achieve effective NO<sub>x</sub> control over a 100-300°F operating window within the bounds of 450-800°F. The preferable operating window is within the bounds of 600-750°F for effective NO<sub>x</sub> control.

Most commercial SCR systems operate over a temperature range of about 600-750°F. At levels above and below this window, the specific catalyst formulation will not be effective and NO<sub>x</sub> reduction will decrease. Operating at high temperatures can permanently damage the catalyst through sintering of surfaces. Increased water vapor content in the exhaust gas (as would result from water or steam injection in the gas turbine combustor) can shift the operating temperature window of the SCR reactor to slightly higher levels.

As stated by the applicant, the exhaust temperature of the proposed combined cycle CT is approximately 1000°F. At temperatures of 1000°F and above, the zeolite catalyst (reported to



operate within 600-950°F) will be irreparably damaged. However, catalyst can be located in the appropriate temperature range in the HRSG, but the applicant has stated that effective SCR operation will be difficult to maintain under significant load and ambient temperature variations. In this case, application of an SCR system appears to be technically feasible.

Although technically feasible, the applicant has also rejected using SCR on the combined cycle unit because of economic, energy, and environmental impacts. The applicant has identified the following limitations:

- a) Reduced power output.
- b) Emissions of unreacted ammonia (slip).
- c) Increased sulfuric acid mist emissions.
- d) Disposal of hazardous waste generated (spent catalyst).
- e) Ammonium bisulfate and ammonium sulfate particulate matter emissions (ammonium salts) due to the reaction of  $\text{NH}_3$  with  $\text{SO}_3$  present in the exhaust gases.
- f) Cost effectiveness for the application of SCR technology to the project was considered to be \$19,794 and \$9,012 per ton of  $\text{NO}_x$  removed when compared to the use of dry low- $\text{NO}_x$  combustors for the GE 7EA and ABB 11N1 CTs, respectively.

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  $\text{NO}_x$  emissions must take into account the potential operating problems that can occur with using SCR in the oil firing mode.

With the use of SCR on a combined cycle project, the formation of ammonium bisulfate can be a problem. In the SCR process, the injected ammonia and the fuel sulfur react to form the ammonium bisulfate, which leads to operational problems (i.e., the plugging of the tubes of the HRSG). In previous BACT determinations, SCR has been judged to be technically infeasible for oil firing.

The latest information available now indicates that SCR can be used for oil firing provided that adjustments are made in the ammonia to NO<sub>x</sub> injection ratio. For natural gas firing operation, NO<sub>x</sub> emissions can be controlled with up to a 90 percent removal efficiency using a 1 to 1 or greater ammonia to NO<sub>x</sub> injection ratio. By lowering the injection ratio for oil firing, testing has indicated that NO<sub>x</sub> can be controlled with efficiencies ranging from 60 to approximately 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 NO<sub>x</sub> emission limits ranging from 11.7 to 25 ppmvd, depending on the efficiency of control established.

The applicant has indicated that the total levelized annual operating cost to install SCR for this project, at 100 percent capacity factor and burning natural gas, is \$1,456,303 for the GE 7EA CT and \$1,444,864 for the ABB 11N1 CT. Taking into consideration the total annual cost, a cost/benefit analysis of using SCR can now be developed.

For the GE 7EA combined cycle combustion turbine and based on the information supplied by the applicant, it is estimated that the maximum annual NO<sub>x</sub> emissions using dry low NO<sub>x</sub> combustors will be 174.9 tons/year (assuming 8,260 and 500 hours of operation per year while firing natural gas and fuel oil, respectively, and at 15% O<sub>2</sub> and ISO conditions; and, 100% load). Assuming that SCR would reduce the NO<sub>x</sub> emissions from 9 ppmvd to 6 ppmvd when firing natural gas and from 42 ppmvd to 13 ppmvd when firing fuel oil, 101.3 tons of NO<sub>x</sub> would be emitted annually. When this reduction of 73.6 TPY, as compared with the application of dry low-NO<sub>x</sub> combustors, is taken into consideration with the total levelized annual operating cost of \$1,456,303, the cost per ton of controlling NO<sub>x</sub> is \$19,794. This calculated cost is higher than has previously been approved as BACT.

For the ABB 11N1 combined cycle combustion turbine and based on the information supplied by the applicant, it is estimated that the maximum annual NO<sub>x</sub> emissions using dry low NO<sub>x</sub> combustors will be 260.9 tons/year [assuming 8260 and 500 hours of operation per year while firing natural gas and fuel oil, respectively, and at 15% O<sub>2</sub> and ISO conditions; and, 100% load]. Assuming that SCR would reduce the NO<sub>x</sub> emissions from 15 ppmvd to 6 ppmvd when firing natural gas and from 42 ppmvd to 13 ppmvd when firing fuel oil, 100.6 tons of NO<sub>x</sub> would be emitted annually. When this reduction of 160.3 TPY, as compared with the application of dry low-NO<sub>x</sub> combustors, is taken into consideration with the total leveled annual operating cost of \$1,444,864, the cost per ton of controlling NO<sub>x</sub> is \$9,012. This calculated cost is higher than has previously been approved as BACT.

BACT Determination by DEP:

Combined Cycle Combustion Turbines

NO<sub>x</sub> Control

The applicant presented information on two different combustion turbines. The vendors claimed that one of them will be able to achieve 9 ppmvd (GE 7EA) and the other one will be able to achieve 15 ppmvd (ABB 11N1). A BACT analysis, by its terms, should consider those technologies that are available and have demonstrated the ability to control a particular pollutant. The Department has, in the past, permitted an ABB model combustion turbine with a NO<sub>x</sub> emission limit of 15 ppmvd at 15% O<sub>2</sub> and ISO conditions (Orlando Cogen Limited; PSD-FL-184; AC 48-206720). The initial compliance test demonstrated that the ABB CT is capable of achieving NO<sub>x</sub> emissions of less than 15 ppmvd.

The GE Model 7EA CT has not yet been applied to (or permitted for) full scale operations, thus lacking commercial operating experience to validate the 9 ppmvd at 15% O<sub>2</sub> and ISO conditions guarantee. Considering the uncertainty regarding the basis of the GE manufacturer guarantees and the lack of commercial operating experience at the 9 ppmvd emission level, the Department has determined that a NO<sub>x</sub> emission limit of 15 ppmvd (53 lbs/hr) @ 15% O<sub>2</sub> and ISO conditions, for continuous compliance basis [on a blocked 24-hour average (midnight to midnight)], is valid. Additionally, the NO<sub>x</sub> emission limit of 15 ppmvd may be lowered by the Department based on the data generated by the applicant, as outlined in Specific Conditions B4 and B5 of the permit. Based on

the initial compliance test and 3 months of continuous emissions monitoring data, the Department will, if less than 15 ppmvd is demonstrated, revise the NO<sub>x</sub> emission limit to 20 percent over the demonstrated concentration rounded off to the next higher ppm, not to exceed 15 ppmvd @ 15% O<sub>2</sub> and ISO conditions.

The information that the applicant presented and the Department's calculations indicate that the cost per ton of controlling NO<sub>x</sub> for the ABB 11N1 CT to be \$9,012, which is significantly higher when compared to other BACT determinations that require SCR. Based on the information presented by the applicant, the Department believes that the use of SCR for NO<sub>x</sub> control is not justifiable as BACT at this time.

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, and various capacity factors). Although the cost and other concerns expressed by the applicant are valid, the Department, in this case, is willing to accept water injection and dry low-NO<sub>x</sub> burner design as BACT for this project.

#### VOC and CO Control

The Department is in agreement with the applicant's proposal of combustor design and good operating practices as BACT for CO and VOCs for this project.

#### Other Emissions Control

The emission limitations for PM and PM<sub>10</sub>, Be, and As are based on previous BACT determinations for similar facilities. Although the emissions of these pollutants could be controlled by particulate matter control devices, such as a baghouse or scrubber, the amount of emission reductions would not warrant the added expense. Therefore, the Department does not believe that the BACT determination would be affected by the emissions of these pollutants. The Department accepts the applicant's proposed control of limiting the inherent quality of the fuel for these pollutants as BACT for the combined cycle unit. Also, to ensure good combustion which minimizes PM/PM<sub>10</sub> emissions, visible emissions (VE) shall not exceed 10% opacity for both natural gas and fuel oil firing. This opacity standard is based on previous BACT determinations for similar facilities. The PM/PM<sub>10</sub> emissions tests and the VE tests shall be conducted concurrently, unless inclement weather prevents this.

The emission limits for the Panda-Kathleen, L.P. project of the combined cycle unit for 115 MW are thereby established as follows at ISO conditions:

**115 MW COMBINED CYCLE COMBUSTION TURBINES**

Pollutant	Emission Standards/Limitations		Method of Control
	Oil(a)	Gas(b)	
NO <sub>x</sub>	42 ppmvd @ 15% O <sub>2</sub>	15 ppmvd @ 15% O <sub>2</sub>	Water Injection on oil Dry Low NO <sub>x</sub> Combustor on gas
CO	30 ppmvd @ 15% O <sub>2</sub>	25 ppmvd @ 15% O <sub>2</sub>	Combustion controls Limited fuel oil operation
VOC	7 ppmvd	7 ppmvd	Combustion controls
PM & PM <sub>10</sub>	33 lbs/hr	5.4 lbs/hr	Combustion controls
<b>Visible Emissions</b>	<b>10% opacity</b>	<b>10% opacity</b>	
Be	2.5 x 10 <sup>-6</sup> lbs/MMBtu		Fuel Quality
As	4.2 x 10 <sup>-6</sup> lbs/MMBtu		Fuel Quality

- (a) No. 2 fuel oil with a maximum of 0.05% sulfur, by weight.  
 (b) Maximum of hours of operation for natural gas/fuel oil are 8760/500 hours per year.

Details of the Analysis May be Obtained by Contacting:

Syed Arif, Permit Engineer  
 Department of Environmental Protection  
 Bureau of Air Regulation  
 2600 Blair Stone Road  
 Tallahassee, Florida 32399-2400

Recommended by:

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

December 28, 1994  
 Date

Approved by:


Virginia B. Wetherell  
 Virginia B. Wetherell, Secretary  
 Dept. of Environmental Protection

1/5/95  
 Date

Memorandum

Florida Department of  
**Environmental Protection**

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TO: Virginia B. Wetherell  
FROM: *for* Howard L. Rhodes   
DATE: December 23, 1994  
SUBJECT: Approval of a PSD Permit (PSD-FL-216)  
Panda Kathleen, L.P., Polk County

Attached for your approval and signature is a PSD permit and a Best Available Control Technology evaluation to construct a 115 megawatt (MW) cogeneration facility consisting of one combined cycle gas turbine generator and associated steam cycle at an electrical power plant site in Lakeland, Polk County, Florida.

The public did not object to the issuance of this PSD permit.

I recommend your approval and signature.

HLR/CHF/bjb