



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:
Lake Cogen Limited
535 N. Ferncreek Ave.
Orlando, FL 32803

Permit Number: AC 35-196459
PSD-FL-176
Expiration Date: June 1, 1993
County: Lake
Latitude/Longitude: 28°55'02"N
81°40'37"W
Project: 108-MW Combined Cycle
Gas Turbine Cogeneration
Facility

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the construction of a 108 combined cycle gas turbine cogeneration facility to be located adjacent to the Golden Gem Citrus Processing Plant in Lake County, Florida. The UTM coordinates are 434.0 km East and 3,198.8 km North.

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. Lake Cogen Limited's application dated May 1, 1991.
2. Department's sufficiency request dated May 31, 1991.
3. Letter from KBN Engineering and Applied Science, Inc., dated June 20, 1991, to supply additional information.

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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, Florida Statutes. 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), Florida Statutes, 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.

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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, Florida Statutes. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

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

11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 17-4.120 and 17-30.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

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

13. 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.

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

2. Unless the Department has determined other concentrations are required to protect public health and safety, predicted acceptable ambient air concentrations (AAC) of the following pollutants shall not be exceeded:

Pollutant	Acceptable Ambient Concentrations		
	8-hrs	24-hrs	Annual
Beryllium	0.02	0.005	0.0004
Lead	1.5	0.36	0.09
Inorganic Mercury	NA	NA	0.3
Compounds, all forms of vapor, as Hg			

3. Visible emissions shall not exceed 10% opacity.

Operating Rates

4. This source is allowed to operate continuously (8,760 hours per year).

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5. This source is allowed to use natural gas as the primary fuel and distillate oil as the emergency backup fuel (limited as shown in Specific Condition 6 below).

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

- Maximum distillate fuel oil consumption shall not exceed either of the following limitations: 2,921 gals/hr/CT; 701,050 gals/yr/CT.
- Maximum annual firing using fuel oil shall not exceed an equivalent of 10 days per year at full load.
- Maximum sulfur (S) content in the oil shall not exceed 0.1 percent by weight.
- Maximum heat input shall not exceed 384 MMBtu/hr/CT (gas) or 387 MMBtu/hr/CT (oil) at ISO conditions.
- Duct firing shall be limited to natural gas firing only with a maximum heat input of 225 MMBtu/hr.
- Duct firing shall be limited to 525,000 MMBtu/year/HRS-duct burner, which is an equivalent to 3,500 hours at 150 MMBtu/hour.

7. Any change in the method of operation, equipment or operating hours shall be submitted to the DER's Bureau of Air Regulation at Central Florida District offices.

8. 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.

Compliance Determination

9. Initial (I) compliance tests shall be performed on each CT using both fuels. The stack test for each turbine shall be performed within 10 percent of the maximum heat rate input for the tested operating temperature. Annual (A) compliance tests shall be performed on each CT with the fuel(s) used for more than 400 hours in the preceding 12-month period. Tests shall be conducted using EPA reference methods in accordance with the November 2, 1989, version of 40 CFR 60 Appendix A:

- a. 5 or 17 for PM (I, A, for oil only)
- b. 10 for CO (I)
- c. 9 for VE (I, A)
- d. 20 for NOx (I, A)

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- e. trace elements of beryllium (Be) shall be tested (I, for oil only) using EMTIC Interim Test Method. As an alternative, Method 104 may be used; or Be may be determined from fuel sample analysis using either Method 7090 or 7091, and sample extraction using Method 3040 as described in the EPA solid waste regulations SW 846.
- f. mercury (Hg) shall be tested using EPA Method 101 (40 CFR 61, Appendix B) (I, for oil only) or fuel sampling analysis using methods acceptable to the Department.

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

10. Method 5 or 17 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.

11. Compliance with the SO₂ emission limit can also be determined by calculations based on fuel analysis using ASTM D2880-71 for the sulfur content of liquid fuels.

12. 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.

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

$$NO_x = (NO_x \text{ obs}) \left(\frac{P_{ref}}{P_{obs}} \right)^{0.5} e^{19} (H_{obs} - 0.0063) \left(\frac{288^\circ K}{T_{AMB}} \right)^{1.53}$$

where:

NO_x = Emissions of NO_x at 15 percent oxygen and ISO standard ambient conditions.

NO_x obs = Measured NO_x emission at 15 percent oxygen, ppmv.

Pref = Reference combustor inlet absolute pressure at 101.3 kilopascals (1 atmosphere) ambient pressure.

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~~P_{obs} = Measured combustor inlet absolute pressure at test ambient pressure~~

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

~~e = Transcendental constant (2.718).~~

~~T_{amb} = Temperature of ambient air at test.~~

14. Test results will be the average of 3 valid runs. The Central District office will be notified at least 30 days in advance of the compliance test. 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 Central District office no later than 45 days after completion.

15. Water injection shall be utilized for NOx control. The water to fuel ratio at which compliance is achieved shall be incorporated into the permit and shall be continuously monitored. In addition, the permittee shall leave a space suitable for future installation of SCR equipment. Alternative combustion controls (i.e., dry low NOx burners) can be installed with prior Department-Bureau of Air Regulation approval provided NOx emission levels are met.

16. Combustion control shall be utilized for CO control. Due to the lack of operational experience with the LM6000 and the uncertainty of actual CO emissions, the permittee shall leave a 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.

17. To determine compliance with the capacity factor condition for oil firing, the Permittee shall maintain daily records of fuel usage. All records shall be maintained for a minimum of three years after the date of each record and shall be made available to representatives of the Department upon request.

18. Sulfur, nitrogen content and lower heating value of the fuel being fired in the gas turbine shall also be recorded per fuel oil shipment. These records shall also be kept by the company for at least three years and made available for regulatory agency's inspection.

Rule Requirements

19. This source shall comply with all applicable provisions of Chapter 403, Florida Statutes and Chapters 17-2 and 17-4, Florida Administrative Code.

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20. This source shall comply with all requirements of 40 CFR 60, Subparts GG and Db and 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.

21. 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)).

22. This source shall comply with F.A.C. Rule 17-2.700, Stationary Point Source Emission Test Procedures.

23. 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: sulfur, nitrogen content and lower heating value of the fuel being fired, fuel usage, hours of operation, air emissions limits, etc. Annual reports shall be sent to the Department's Central District office.

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

25. An application for an operation permit must be submitted to the Central Florida District office at least 90 days prior to the expiration date of this construction permit or within 45 days after completion of compliance testing, whichever occurs first. 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. Rule 17-4.220).

Issued this _____ day
of _____, 1991

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

Carol M. Browner, Secretary

Table 1. Allowable Emission Limits Combined Cycle Combustion Turbine Cogeneration Facility

Pollutant	Source ^a	Fuel ^b	Basis of Limit	Allowable Emission Limits	
				lbs/hr	tons/year
NOx	CT	NG	BACT: 25 ppmvd at 15% O ₂	78.8	404.7
	CT	DFO	BACT: 42 ppmvd at 15% O ₂	137.0	
	DB	NG	BACT: 0.1 lb/MMBtu	45.0	
CO	CT	NG	BACT: 42 ppmvd	80.6*	466.5*
	CT	DFO	BACT: 78 ppmvd	151.0*	
	DB	NG	BACT: 0.2 lb/MMBtu	90.0*	
PM/PM10	CT	NG	BACT: 0.0065 lb/MMBtu	5.0	27.0
	CT	DFO	BACT: 0.026 lb/MMBtu	20.0	
	DB	NG	BACT: 0.006 lb/MMBtu	2.6	
SO ₂	CT	DFO	Established by Applicant 0.1% S	80.0	21.0
VOC	CT	NG	Established by Applicant	3.3	30.8
	CT	DFO	Established by Applicant	8.3	
	DB	NG	Established by Applicant	13.5	
Mercury (Hg)	CT	DFO	Established by Applicant	--	0.1
Lead (Pb)	CT	DFO	Established by Applicant	--	0.6
Beryllium (Be)	CT	DFO	Established by Applicant	--	0.0004
Sulfuric Acid Mist	CT	DFO	Established by Applicant	--	7.0

^a CT = combustion turbine

DB = duct burner

^b NG = natural gas

DFO = distillate fuel oil

* Emission limit for CO subject to change should additional control (oxidation catalyst) be required.

DARM-EM-05

TO: District Air Program Administrators
County Air Program Administrators

FROM: Howard L. Rhodes, Director
Division of Air Resources Management

DATE: November 22, 1995

SUBJECT: Guidance on Rate of Operation During Compliance
Testing for Combustion Turbines

This memo is to provide guidance on determining the rate of operation during compliance testing for combustion turbines (CTs).

The mass throughput rate of combustion turbines is inversely proportional to temperature and humidity measured at the CT inlet as a result of the changing air densities encountered. Inlet air temperature is the predominant factor; therefore, higher temperatures will result in a lower heat input rate (MMBtu/hr) and vice versa. The temperature is referenced to the CT inlet temperature rather than ambient temperature, as some CTs are equipped with inlet air conditioning systems (e.g., chillers or evaporative coolers) to maintain optimum operating temperature. Inlet air temperature and ambient temperature are equivalent in cases where no conditioning systems are used. Variations of heat input (capacity) are to be expected due to the range of ambient temperatures and humidities encountered in Florida. Over the usual operating ranges, the CT operating curve (capacity vs. inlet air temperature) is essentially a straight line. An owner or operator of a CT may use these curves in determining the maximum heat input rate for the unit.

The determination of the rate of CT operation during compliance testing is illustrated in the following example. The heat input limit is often referenced to 59 F, and in this example, corresponds to 750 MMBtu/hr (Point A). On the date that compliance testing is conducted, the average ambient (or conditioned) air temperature during the test period is determined to be 80 F. According to the attached curve, the maximum design heat input rate achievable is 700 MMBtu/hr (Point B). The CT has successfully achieved 90 percent of its maximum permitted capacity for this temperature if it is determined to be operating at 630 MMBtu/hr or more (Point C). In this example, the dashed line represents 90 percent of the maximum heat input value achievable over a range of inlet air temperatures. Heat input may vary depending on CT characteristics; therefore, manufacturer's curves for correction to other temperatures shall be provided to the Department, if a source intends to use the curves for compliance purposes. At the request of a permittee, the following condition shall be incorporated into the construction and corresponding operating permits:

"Testing of emissions shall be conducted with the source operating at capacity. Capacity is defined as 95-100 percent of the manufacturer's rated heat input achievable for the average ambient (or conditioned) air temperature during the test. If it is impracticable to test at capacity, then sources may be tested at less than capacity. In such cases, the entire heat input vs. inlet temperature curve will be adjusted by the increment equal to the difference between the design heat input value and 105 percent of the value reached during the test. Data, curves, and

calculations necessary to demonstrate the heat input rate correction at both design and test conditions shall be submitted to the Department with the compliance test report."

To demonstrate compliance with federal new source performance standard Subpart GG - Standards of Performance for Stationary Gas Turbines, an initial test shall be conducted at four load points and corrected to ISO conditions for comparison to the NSPS allowable. [Subsequent annual compliance tests conducted to establish compliance with NOx limits that are more stringent than the NSPS standard shall not require an ISO correction or testing at four load points; rather, the testing shall be done at capacity, as defined above. However, when testing shows that NOx emissions exceed the standard when operating at capacity, the company shall recalibrate the NOx emission control system using emission testing at four loads as required in Subpart GG.]

HLR/chf/h

Attachment

{ Table 1 }