

REVISED  
CONSTRUCTION PERMIT -- OPERATING PERMIT DENIAL -- NSPS

PERMITTEE

Southwestern Electric Cooperative, Inc.  
Attention: H. L. Drenner  
525 U.S. Route 40  
Greenville, Illinois 62246

Application No: 99060052 I.D. No.: 051808AAK  
Applicants Designation: CISSPP-1 Date Received: June 16, 1999  
Subject: Gas Turbine (Power Production)  
Date Issued: September 7, 1999  
Location: State Road 4, St. Elmo, Fayette County

Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of one gas turbine (GELM6000) as described in the above referenced application. This Permit is subject to standard conditions attached hereto and the following special condition(s):

- 1a. The turbine is subject to the New Source Performance Standard (NSPS) for Stationary Gas Turbines, 40 CFR 60, Subpart A and GG. The Illinois EPA is administrating NSPS in Illinois on behalf of the United States EPA under a delegation agreement.
- b. The Permittee shall not emit into the atmosphere from the turbine any gases which contain nitrogen oxides (NO<sub>x</sub>) in excess of the following equation, pursuant to 40 CFR 60.332 (a) (1), except as allowed by 40 CFR 60.332 (f):

$$STD = 0.0075 \left( \frac{14.4}{Y} \right) + F$$

where:

- STD = allowable NO<sub>x</sub> emission (percent by volume at 15 percent oxygen and on a dry basis).
- Y = manufacturer's rated heat rate at manufacture's rated load (kilojoules per watt hour) or, actual measured heat rate based on lower heating value of fuel as measured as actual peak load for the facility. The value of Y shall not exceed 14.4 kilojoules per watt-hour.
- F = NO<sub>x</sub> emission allowance for fuel-bound nitrogen as defined in 40 CFR 60.332 (a) (3).

- c. The Permittee shall not emit into the atmosphere from the turbine any gases which contain sulfur dioxide in excess of 0.015 percent by volume at 15 percent oxygen and on a dry basis, or shall not burn any fuel which contains sulfur in excess of 0.8 percent by weight, pursuant to 40 CFR 60.333 (a) and (b).
  - d. At all times, the Permittee shall maintain and operate the turbine in a manner consistent with good air pollution control practice for minimizing emissions, pursuant to the NSPS, 40 CFR 60.11(d).
2. The turbine is an affected unit under the Acid Rain Deposition Control Program pursuant to Title IV of the Clean Air Act and is subject to certain control requirements and emissions monitoring requirements pursuant to 40 CFR Parts 72, 73 and 75. As an affected unit under the Acid Rain Program, Spectrum Energy, Inc. must also obtain an Acid Rain Permit for operation of the turbine in accordance with 40 CFR 70.30(a)(2)(ii) and 72.32(a).
  3. The turbine shall each be equipped, operated, and maintained with water injection to control NO<sub>x</sub> emissions.
  - 4a. The only fuel fired at the facility shall be natural gas.
  - b. Operation of turbine shall not exceed more than 1,580,000 million BTU per year. This is based on the fuel use at 100% load for 4,000 hours, 59°F turbine inlet. Compliance with this limit shall be determined from a running total of 365 days of data.
  - c. Hourly emissions from the turbine shall not exceed the following limits. Notwithstanding the above, during startup, as allowed by Condition 5(b) and when ice fog is deemed a traffic hazard by the Permittee, the turbine may exceed the NO<sub>x</sub> lb/hr limit.

<u>Unit</u>	<u>NO<sub>x</sub></u> <u>(lb/hr)</u>	<u>CO</u> <u>(lb/hr)</u>	<u>PM/PM<sub>10</sub></u> <u>(lb/hr)</u>	<u>VOM</u> <u>(lb/hr)</u>	<u>SO<sub>2</sub></u> <u>(lb/hr)</u>
LM6000	43	78.1	21	8.1	0.7

These limits are based on the information provided in the permit application.

- d. The annual emissions from the facility shall not exceed the following limitations. Compliance with the annual limitations shall be determined from a running total of 12 months of data.

<u>Pollutant</u>	<u>Emissions</u> <u>(tons/year)</u>
NO <sub>x</sub>	85.9
CO	113.0
PM/PM <sub>10</sub>	42.0
VOM	16.2
SO <sub>2</sub>	1.3

The above limits are established pursuant to 40 CFR 52.21, the federal rules for Prevention of Significant Deterioration of Air Quality (PSD). These limits ensure that the construction and operation of the turbines do not constitute a new major source pursuant to PSD.

- 5a. The emission of smoke or other particulate matter from the turbine shall not have an opacity greater than 30 percent, pursuant to 35 IAC 212.123(a), except as allowed by Condition 5(b) (35 IAC 201.149, 212.123(b) or 212.124).
- b. The Permittee is authorized to operate the turbine in excess of the applicable opacity limit during startup pursuant to 35 IAC 201.262, as the Permittee has affirmatively demonstrated that all reasonable efforts have been made to minimize startup emissions, duration of individual starts, and frequency of startups. This authorization only extends for a period of up to 20 minutes following initial firing of fuel during each startup event. The Permittee shall implement the established startup procedures to minimize startup emissions.
- 6a. Under this permit, the turbine may be operated for a period of up to 180 days from initial startup to allow for equipment shakedown and emissions testing as required. This period may be extended by the Illinois EPA upon request of the Permittee if additional time is needed to complete startup or perform emission testing.
- b. Upon successful completion of emission testing demonstrating compliance with applicable limitations, the Permittee may continue to operate the facility as allowed by Section 39.5 (5) of the Environmental Protection Act.
7. The Permittee shall furnish the Illinois EPA with written notification as follows:
  - a. The date construction of the turbine commenced, postmarked no later than 30 days after such date, pursuant to 40 CFR 60.7(a)(1).
  - b. The anticipated date of initial startup of the turbine, postmarked not more than 60 days nor less than 30 days prior to such date, pursuant to 40 CFR 60.7(a)(2).
  - c. The actual date of initial startup of the turbine, postmarked within 15 days after such date, pursuant to 40 CFR 60.7(a)(3).
- 8a. Each turbine shall each be equipped, operated, and maintained with a continuous monitoring system to monitor and record the fuel consumption being fired.
- b. The turbine shall be equipped, operated, and maintained with a continuous monitoring system to monitor and record the ratio of water to fuel being fired, pursuant to 40 CFR 60.334(a).

9. As an alternate to the daily sampling requirement of 40 CFR 60.334 (b)(2), the Permittee shall monitor sulfur content of the fuel being fired in the turbines in accordance with applicable requirements of the federal Acid Rain Program, subject to the following as allowed by USEPA's Custom Fuel Monitoring Document dated January 16, 1996.:
  - a. The Permittee submits a monitoring plan, certified by signature of the Designated Representative (DR), that commits to using a primary fuel of pipeline supplied natural gas (sulfur content less than 20 gr/100 scf pursuant to 40 CFR 75.11(d)(2)).
  - b. The turbine shall be monitored for SO<sub>2</sub> emissions using methods consistent with the requirements of 40 CFR 75 and certified by the USEPA.
- 10a. This permit is issued based on the turbine being gas-fired peaking unit, as specified in 40 CFR Part 75, so that continuous emission monitoring is not required for NO<sub>x</sub>. To maintain this status, the three year rolling average annual capacity factor of a turbine shall not be greater than 10 percent, and the highest annual capacity factor shall not be greater than 20 percent in any one of the three averaging years.
  - b. Should the operation of the turbine exceed the above requirements relating to the definition of a gas-fired peaking unit in 40 CFR 75, the Permittee shall install the appropriate Continuous Monitoring System(s) on the turbine by December 31 of the following calendar year, as defined in 40 CFR 75, in order to remain in compliance with the provisions of the Acid Rain Program.
11. Monitoring of fuel nitrogen content is not required as natural gas is the only fuel fired in the turbines, pursuant to USEPA Custom Fuel Monitoring Document dated August 14, 1987.
- 12a. Within 60 days after achieving the maximum production rate at which the natural gas fired stationary gas turbine will be operated, but not later than 180 days after initial startup, the nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), and oxygen (O<sub>2</sub>) concentrations in the exhaust of the turbine shall be measured by an approved independent testing service to determine compliance with the NO<sub>x</sub> and CO limits in Condition 1 and 4 in the following manner:
  - i. The NO<sub>x</sub> emission rate for determining compliance with Condition 4 shall be computed for each run using the equation in 40 CFR 60.335(c)(1). The NO<sub>x</sub> emission rate for determining compliance with Condition 4 in lb/hr shall use EPA Method 19 and heat input in mmBTU/hr.
  - ii. Method 20 of 40 CFR 60, Appendix A, shall be used to determine the NO<sub>x</sub> and O<sub>2</sub> concentrations. The span values

shall be 300 ppm of NO<sub>x</sub> and 21 percent O<sub>2</sub>, pursuant to 40 CFR 60.335 (C) (3).

- iii. The NO<sub>x</sub> emissions shall be determined at four points in the normal operating range of the turbine, including the minimum point in the range and peak load, pursuant to 40 CFR 60.335(c)(2).
  - iv. All loads shall be corrected to ISO conditions using the appropriate equations supplied by the manufacturer, pursuant to 40 CFR 60.335 (c) (2).
  - v. Method 10 of 40 CFR 60, Appendix A, shall be used to determine CO concentrations at peak turbine load with EPA Method 19 and heat input used to determine lb/hour emission rate.
  - vi. The test at each load shall consist of three separate runs each at least 60 minutes in duration. Compliance shall be determined from the average of the runs provided that the Illinois EPA may accept the arithmetic mean of two of the runs in circumstances described in 40 CFR 60.8 (f).
- b. The Permittee shall submit a test plan to the Illinois EPA at least 60 days prior to testing. The Permittee may propose a strategy for testing across the normal load range of the turbines.
- c. The Illinois EPA shall be notified prior to these tests to enable the Illinois EPA to observe these tests. Notification of the expected date of testing shall be submitted a minimum of thirty (30) days prior to the expected date. Notification of the actual date and expected time of testing shall be submitted a minimum of five (5) working days prior to the actual date of the test. The Illinois EPA may, at its discretion, accept notifications with shorter advance notice provided that the Illinois EPA will not accept such notifications if it interferes with the Illinois EPA's ability to observe the testing.
- d. The Final Report for these tests shall be submitted to the Illinois EPA within 60 days after the date of the tests. The Final Report shall include as a minimum:
- i. A summary of results.
  - ii. General information.
  - iii. Description of test method(s), including description of sampling points, sampling train, analysis equipment, and test schedule.
  - iv. Detailed description of test condition, including:
    - A. Fuel consumption (standard ft<sup>3</sup>);

- B. Firing rate (million Btu/hr); and
  - C. Turbine/Generator output rate (MW).
- v. Data and calculations, including copies of all raw data sheets and records of laboratory analyses, sample calculations, and data on equipment calibration.
- 13a. The Permittee shall maintain records of the following items:
- i. The sulfur contents of the fuel used to fire the turbines as determined in accordance with Condition 9;
  - ii. Fuel consumption for the turbine and ratio of water to fuel being fired in accordance with Condition 8;
  - iii. Operating hours and fuel consumption for the turbine, on a daily basis.
- b. The Permittee shall maintain the following records for the turbine subject to Condition 5, which at a minimum shall include:
- i. The following information for each startup of the turbine:
    - A. Date and time of startup;
    - B. Whether operating personnel for the turbine or air environmental staff are on site during startup; and
    - C. A description of startup, if operating problems are identified during the startup.
  - ii. The following information for the turbine when above normal opacity has been observed by source personnel as identified in (i)(B) above.
    - A. Name of observer, position and reason for being at site;
    - B. Date and duration of above normal opacity, including start time and time normal operation was achieved;
    - C. If normal operation was not achieved within 20 minutes, an explanation why startup could not be achieved;
    - D. A detailed description of the startup, including reason for operation and whether reduced loading was performed;
    - E. An explanation why reduced loading and other established startup procedures could not be performed, if not performed;
    - F. The nature of opacity following the end of startup or 30 minutes of operation, whichever occurs first, and

duration of operation until achievement of normal opacity or shutdown; and

- G. Whether exceedance of Condition 5 may have occurred during startup, with explanation if qualified observer was on site
  - c. The Permittee shall keep a maintenance/repair log for the turbine and for the water injection System.
  - d. The Permittee shall maintain the following records on at least a quarterly basis:
    - i. Heat content of the natural gas (Btu/ft<sup>3</sup>) being fired during the quarter, with supporting documentation;
    - ii. Fuel consumption for the turbine for each month since the previous record;
    - iii. The annual emissions of NO<sub>x</sub>, SO<sub>2</sub>, PM and CO for each month since the previous record with supporting calculations.
  - e. The Permittee shall maintain records that identify:
    - i. Any periods during which a continuous monitoring system was not operational, with explanation.
    - ii. Any 1-hour period during which the average water to fuel ratio, as measured by the continuous monitoring system, falls below the water-to-fuel ratio determined by test to be necessary to comply with requirements for NO<sub>x</sub> emissions, with the average water-to-fuel ratio, average fuel consumption, ambient conditions and turbine load.
    - iii. Any period when the turbine was in operation during which ice fog was deemed to be a traffic hazard, the ambient conditions existing during the periods, the date and time the water injection system was deactivated, and the date and time the system was reactivated.
    - iv. Any day in which emission exceeded an applicable standard or limit.
  - f. These records shall be retained for three years and shall be available for inspection and copying by the Illinois EPA.
- 14a. Pursuant to 40 CFR 60.7 (c) and 60.334 (c), a report shall be submitted by the Permittee to the Illinois EPA on a quarterly basis no later than 30 days after the end of the calendar quarter. This report shall contain information on any one-hour period when the average water to fuel ratio falls below the ratio needed to show compliance. For such periods, the report shall include the actual

water to fuel ratio, average fuel consumption, ambient conditions and turbine load.

- b. If there is any other exceedance of the requirements of Conditions 1 through 4 of this permit, as determined by the records required by this permit, the Permittee shall submit a report within 30 days after the exceedance. The report shall include the emissions released in accordance with the recordkeeping requirements, a copy of the relevant records, and a description of the exceedance or violation and efforts to reduce emissions and future occurrences.
15. Two copies of required reports and notifications concerning equipment operation or repairs, performance testing, or a continuous monitoring system shall be sent to:

Illinois Environmental Protection Agency Division  
of Air Pollution Control  
Compliance Section (#40)  
P.O. Box 19276  
Springfield, Illinois 62794-9276

and one copy shall be sent to the Illinois EPA's regional office at the following address, unless otherwise indicated:

Illinois Environmental Protection Agency  
Division of Air Pollution Control - Regional Office  
209 Mall Street  
Collinsville, IL 62234  
Telephone 618/346-5150 Facsimile 618/346-5155

The OPERATING permit application is DENIED because the Illinois Environmental Protection Act, Section 9, and 35 Ill. Adm. Code 201.160 might be violated if an operating permit were issued before the emission testing required by Condition 12 were performed.

If you have any questions concerning this permit, please contact Shashi Shah at 217/782-7395.

Donald E. Sutton, P.E.  
Manager, Permit Section  
Division of Air Pollution Control

DES:SRS:KJL:psj

cc: Region