

CONSTRUCTION PERMIT - NSPS

PERMITTEE

Ameren Energy Generating Company
Attention: Michael L. Menne
1901 Chouteau Avenue
P.O. Box 66149 MC 602
St. Louis, MO 63166-6149

Application No: 00100065

I.D. No.: 031438ABC

Applicants Designation: EEC

Date Received: October 26, 2000

Subject: Gas Turbines (Power Production)

Date Issued:

Location: Elgin Energy Center, 1559 Gifford Road, Elgin, Cook County

Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of four simple cycle gas turbines (CT 01-04) (nominal plant capacity - 540 MWe, rated heat input 1472 mmBtu/hr per turbine) equipped with dry low-NO_x burners, two indirect heaters (Heater A and B) and other associated ancillary equipment as described in the above referenced application. This Permit is subject to standard conditions attached hereto and the following special condition(s):

- 1a. The turbines are 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 any turbine any gases which contain nitrogen oxides (NO_x) in excess of the applicable standards pursuant to 40 CFR 60.332 (a)(1).
 - c. The Permittee shall not emit into the atmosphere from any turbine any gases which contain sulfur dioxide (SO₂) 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 turbines in a manner consistent with good air pollution control practice for minimizing emissions, pursuant to the NSPS, 40 CFR 60.11(d).
2. The turbines are affected units under the Acid Rain Deposition Control Program pursuant to Title IV of the Clean Air Act and are subject to certain permit requirements and emissions monitoring requirements pursuant to 40 CFR Parts 72, 73 and 75. As affected units under the Acid Rain Program, the Permittee must also obtain an Acid Rain Permit for operation of the turbines in accordance with 40 CFR 72.30(b)(2)(ii) and 72.32(a).
 - 3a. The only fuel fired in the turbines shall be natural gas.

- b. The turbines, in total, shall not fire more than 8,220 million standard cubic feet of natural gas per year. Compliance with this limit shall be determined from a running total of 12 months of data.
- c. The turbines, in total, shall not operate more than 5,744 hours per year. Compliance with this limit shall be determined from a running total of 12 months of data from the sum of operating hours counted as set forth below:
 - i. Each hour of operation for a turbine operating with wet compression on for power augmentation shall be counted as 1.55 hours. For this purpose, wet compression for power augmentation means introducing water into the inlet air duct immediately before the compressor section of the turbine following achievement of base power output to increase power output from the turbine;
 - ii. Each startup hour for a turbine shall be counted as 1.2 hours; and
 - iii. Each hour of operation for a turbine operating in other modes than identified in Condition 3(c)(i) and (ii) shall be counted as 1 hour.
- d. i. Each turbine shall be equipped, operated, and maintained with dry low NO_x combustors to control NO_x emissions.
 - ii. A. Hourly emissions from each turbine shall not exceed the following limits except during startup and shutdown as addressed by Condition 3(e)(ii)(B) and when wet compression is on as addressed below. These limits are based on the information provided in the permit application. Compliance with these limits shall be determined from emission testing in accordance with Condition 12 (3-run average) or emission monitoring in accordance with Condition 11 (24-hour average).

NO _x (lb/hr) (lb/mmBtu)	CO (lb/hr) (lb/mmBtu)	VOM (lb/hr) (lb/mmBtu)	PM/PM ₁₀ (lb/hr)	SO ₂ (lb/hr)
82.0 (0.0557) ¹	66.0 (0.05) ¹	2.8 (0.002) ¹	10.0	0.62

1 - Based on Higher Heating Value (HHV) of the fuel.

- B. Notwithstanding the NO_x limit above, during operation of a turbine with wet compression on for power augmentation, NO_x emissions shall not exceed 127 lb/hr (0.087 lb/mmBtu (HHV)).
- e. i. The annual emissions from the facility turbines (Total 4 turbines) shall not exceed the following limitations. Compliance with these limitations shall be determined from a running total of 12 months of data.

<u>Pollutant</u>	<u>Emissions (tons/year)</u>
NO _x	235.5
CO	237.0
PM/PM ₁₀	42.2
VOM	11.7
SO ₂	2.9

- ii. For purpose of determining compliance with the above limitations:
- A. Unless emission monitoring is performed for a pollutant, emissions during periods other than startup shall be determined from emission factors developed from testing in accordance with Condition 12 (NO_x, CO, VOM and PM/PM₁₀) and analysis of fuel sulfur content or standard factors (SO₂).
 - B. Unless an alternative factor is established for the pollutant or emissions monitoring is performed for the pollutant, emissions of NO_x, CO and VOM during an hour that includes a startup shall be presumed to be 120, 700 and 1200 percent respectively of the limits in Condition 3(d)(ii)(A), i.e. NO_x, CO and VOM emissions during an hour with a startup shall be presumed to be 98.4 lb/hr, 462 lb/hr and 33.6 lb/hr, respectively. These presumptions are based on data in the application describing maximum emissions during startup of a turbine. Any alternative factor for emissions during startup of a turbine shall be based on representative emission testing conducted with USEPA Reference Test Methods. (Refer to Condition 12.)
 - C. The establishment of the above procedures for determining compliance with the annual emission limits shall not shield the Permittee from responsibility to account for all emissions from the source, including emissions during startup or upset conditions, as other credible information may demonstrate that the above procedures do not adequately account for the actual emissions of the source.
- f. Annual emissions of hazardous air pollutants from the source shall be less than 10 tons of any hazardous pollutant and less than 25 tons in aggregate for any combination of hazardous air pollutants, as indirectly addressed by limits on emissions of criteria pollutants.

The above limits are established to address applicability of 40 CFR 52.21, the federal rules for Prevention of Significant Deterioration of Air Quality (PSD) and the state rules for Major Stationary Source Construction and Modification (MSSCAM), 35 IAC, Part 203. These limitations ensure that the construction and operation of the turbines do not constitute a new major source pursuant to PSD or MSSCAM.

- 4a. The emission of smoke or other particulate matter from each turbine shall not have opacity greater than 30 percent, pursuant to 35 IAC 212.123(a).

- b. Each turbine shall be operated in a manner consistent with good air pollution control practice to minimize emissions and opacity during startup and shutdown including the following. These practices shall be reviewed at least annually and enhanced consistent with good air pollution control practice based on actual operating experience and performance of the turbines.
 - A. The Permittee shall manage the operation of the turbines to minimize multiple startups of a turbine in a single day, unless startup is tripped off, and to provide adequate time for normal startup of the turbines, except for "quick starts" that are due to requests for immediate delivery of power, as would result from unexpected loss of a transmission line or other generating capacity.
 - B. Except during startup or shutdown of a turbine or for the purpose of emission testing, the Permittee shall not operate turbines below 75 percent load at which emission testing conducted in accordance with Condition 12(b) has demonstrated compliance with the applicable hourly emission limits in Conditions 3(d)(ii) (see Condition 12(b)(iii)).
 - C. The Permittee shall operate in accordance with the manufacturer's written instructions or other written instructions developed and maintained by the Permittee, which shall include at a minimum the following measures:
 - I. Review of operating parameters of the unit during startup, or shutdown as necessary to make adjustments to reduce emissions; and
 - II. Implementation of inspection and repair procedures for a turbine prior to attempting startup following repeated trips.
 - D. The Permittee shall maintain the turbines in accordance with written procedures developed and maintained by them.
- 5. Emissions of NO_x, CO, and VOM from each indirect heater shall not exceed 1.36 lb/hr, 0.12 lb/hr, and 0.16 lb/hr, respectively. Annual emissions of NO_x, CO, and VOM from the two indirect heaters shall not exceed 11.9 ton/yr, 1.1 ton/yr, and 1.4 ton/yr, respectively. These limits are based on the information provided in the application and operation of each indirect heater for 8760 hours per year.
- 6a. This permit is issued based on the source not being a participating source or new participating source under the Emission Reduction Market System (ERMS), 35 IAC Part 205, because its VOM emissions during each seasonal allotment period are expected to be less than 10 tons. This reflects an expectation that actual VOM emissions will be less than allowed by Condition 3(e).
- b. The Permittee shall become subject to the ERMS as a new participating source if the VOM emissions from the source are 10 tons or greater in any seasonal allotment period. In such case, the Permittee shall hold Allotment Trading Units (ATU) for its seasonal emissions in accordance with 35 IAC 205.150(d)(2) and 205.720. For this purpose, the source's

VOM emissions shall be determined by the methods and procedures specified in this permit or the Clean Air Act Permit Program (CAAPP) permit for the source.

- c. The Permittee shall promptly notify the Illinois EPA if the source's VOM emissions are 10 tons or greater in a season [see also Condition 13(e)(v)]. By December 1 of the year in which seasonal VOM emissions are first 10 tons or greater, the Permittee shall submit a request for a revision to this construction permit or the source's CAAPP permit to address applicable requirements of the ERMS. This request shall include a certification acknowledging that it will be required to hold ATUs by the end of each reconciliation period. [35 IAC 205.310(a) and (g)(2)].
- 7a. Under this permit, each 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. The Illinois EPA, upon request of the Permittee, may extend this period if additional time is needed to complete shakedown or perform emission testing.
- b. Upon successful completion of emission testing demonstrating compliance with applicable limitations, the Permittee may continue to operate the turbines as allowed by Section 39.5 (5) of the Environmental Protection Act. The Permittee shall submit a complete CAAPP application within 12 months after commencing operation.
- c. This condition supersedes standard Condition 6.
8. The Permittee shall furnish the Illinois EPA with written notification as follows with respect to commencement of construction and operation of the turbines:
 - a. The date construction of the turbines commenced postmarked no later than 30 days after such date, pursuant to 40 CFR 60.7(a)(1);
 - b. The actual date of initial startup of the turbines, postmarked within 15 days after such date, pursuant to 40 CFR 60.7(a)(3); and
 - c. The actual date that each turbine begins gainful operation, with electricity produced by the turbine available for sale at more than the minimum or avoided cost of the purchaser, postmarked within 15 days after such date.
9. Each turbine shall each be equipped, operated, and maintained with a continuous monitoring system to monitor and record the fuel consumption, pursuant to 40 CFR 60.334(a).
- 10a. The Permittee shall sample and analyze for the sulfur content of the fuel for the CTs in accordance with the Federal Acid Rain Program 40 CFR 75.11(d) [refer to Part 75, Appendix D, Section 2.3 for pipeline natural gas combustion] unless it elects to install and operate CEMS for emission of SO₂ from the CTs.
- b. Monitoring of fuel nitrogen content is not required while pipeline quality natural gas, as defined in 40 CFR 72.2, is being fired in the turbines.

- c. The above provisions establish a custom schedule for determination of sulfur content and nitrogen content of fuel, subject to case-specific approval by USEPA pursuant to 40 CFR 60.13(i), in which approval USEPA may establish additional requirements upon the Permittee for sampling and analysis of fuel. If USEPA does not approve a custom schedule for the turbines, the Permittee shall also sample and analyze for sulfur and nitrogen content of the natural gas being fired in the turbines in accordance with 40 CFR 60.334(b).
11. The Permittee shall install, operate, and maintain a Continuous Emissions Monitoring (CEM) system on turbines to measure emissions of NO_x. The applicable procedures under 40 CFR 75.12 and 40 CFR 75, subpart H shall be followed for the installation, evaluation, and operation of this NO_x CEM system.
- 12a. The nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic material (VOM), particulate matter (PM), and oxygen (O₂) concentrations in the exhaust of the turbines and the opacity of exhaust shall be measured by an independent testing service approved by the Illinois EPA as follows to determine compliance with the emissions limits in Condition 1 and 3:
- i. Within 60 days after operating a turbine at the greatest load at which it will normally be operated but not later than 180 days after its initial startup;
 - ii. Within 90 days after a written request from the Illinois EPA, for such pollutants listed above as specified by the request; and
 - iii. Any extension to these time periods that may be provided at its discretion by the Illinois EPA shall not alter the Permittee's obligation to perform emission testing for purpose of the NSPS in a timely manner as specified by 40 CFR 60.8.
- b. The following methods and procedures shall be used for testing of emissions:
- i. USEPA Reference Test Methods shall be used for emission testing, including the following methods:

Opacity	USEPA Method 9
Carbon Monoxide	USEPA Method 10
Volatile Organic Material	USEPA Method 18 or 25A
Nitrogen Oxides	USEPA Method 20
Particulate Matter	USEPA Method 5
Particulate Matter ₁₀	USEPA Method 201 or 201A (40 CFR 51, Appendix M)
 - ii. Measurements for NO_x shall be conducted in accordance with 40 CFR 60.335, as specified below, unless alternative testing procedures are approved by USEPA pursuant to 40 CFR 60.8(b):
 - A. The NO_x emissions shall be computed for each run using the equation in 40 CFR 60.335(c)(1).
 - B. The span values for Method 20 shall be 300 ppm of NO_x and 21 percent O₂, pursuant to 40 CFR 60.335(c)(3).

- C. The NO_x emissions shall be determined at four points in the normal operating range of the gas turbines, including the minimum point in the range and peak load, pursuant to 40 CFR 60.335(c)(2).
 - D. All loads shall be corrected to ISO conditions using the appropriate equations supplied by the manufacturer, pursuant to 40 CFR 60.335(c)(2).
- iii. Measurements for other pollutants shall be conducted as follows:
- A. CO, PM and VOM concentrations shall be measured at peak, intermediate and minimum gas turbine load and with wet compression for power augmentation. (Testing with wet compression need not be performed until the turbines are able to operate with wet compression.)
 - B. PM emissions measured by USEPA Method 5, including back half condensable particulate, may be provided as an alternative to measurement of PM₁₀ emissions using USEPA Method 201 or 201A.
 - C. Measurements for organic hazardous air pollutants in the VOM (e.g., formaldehyde, toluene, acetaldehyde, and acrolein) shall be provided if VOM emissions are measured by Method 18. (See also Condition 12(c)(iii).)
 - D. Unless continuous emissions monitoring is conducted for the particular pollutant, measurements shall also be performed for emissions of NO_x, CO and VOM during startup of a turbine, in accordance with a plan approved by the Illinois EPA. For purposes of these measurements, as approved by the Illinois EPA, the Permittee may adapt USEPA Reference Test Methods as necessary to address the short duration and transient conditions of startups.
- c. At least 60 days prior to the actual date of testing, a written test plan shall be submitted to the Illinois EPA for review. This plan shall describe the specific procedures for testing and shall include as a minimum:
- i. The person(s) who will be performing sampling and analysis and their experience with similar tests;
 - ii. The specific conditions under which testing shall be performed including a discussion of why these conditions will be representative of maximum emissions and the means by which the operating parameters for a turbine will be tracked and recorded;
 - iii. The specific determinations of emissions that are intended to be made, including sampling and monitoring locations; the test method(s) that will be used, with the specific analysis method, if the method can be used with different analysis methods; and identification of any organic hazardous air pollutants that will

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be measured. As part of this plan, the Permittee may set forth a strategy for performing emission testing of selected turbines provided that all turbines are fitted for testing; the identity of the turbines to be tested is determined immediately before testing, by the Illinois EPA or otherwise randomly; and continuous emission monitoring of NO_x is present on all turbines. The Permittee may also propose a plan for testing across the normal operating range of the turbines; and

- iv. The proposed plans for testing emissions during startup of a turbine as required by Condition 12(b)(iii)(D), including the number of startups for which measurements will be performed; the procedures that will be followed for startup of the turbine; the approach that will be generally followed to assure that measurements can be conducted for and will be representative of the startup period; any proposed adaptations to reference test methods; and any other significant considerations for testing of emissions during startup.
- d. 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.
- e. Three copies of the final reports for emission tests shall be forwarded to the Compliance Section in Springfield within 30 days after the test results are compiled and finalized. The final report from testing shall contain 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 conditions, including:
 - A. Fuel consumption (standard ft³);
 - B. Firing rate (million Btu/hr);
 - C. Turbine/Generator output rate (MW); and
 - 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 a file of the following items:

- i. Manufacturers specification of rated turbine load;
 - ii. The composition of fuel as determined in accordance with Condition 10;
 - iii. Heat content of the natural gas (Btu/ft³) being fired, with supporting documentation, on a quarterly basis;
 - iv. A copy of the Final Report(s) for emission testing conducted pursuant to Condition 12; and
 - v. Copies of opacity determinations taken for the source by qualified observer(s) using USEPA method 9.
- b. The Permittee shall maintain the following daily operating records:
- i. The quantity of fuel consumed for each CT (standard cubic feet);
 - ii. Period of time when wet compression is used for power augmentation;
 - iii. Actual operating hours for each turbine (total hours, hours for startup, and hours with wet compression on);
 - iv. Effective operating hours for each turbine with operating hours counted in accordance with Condition 3(c)(i), (ii) and (iii);
 - v. Facility operating hours on a daily basis. For this purpose, the Permittee shall consider the facility to operate for one hour if one or more turbines are operated during an hour. For example, if one turbine or four turbines operate from 12:00 noon to 6:00 PM on a day, in both cases, this shall count as six operating hours; and
 - vi. Fuel consumption and/or operating hours for each indirect heater.
- c. The Permittee shall maintain the following records related to each startup of the turbines:
- i. Date and time of startup;
 - ii. Whether operating personnel for the turbines or air environmental staff are on site during startup; and
 - iii. A description of the startup, if written operating procedures are not followed during the startup or significant problems occur during the startup, including detailed explanation.
- d. The Permittee shall keep inspection, maintenance, and repair logs with dates and the nature of such activities for each turbine, including the wet compression system.
- e. The Permittee shall maintain the following records related to emissions:
- i. Other data, not addressed above, used or relied upon by the Permittee to determine emissions;

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- ii. Fuel consumption and number of startups for each turbine, compiled on at least a monthly basis;
 - iii. The annual emissions of NO_x, SO₂, PM, VOM and CO for each month since the previous record with supporting calculations. NO_x emissions shall be based on data from the CEMS. All other emissions shall be calculated based on fuel consumption data and site-specific emission factors developed from emission test data or other methods approved by the Illinois EPA;
 - iv. NO_x emissions, from each turbine recorded hourly (in lb/mmBtu and lb or ton) by combining the pollutant concentration (in ppm) and diluent's concentration (in percent O₂ or CO₂) measurements according to the procedures in 40 CFR 75 Appendix F; and
 - v. Seasonal emissions of VOM (May through September) from the facility.
- f. The Permittee shall maintain records that identify:
- i. Any periods during which a continuous monitoring system was not operational, with explanation; and
 - ii. Any day in which emissions or operation exceeded an applicable standard or limitation.
- g. All records required by this permit shall be retained on site for a period of at least 3 years and shall be readily available for inspection and copying by the Illinois EPA upon request.
- h. The Permittee shall maintain records documenting annual review of its operating procedures (see Condition 4).
- 14a. The Permittee shall notify the Illinois EPA within 10 days if the total NO_x or CO emissions from the plant go above 160 tons/year, as calculated following condition 13(e)(iii). This notification shall explain whether this appears to be due to unusually high demand for power or represents levels of demand that may be expected to continue in the future.
- b. If there is any exceedance of the requirements of Conditions 1, 3 and 4 of this permit, as determined by the records required by this permit or by other means, 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.
- c. In conjunction with the Annual Emission Report required by 35 IAC Part 254, the Permittee shall provide:
- The operating hours of each turbine, the total number of startups, the total number of actual hours with wet compression on for power augmentation, and the total fuel consumption during the preceding calendar year.

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- d. The Permittee shall comply with applicable reporting requirements under the Acid Rain Program, with a single copy of such report sent to Illinois EPA. This copy shall be sent to the Division of Air Pollution Control, Compliance Unit.
 - e. If the emission testing required by Condition 12(a)(i) is not performed within 60 days of beginning gainful operation of a turbine, the Permittee shall submit a report summarizing NO_x, CO and VOM (or hydrocarbon) emissions of the turbines as determined by diagnostic measurements, e.g., combustion gas analyzers, during shakedown of the turbines.
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

Telephone: 217/782-5811 Fax: 217/782-6348

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
9511 West Harrison
Des Plaines, Illinois 60016

Telephone: 847/294-4000 Fax: 847/294-4018

- 16a. This Permit for the above referenced project does not relieve the Permittee from the responsibility to comply with all Local, State and Federal Regulations which are part of the applicable Illinois State Implementation Plan, as well as all other applicable Federal, State, and Local requirements.
- b. This permit does not excuse the Permittee from any new requirements that would be applicable to construction or operation of the turbines based on the timing of their actual installation.

Please note that additional rules addressing NO_x emissions from these turbines may be adopted in the near future in response to USEPA's so called "NO_x SIP call" and the development of Illinois's plans for attainment of the ozone air quality standard in the Chicago and Metro-East ozone nonattainment areas.

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If you have any questions concerning this permit, please contact Manish Patel at 217/782-2113.

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

DES:MNP

Attachment

CC: Region 1