

217/782-2113

CONSTRUCTION PERMIT

NSPS

PERMITTEE

Calumet Power, LLC  
Attn: Wayne A. Belko  
150 North Michigan Avenue, Suite 3900  
Chicago, Illinois 60601

Application No: 01040082

I.D. No.: 031600GKE

Applicants Designation:

Date Received: April 20, 2001

Subject: Gas Turbines (Power Production)

Date Issued:

Location: Calumet Power, 3141 East 96th Street, Chicago, Cook County

Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of eight simple cycle gas turbines (SCCT 1 - 8) (nominal plant capacity - 350 MWe, rated heat input 467 mmBtu/hr per turbine) and other 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<sub>x</sub>) 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 (SO<sub>2</sub>) 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 9,008 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 fire more than 472 million standard cubic feet of natural gas per year in "peak" mode (500 hours of operation). For purpose of this permit, peak mode means gas turbine operation above the normal rated capacity of the turbine, as specified by the equipment manufacturer, to supply additional output on a short-term basis with the potential for greater than normal wear on the turbine and increased frequency for periodic inspection and maintenance of the turbine.

d. i. Each turbine shall be equipped, operated, and maintained with dry low NO<sub>x</sub> combustors to control NO<sub>x</sub> 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 peak mode operation as addressed below. These limits are based on the information provided in the permit application. Compliance with these limits shall be determined emission testing in accordance with Condition 11 (3-run average).

NO <sub>x</sub> (Lb/Hr) <u>(Lb/mmBtu)<sup>1</sup></u>	CO (Lb/Hr) <u>(Lb/mmBtu)<sup>1</sup></u>	VOM (Lb/Hr) <u>(Lb/mmBtu)<sup>1</sup></u>	PM/PM <sub>10</sub> (Lb/Hr) <u>(Lb/Hr)</u>	SO <sub>2</sub> (Lb/Hr) <u>(Lb/Hr)</u>
24.5 (0.0524) <sup>1</sup>	14.37 (0.0308) <sup>1</sup>	1.77 (0.0038) <sup>1</sup>	4.2	1.28

<sup>1</sup> Based on Lower Heating Value (LHV) of the fuel

B. Notwithstanding the above, during peak mode operation of a turbine, NO<sub>x</sub> emissions shall not exceed 41 lb/hr (0.087 lb/mmBtu (LHV)).

e. i. The annual emissions from the facility (Total 8 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 <sub>x</sub>	245.8
CO	144.1
PM/PM <sub>10</sub>	42.1
VOM	17.8
SO <sub>2</sub>	12.8

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 11 (NO<sub>x</sub>, CO, VOM and PM/PM<sub>10</sub>) and analysis of fuel sulfur content or standard factors (SO<sub>2</sub>).

- B. Unless an alternative factor is established for the pollutant or emissions monitoring is performed for the pollutant, emissions of NO<sub>x</sub>, CO and VOM during an hour that includes a startup shall be presumed to be higher by a factor of 1.25, 1.5 and 10.0 respectively than the limits in Condition 3(d)(ii)(A), for example, NO<sub>x</sub> emissions during an hour with a startup shall be presumed to be 35.9 lb/hr rather than 24.5 lb/hr as allowed for normal operation. 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 11.)
- 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. i. 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.
  - A. The Permittee shall manage the operation of the turbines to minimize multiple startups of a turbine in a single day, unless the turbine is tripped off during startup, 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 11(b)(iii) has demonstrated compliance with the applicable hourly emission limits in Conditions 3(d)(ii) (see Condition 11(b)(iii)).

- C. The Permittee shall operate the turbines in accordance with written operating procedures that shall include at a minimum the following measures:
    - 1. Review of operating parameters of the unit during startup, or shutdown as necessary to make adjustments to reduce emissions; and
    - 2. 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 that shall include at a minimum the following measures:
    - 1. Periodic inspection of components of the turbines that affect emissions; and
    - 2. Timely replacement of components of the turbine that affect emissions that must be routinely replaced.
  - ii. The above procedures may incorporate the manufacturer's written instructions for operation and maintenance of the turbines. The Permittee shall review these procedures at least annually and shall enhance them as necessary to be consistent with good air pollution control practice based on actual operating experience and performance of the turbines.
- 5a. The turbines would qualify as Electrical Generating Units (EGU) for purposes of Part 217, Subpart W. As EGU, when this program becomes effective, the Permittee would have to hold NO<sub>x</sub> allowances for the NO<sub>x</sub> emissions of the turbines during each seasonal control period.
- b.
    - i. 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 less than 10 tons. This reflects an expectation that actual VOM emissions will be much less than allowed by Condition 3(e).
    - ii. 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, beginning with the following seasonal allotment period or the first seasonal allotment period. 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.

- iii. 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 12(e)(iv)]. 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 and an explanation of the means that it plans to obtain ATUs. [35 IAC 205.310(a) and (g)].

- 6a. 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.
  - c. This condition supersedes Standard Condition 6.
7. 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.
8. 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).
- 9a. 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) [sampling in accordance with Part 75, Appendix D, Section 2.3 for natural gas combustion unless it elects to install and operate CEMS for emission of SO<sub>2</sub> from the turbines].
- b. 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), unless USEPA approves a custom schedule for or waives such monitoring, in which case the Permittee shall comply with the terms of USEPA's approval.
- 10a. This permit is issued based on the turbines being gas-fired peaking units, 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 eight turbines shall be low mass emission units. SO<sub>2</sub> and NO<sub>x</sub> emissions will be less than 5 tons and 50 tons annually per turbine.

- b. Should the operation of a turbine exceed the above requirements relating to the definition of a low mass emissions 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.
- 11a. The nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), volatile organic material (VOM), particulate matter (PM), and oxygen (O<sub>2</sub>) 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 as follow:

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 <sub>10</sub>	USEPA Method 201 or 201A (40 CFR 51, Appendix M)
  - ii. Measurements for NO<sub>x</sub> 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<sub>x</sub> 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<sub>x</sub> and 21 percent O<sub>2</sub>, pursuant to 40 CFR 60.335(c)(3).

- C. The NO<sub>x</sub> 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.
  - B. PM emissions measured by USEPA Method 5, including back half condensable particulate, may be provided as an alternative to measurement of PM<sub>10</sub> 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 11(c)(iii).)
  - D. Unless continuous emissions monitoring is conducted for the particular pollutant, measurements shall also be performed for emissions of NO<sub>x</sub>, 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 be measured. As part of this plan, the Permittee shall propose a plan for testing across the normal operating range of the turbines, and the Permittee also may set forth a strategy for approval by the Illinois EPA 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<sub>x</sub> is present on all turbines.

- iv. The proposed plans for testing emissions during startup of a turbine as required by Condition 11(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 cubic feet);
    - 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.
  
- 12a. The Permittee shall maintain a file of the following items:
  - i. Manufacturers specification for rated turbine load;

- ii. The composition of fuel as determined in accordance with Condition 9;
- iii. Heat content of the natural gas (Btu/ft<sup>3</sup>) being fired, with supporting documentation, on a quarterly basis;
- iv. A copy of the Final Report(s) for emission testing conducted pursuant to Condition 11; and

- v. Copies of opacity determinations taken for the source by qualified observer(s) using USEPA method 9.
- b. The Permittee shall maintain following daily operating records for the turbines:
  - i. Fuel consumption (for each turbines) as monitored in accordance with Condition 8;
  - ii. Operating hours for each turbine ;
  - iii. 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 eight turbines operate from 12:00 noon to 6:00 PM on a day, in both cases, this shall count as six operating hours; and
  - iv. Ambient temperature, and turbine load (MWe), on a daily basis for each hour turbine is operated.
- c.
  - i. The Permittee shall maintain operating logs for each turbine, which at a minimum shall include daily information for operating hours, each period when a turbine operates in peak mode, fuel consumption and periods of time when inlet air-cooling is used;
  - ii. The Permittee shall keep inspection, maintenance, and repair logs with dates and the nature of such activities for each turbine.
- d. 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 operating problems occur during the startup, including detailed explanation.
- 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;
  - ii. Fuel consumption that also identifies consumption when turbine operated in peak mode, operating hours identifying peak mode hours

and number of startups for each turbine, compiled on at least a monthly basis;

- iii. The annual emissions of NO<sub>x</sub>, SO<sub>2</sub>, PM, VOM and CO, compiled on at least a monthly basis with supporting calculations; and
- iv. 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, if applicable, with explanation; and
  - ii. Any day in which emission and/or opacity exceeded an applicable standard or limit.
- g. The Permittee shall maintain records documenting annual review of its operating procedures (see Condition 4(b)(iv)).
- 13. 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.
- 14a. The Permittee shall notify the Illinois EPA within 10 days if CO or NO<sub>x</sub> emissions of the facility, go above 160 tons/year, as calculated following condition 12(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 through 5 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 fuel consumption, and the total fuel consumption in "peak" mode during the preceding calendar year.
- 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 Section.
- e. If the emission testing required by Condition 11(a)(i) is not performed within 45 days of beginning gainful operation of a turbine, the Permittee shall submit a report summarizing NO<sub>x</sub>, 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. In particular, this Permit does not relieve the Permittee from the responsibility to carry out practices during the construction and operation of the plant, such as application of water or dust suppressant sprays to unpaved traffic areas, to minimize fugitive dust and prevent an air pollution nuisance from fugitive dust, as prohibited by 35 IAC 201.141.

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

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

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cc: Region 1