

217/782-2113

CONSTRUCTION PERMIT -- NSPS

PERMITTEE

University Park Energy, LLC  
C/O Constellation Companies  
Attention: Todd R. Jaffe, Vice President of Development  
111 Market Place, Suite 200  
Baltimore, Maryland 21202

Application No: 99120020

I.D. No.: 197899AAB

Applicants Designation: UnivPark

Date Received: December 6, 1999

Subject: Gas Turbines (Power Production)

Date Issued: May 1, 2000

Location: Southwest of intersection of Central Ave. and Dralle Rd., University Park, Will County

Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of six Pratt & Whitney FT8 "Twin Pacs" - each twin pac consisting of two, aero-derivative natural gas fired turbines driving a shared electrical generator in a simple cycle, with a nominal capacity of 50 MWe per Twin Pac (Total 300 MWE) (rated heat input 247 mmBtu/hr per turbine), and other ancillary operations, 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 following equation, pursuant to 40 CFR 60.332 (a)(1), except as allowed by 40 CFR

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

60.332(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 any 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, including periods of startup, 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).
- 2a. 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 control 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 70.30(a)(2)(ii) and 72.32(a).
- b. This source is considered a "participating source" for purposes of the Emissions Reduction Market System (ERMS), 35 IAC Part 205. Pursuant to 35 IAC 205.150(c)(1) and 35 IAC 205.720, as of December 31 of each year, this source shall hold Allotment Trading Units (ATUs) in its account in an amount not less than the ATU equivalent of its VOM emissions during the preceding seasonal allotment period (May 1 - September 30), not including VOM emissions from insignificant emission units and activities, in accordance with 35 IAC 205.220, or the source shall be subject to "emissions excursion compensation."
- 3. The turbines shall each be equipped, operated, and maintained with water injection in the combustors.
- 4a. The only fuel fired at the facility shall be natural gas.
- b. The turbines, in total, shall not fire more than 4,443 million ft<sup>3</sup> of natural gas per year. Compliance with this limit shall be determined from a running total of 12 months of data.
- c. Hourly emissions from each turbine shall not exceed the following limits:

Nitrogen oxides (lb/hr)	Carbon Monoxide (lb/hr)	Particulate Matter/ PM <sub>10</sub> (lb/hr)	Volatile Organic Material (lb/hr)	Sulfur Dioxide (lb/hr)
30.0	18.3	3.0	2.3	0.5

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

- d. The annual emissions from the facility, including emission during startup, shall not exceed the following limitations. Compliance with these annual limitations shall be determined from a running total of 365 days of data with emissions calculated from operating data and emissions determined from testing in accordance with Condition 12 (NO<sub>x</sub>, VOM and CO) or standard emission factors (SO<sub>2</sub> and PM/PM<sub>10</sub>).

<u>Pollutant</u>	<u>Emissions (tons/year)</u>
NO <sub>x</sub>	245
CO	149.7
PM/PM <sub>10</sub>	27.0
VOM	18.5
SO <sub>2</sub>	3.6

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

5. The emission of smoke or other particulate matter from a turbine shall not have an opacity greater than 30 percent, pursuant to 35 IAC 212.123(a), except as allowed by 35 IAC 201.149, 212.123(b) or 212.124.
- 6a. Pursuant to 35 IAC 201.149, the Permittee is authorized to operate the turbines in excess of 30 percent opacity during startup pursuant to 35 IAC 201.262 provided that all reasonable efforts are made to minimize startup emissions. This authorization only extends for a period of up to 12 minutes following initial firing of fuel during each startup event.
  - b. The Permittee shall implement established startup procedures to minimize startup emissions. These procedures shall be reviewed and enhanced consistent with good air pollution control practice based on actual operating experience and performance of the turbines.
- 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. 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.
8. 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).
9. Each turbine shall each be equipped, operated, and maintained with a continuous monitoring system to monitor and record the fuel consumption and the ratio of water to fuel being fired, pursuant to 40 CFR 60.334 (a).
- 10a. The Permittee shall monitor sulfur content of the gas fired in the turbines pursuant to the applicable provisions in 40 CFR Part 75, Appendix D, Section 2.3 for pipeline natural gas combustion.
  - b. Monitoring of fuel nitrogen content is not required, as natural gas is the only fuel fired in the turbines.
  - c. The above provisions establish a custom schedule for determination of sulfur content and nitrogen content of fuel in accordance with 40 CFR 60.334 (b)(2) and USEPA's Custom Fuel Monitoring Document dated August 14, 1987, subject to case-specific approval by USEPA pursuant to 40 CFR 60.13(i).
- 11a. 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 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 a 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.
- 12a. Within 60 days after achieving the maximum production rate at which the natural gas fired stationary gas turbines will be operated, but not later than 180 days after initial startup, the nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), volatile organic material (VOM), and oxygen (O<sub>2</sub>) concentrations in the exhaust of the turbines 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 shall be computed for each run using the equation in 40 CFR 60.335(c)(1).
  - 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.
  - vi. Method 18 or 25A of 40 CFR 60, Appendix A, shall be used to determine VOM concentrations at peak turbine load.
  - vii. 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. As part of this plan, the Permittee may propose for approval by the Illinois EPA a strategy for performing emission testing of selected turbines provided that all turbines are fitted for testing; the identity of the engines to be tested is determined immediately before testing, by the Illinois EPA or otherwise randomly. The Permittee may also 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 conditions, including:
      - A. Fuel consumption (standard ft<sup>3</sup>);
      - B. Water consumption
      - C. Firing rate (million Btu/hr); and

- D. 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 10;
  - ii. Fuel consumption and ratio of water to fuel being fired for each turbine in accordance with Condition 9;
  - iii. Operating hours and fuel consumption for each turbine, on a daily basis;
  - iv. Startup procedures for turbines
- b. The Permittee shall maintain the following records related to startup of the turbines:
- i. The following information for each startup of the turbines:
    - A. Date and time of startup;
    - B. Whether operating personnel for the turbines 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 turbines when above normal opacity has been observed by source personnel as identified in (i) (B) above:
    - A. Name of observe, 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 [30 percent opacity] may have occurred during startup, with explanation if qualified observer was on site.
- c. The Permittee shall maintain copies of the following documents as its Compliance Master File for purposes of the ERMS [35 IAC 205.700(a)]:
  - i. Actual seasonal emissions of VOM from the source;
  - ii. A description of the methods and practices used to determine VOM emissions, as required by this permit, including any supporting documentation and calculations;
- d. The Permittee shall keep a maintenance/repair log for the turbines and water injection system on each turbine.
- e. 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 each turbine for each month since the previous record;
  - iii. Water consumed for water injection;
  - iv. The annual emissions of NO<sub>x</sub>, SO<sub>2</sub>, PM, VOM and CO for each month since the previous record with supporting calculations.
- f. 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.
- g. All records and logs required by this permit shall be retained at a readily accessible location at the source for at least three years from the date of entry and shall be available for inspection and copying by the Illinois EPA upon request. Any record retained in an electronic

format (e.g., computer) shall be capable of being retrieved and printed on paper during normal source office hours so as to be able to respond to an Illinois EPA request for records during the course of a source inspection.

- 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  
1701 South 1<sup>st</sup> Avenue, 12<sup>th</sup> Floor  
Maywood, IL 60153

Telephone: 708/338-7969 Facsimile: 708/338-7930

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

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

DES:TDP

