

217/782-2113

CONSTRUCTION PERMIT

PERMITTEE

Panhandle Eastern Pipeline Co.
Attn: Eric Estopinal
5444 Westheimer
Houston, Texas 77056-5306

Application No.: 00100026

I.D. No.: 149820AAB

Applicant's Designation: TURBINES

Date Received: October 10, 2000

Subject: Solar Turbines

Date Issued: May 14, 2001

Location: 4.5 Miles South of Atlas on Highway 96, Pleasant Hill

Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of two compressor turbines equipped with low-NO_x combustors, to replace existing six reciprocating engines, as described in the above-referenced application. This Permit is subject to standard conditions attached hereto and the following special condition(s):

1.0 Compressor Turbines

1.1 Unit 01: New Gas Turbines

1.1.1 Description

Gas turbines at this station are used to convey natural gas along the interstate pipeline. The gas turbines operate on natural gas.

1.1.2 List of Emission Units and Pollution Control Equipment

Emission Unit	Description	Applicable Regulations	Rated Output
1018 and 1019	Solar Gas Turbines Equipped with Low-NO _x Combustors	NSPS 40 CFR 60 Subparts A and GG	6,130 Hp Each (ISO Rated)

1.1.3 Applicability Provisions and Applicable Regulations

- a. An "affected gas turbine" for the purpose of these unit-specific conditions is a gas turbine that is subject to the NSPS for Stationary Gas Turbines, 40 CFR 60 Subparts A and GG, because the heat input at peak load is equal to or greater than 10.7 gigajoules per hour (10 mmBtu/hr), based on the lower heating value of the fuel fired and the gas turbine commenced construction, after October 3, 1977, and that has a heat input peak load less than or equal to 107.2 gigajoules per hour (100 mmBtu/hr). The Illinois EPA administers the NSPS for subject sources in Illinois pursuant to a delegation agreement with the USEPA.

b. Standard for Nitrogen Oxides:

- i. Pursuant to the NSPS, 40 CFR 60.332(a)(2), no owner or operator of an affected gas turbine shall cause to be discharged into the atmosphere from such gas turbine, any gases which contain nitrogen oxides in excess of:

$$\text{STD} = 0.0150 \frac{(14.4)}{Y} + F$$

Where:

STD = Allowable NO_x emissions (percent by volume at 15 percent oxygen and on a dry basis).

Y = Manufacturer's rated heat rate at manufacturer's peak load (kilojoules per watt hour), or actual measured heat rate based on lower heater value of fuel as measured at actual peak load for the facility. The value of Y shall not exceed 14.4 kilojoules per watt hour.

F = NO_x emission allowance for fuel-bound nitrogen calculated from the nitrogen content of the fuel in accordance with 40 CFR 60.332(a)(3).

c. Standard for Sulfur Dioxide

On and after the date on which the performance test required to be conducted by 40 CFR 60.8 is completed, every owner or operator subject to the provision of this subpart shall comply with one or the other of the following conditions:

- i. No owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any stationary gas turbine any gases which contain sulfur dioxide in excess of 0.015 percent by volume at 15 percent oxygen and on a dry basis.
- ii. No owner or operator subject to the provisions of this subpart shall burn in any stationary gas turbine any fuel which contains sulfur in excess of 0.8 percent by weight.

- d. The emissions of smoke or other particulate matter from each affected gas 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.

1.1.4 Non-Applicability of Regulations of Concern

- a. This permit is issued based on the affected gas turbine not being subject to 35 IAC 212.321 because due to the nature of this process, such rule cannot reasonably be applied.
- b.
 - i. The permit is issued based on the construction and operation of the new engines not constituting a major modification pursuant to the federal rules for Prevention of Significant Deterioration (PSD), 40 CFR 52.21 because it will be accompanied by a contemporaneous decrease in emissions from removal of six existing reciprocating engines, 1001 through 1006.
 - ii. Within 180 days of initial startup of each affected gas turbine, three existing engines shall be permanently removed from service. This will remove 5,400 hp capacity from the source for each 6,130 hp turbine.

1.1.5 Operational and Production Limits and Work Practices

- a. At all times, including periods of startup, shutdown, and malfunction, the Permittee shall, to the extent practicable, maintain and operate any affected gas turbine in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Illinois EPA or the USEPA which may include, but is not limited to review of operating and maintenance procedures, and inspection of the source [40 CFR 60.11(d)].
- b.
 - i. An affected gas turbine shall only be fired with natural gas.
 - ii. The rated output of each affected gas turbine shall not exceed 6,130 hp, ISO rated conditions.

- iii. Natural gas usage from the affected gas turbines shall not exceed 44 mmscf/month and 440 mmscf/year.

1.1.6 Emission Limitations

The affected gas turbine is subject to the following:

- a. i. Operation and emissions of each affected gas turbine shall not exceed the following limits:

Total Nitrogen Oxide Emissions		Carbon Monoxide Emissions		Volatile Organic Material Emissions	
<u>(Lb/Hr)</u>	<u>(tpy)</u>	<u>(Lb/Hr)</u>	<u>(tpy)</u>	<u>(Lb/Hr)</u>	<u>(tpy)</u>
4.78	25.0	7.11	35.0	0.16	1.31

These limits are based on the maximum operating rate. The annual limits are based on continuous operation (8,760 hr/yr), at the maximum rate.

- ii. The net change in NO_x emissions resulting from the installation of turbines 1018 and 1019, and the removal of engines 1001 through 1006 is a net decrease of 569.2 tpy (See Attachment 1).

1.1.7 Testing Requirements

- a. Within 60 days after operating an affected gas turbine at the greatest load at which it will normally be operated but not later than 180 days after its initial startup, the Permittee shall have emissions tests for the turbines performed by an approved testing service as follows:
- b. Emissions shall be measured at maximum load for NO_x, CO and VOM. Emissions shall also be measured at the minimum load, and two intermediate load levels for NO_x and CO.
- c. The following USEPA methods and procedures shall be used for testing of emissions. For each turbine, measurement of NO_x emissions shall be conducted and data collected in accordance with the test methods and procedures specified in 40 CFR 60.335, unless USEPA approves alternative procedures for testing:

Location of Sample Points	USEPA Method 1
Gas Flow and Velocity	USEPA Method 2
Flue Gas Weight	USEPA Method 3 or 3A
Moisture	USEPA Method 4
Nitrogen Oxides	USEPA Method 20
Carbon Monoxide	USEPA Method 10
Volatile Organic Material	USEPA Method 18 or 25A

* The Permittee may report all PM emissions measured by USEPA Method 5 as PM₁₀, including back half condensable particulate. If the Permittee reports USEPA Method 5 PM emissions as PM₁₀, testing using USEPA method 201 or 201A need not be performed.

- d. 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 the turbine will be tracked and recorded.
 - iii. The specific determinations of emissions that are intended to be made, including sampling and monitoring locations. 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 engine 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.
 - iv. The test method(s) which will be used, with the specific analysis method, if the method can be used with different analysis methods.
- e. The Illinois EPA shall be notified prior to these tests to enable it to observe these tests. Notification for the expected date of testing shall be submitted a minimum of 30 days prior to the expected date. Notification of the actual date and expected time of testing shall be submitted a minimum of 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 testing.

- f. Three copies of the Final Reports for these tests shall be forwarded to the Illinois EPA, 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 a description of sampling points, sampling train, analysis equipment, and test schedule;
 - iv. Detailed description of test conditions, including:
 - A. Fuel consumption (standard ft³);
 - B. Heat input (million Btu/hr);
 - C. Turbine output rate (hp); and
 - D. Turbine burner settings.
 - v. Data and calculations, including copies of all raw data sheets and records of laboratory analysis, sample calculations, and data on equipment calibration.

1.1.8 Monitoring Requirements

Pursuant to 40 CFR 60.334(b), the Permittee shall monitor sulfur content and nitrogen content of the fuel being fired in the affected gas turbine as follows unless such monitoring is waived or a custom schedule for sampling and analysis of fuel is approved by USEPA.

For natural gas, which is supplied without intermediate bulk storage, the values shall be determined and recorded daily.

The analysis may be performed by the Permittee, a service contractor retained by the owner or operator, the fuel vendor, or any other qualified agency [40 CFR 60.335(e)].

1.1.9 Recordkeeping Requirements

The Permittee shall maintain records of the following items for the affected gas turbines to demonstrate compliance with Conditions 1.1.1, 1.1.3, 1.1.5, and 1.1.6:

- a. An operating log for each affected gas turbine.
- b. An inspection, maintenance and repair log for each turbine.
- c. Natural gas fuel usage for each affected gas turbine, scf/mo and scf/yr;
- d. The sulfur content of the natural gas used in the affected gas turbine as monitored pursuant to Condition 1.1.8;
- e. The heat content of the natural gas used in the affected gas turbine, Btu/scf; and
- f. Monthly and annual aggregate NO_x, CO, and VOM emissions from the affected gas turbines shall be maintained, based on operating data and the applicable procedures in Condition 1.1.12, with supporting calculations.

1.1.10 Reporting Requirements

- a. The Permittee shall fulfill applicable notification and reporting requirements of the NSPS, 40 CFR 60:
- b. The Permittee shall promptly notify the Illinois EPA, of noncompliance with applicable requirements as follows:
 - i. Pursuant to 40 CFR 60.334(c), periods of excess emissions for sulfur dioxide that shall be reported are defined as follows:

Any daily period during which the sulfur content of the fuel being fired in the gas turbine may not comply with Condition 1.1.3(c) [40 CFR 60.334(c)(2)].
 - ii. Emissions of NO_x from each affected gas turbine in excess of the limits specified in Condition 1.1.6(b).

- c. Two copies of submittals and notification required by this permit shall be made to the Illinois EPA at the following:

Illinois Environmental Protection Agency
Division of Air Pollution Control
2009 Mall Street
Collinsville, Illinois 62234

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

1.1.11 Operational Flexibility/Anticipated Operating Scenarios

N/A

1.1.12 Compliance Procedures

- a. Compliance with Condition 1.1.3(c) is to be demonstrated by the sampling and analysis of natural gas for sulfur content required by Condition 1.1.8.
- b. i. Compliance with the emission limits in Condition 1.1.6 shall be based on the recordkeeping requirements in Condition 1.1.9 and the emission factors and formulas listed below, if the affected turbine is properly operated and achievement of these emission factors is confirmed by the emission testing data required by Condition 1.1.3. Otherwise, emissions shall be determined using the most appropriate emission factors selected based on good engineering judgment:

<u>Pollutant</u>	<u>Emission Factor</u> <u>(lb/scf)</u>
NO _x	0.129
VOM	0.010
CO	0.159

These are the emission factors for uncontrolled natural gas-fired gas turbines, Table 3.1-1, Volume I, Supplement B, October 1996 adapted for the heat rate of the affected gas turbines.

Gas Turbine Emissions (lb/mo) = NO_x, VOM or CO emissions = E.F. x Fuel Usage (in scf/mo)

ii. Blowdown Emissions

$10,000 \text{ scf/blowdown} \times 1.082 \text{ lb VOM/mmscf} \times$
 $\text{mmscf}/1,000 \text{ scf} = 10.82 \text{ lb}$
VOM/blowdown/turbine

VOM emissions (lb/yr) = $10.82 \text{ lb VOM/blowdown}$
per turbine $\times 75$ (number of blowdowns/turbine)

VOM emissions = $811.5 \text{ lb VOM/turbine}$

If you have any questions concerning this permit, please call Bob Smet at 217/782-2113.

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

DES:RPS:jar

cc: Region 2

ATTACHMENT 1

Netting Table

Change in NO_x Emissions in Tons/Year

Permitted increase in NO_x emissions in tpy:

Install Turbines 1018 and 1019: 50.0

Required decrease in actual NO_x emissions:

Remove Engines 1001 through 1006: 619.2

Net change in NO_x emissions = 50.0 - 619.2 = - 569.2 tons/year)

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