

217/782-2113

CONSTRUCTION PERMIT -- NSPS

PERMITTEE

Panhandle Eastern Pipeline Company  
Attn: Marc Phillips, Principal Engineer  
5444 Westheimer Road  
Houston, Texas 77056-5306

Application No.: 08040053

I.D. No.: 041804AAC

Applicant's Designation:

Date Received: April 21, 2008

Subject: Two New Turbines for Compressor Station

Date Issued:

Location: Tuscola Compressor Station, 575 E. Highway US 36, Tuscola

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<sub>x</sub> combustors, to replace eight existing 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 Natural Gas Fired Turbines

1.1 Description

This permit authorizes construction of two new gas fired turbines (Turbines 1221 and 1222), each with ISO rating of 10,310 HP at the Permittee's Natural Gas Pipeline compressor station West of Tuscola. The new turbines will replace eight existing engines (Engines 1208, 1209, 1212, 1213, 1214, 1215, 1216, and 1220), which will be permanently removed from the source or otherwise permanently disabled when the two new turbines begin operation.

This permit also addresses potential increase in the emissions for the existing three compressor engines (Engines 1217, 1218, and 1219) that are equipped with low-NO<sub>x</sub> combustion technology and will remain in service. This permit does not authorize any physical modifications or changes to the operation of these engines, which would increase design capacity of the engines. These engines shall continue to comply with the requirements or conditions that apply to the operations of the engines, including applicable emissions standards, testing, monitoring, recordkeeping, and reporting requirements established in the current Clean Air Act Permit Program (CAAPP) permit issued for the source.

1.2 List of Emission Units and Pollution Control Equipment

Unit	Description	Emissions Control
1221 and 1222	Solar Gas Turbines Equipped with Lean Pre-Mix Low-NO <sub>x</sub> Combustion Technology (Model 70-10302S), Maximum Nominal Heat Input Capacity 85.4 million Btu/hour, Nominal Output 10,310 Hp (ISO Rated)	Low-NO <sub>x</sub> Combustion Technology

### 1.3 Applicability Provisions and Applicable Regulations

- a.
  - i. An "affected turbine" for the purpose of these unit-specific conditions is a gas turbine described in Conditions 1.1.1 and 1.1.2.
  - b.
    - i. The affected turbines are subject to the federal New Source Performance Standards (NSPS) for New Stationary combustion Turbines, 40 CFR 60 Subparts A and KKKK, because their 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 turbines commenced construction, after February 18, 2005. The Illinois EPA administers the NSPS for subject sources in Illinois pursuant to a delegation agreement with the USEPA.
      - ii. Standard for Nitrogen Oxides:  
  
For the affected turbines, pursuant to the NSPS, 40 CFR 60.4320(a), the Permittee must comply with the nitrogen oxides (NO<sub>x</sub>) emission standards specified in Table 1 of 40 CFR Part 60 Subpart KKKK.
      - iii. Standard for Sulfur Dioxide  
  
For the affected turbines, pursuant to the NSPS, the Permittee must comply with the applicable sulfur dioxide (SO<sub>2</sub>) emission standard in 40 CFR 60.4330(a).
      - iv. Pursuant to the NSPS, 40 CFR 60.4333, the Permittee must operate and maintain the affected turbines and associated air pollution control and monitoring equipment in a manner consistent with good air pollution control practices for minimizing emissions at all times including during startup, shutdown, and malfunction.
  - c.
    - i. The emissions of smoke or other particulate matter from each affected turbine shall not have an opacity greater than 30 percent, pursuant to 35 IAC 212.123(a).

- ii. Notwithstanding the above, the Permittee is authorized to operate the affected turbines in violation of the applicable opacity standards in 35 IAC 212.123(a), during startup subject to the following provisions. This authorization is provided 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.
  - A. This authorization only extends for a period of up to 12 minutes following initial firing of fuel during each startup event. As provided by 35 IAC 201.265, this authorization does not shield the Permittee from enforcement for any such violation and shall only constitute a prima facie defense to such an enforcement action provided that the Permittee has fully complied with all associated terms and conditions.
  - B. To minimize startup emissions, the duration of startups, and the frequency of startups, the Permittee shall conduct startup of the affected turbines in accordance with the manufacturer's written instructions or other written instructions prepared and maintained on site and which shall include, at a minimum, review of the operational condition of turbines prior to initiating startup of the turbine and review of the operating parameters of turbines during each startup to make appropriate adjustments to the startup to reduce or eliminate excess emissions.
  - C. The Permittee shall fulfill applicable recordkeeping requirements of Condition 1.9(b).
  - D. Any startup that does not meet the requirements of this condition shall be considered a deviation so that the reporting requirements of Condition 1.10(b) apply.

#### 1.4 Non-Applicability Provisions

- a. i. The permit is issued based on this project not constituting a major modification pursuant to the federal rules for Prevention of Significant Deterioration (PSD), 40 CFR 52.21 for emissions of NO<sub>x</sub> and CO. This is because it will be accompanied by contemporaneous decreases in emissions from the removal of eight existing gas fired compressor engines. The net change in NO<sub>x</sub> and CO emissions

(comparing the past actual to future potential emissions from each emission unit) resulting from the installation of the affected turbines, the removal of Engines from service 1208, 1209, 1212, 1213, 1214, 1215, 1216, and 1220 and increased emissions for the existing Engines 1217, 1218, and 1219 is a net decrease of 786.5 tons per year of NO<sub>x</sub> and a net increase of 99.4 tons per year of CO. (See Attachment 1.) In addition, even if the actual emissions of Engines 1209, 1212, and 1213 are assumed to be zero, after compliance with 35 IAC Part 217, Subpart Q, the net change in NO<sub>x</sub> emissions would be a net decrease of 165.7 tons of NO<sub>x</sub> per year.

- ii. Within 180 days of initial startup of each affected turbine, four of the existing engines designated to be removed shall be permanently removed from service.
  - iii. If the Permittee is complying with 35 IAC Part 217, Subpart Q, relying on an emission averaging plan that includes existing Engine 1209, 1212, or 1213, not later than 60 days after such engines are permanently removed from service, the Permittee shall submit a revised emission averaging plan (or notify the Illinois EPA of its intent to terminate the plan at the end of the calendar year), in accordance with 35 IAC 217.390(d).
- b. The status of the affected turbines for purposes of NO<sub>x</sub> emission averaging plans under 35 IAC Part 217, Subpart Q, and Section 217.390.

Reserved

Note: The status of the affected turbines is currently being discussed by Panhandle and the Illinois EPA and may be clarified in conjunction with a rulemaking that is currently pending before the Illinois Pollution Control Board, R07-019.

- c. This permit is issued based on affected turbines not being subject to the emission standards of the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Stationary Combustion Turbines, 40 CFR 63 Subpart YYYYY because pursuant to a USEPA stay issued on August 18, 2004 (69 FR 51185), new lean premix gas-fired turbines, constructed or reconstructed after January 14, 2003, are temporarily relieved of the obligation to apply pollution controls and to comply with associated operating, monitoring, and reporting requirements of 40 CFR 63 Subpart YYYYY. However the owners and operators of such turbines must still meet the initial notification requirements of 40 CFR 63.6145 for such turbines.

- d. Pursuant to 40 CFR 60.4305(b), the affected turbines are not subject to the requirements of the NSPS, 40 CFR 60 Subpart GG, because they are subject to the requirements of the NSPS, 40 CFR 60 Subpart KKKK.
- e. This permit is issued based on the affected turbines not being subject to 35 IAC 212.321 because due to the nature of this process, such rule cannot reasonably be applied.

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 the affected turbines, 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 turbines. [40 CFR 60.11(d) and 60.4333(a)]
- b.
  - i. Affected turbines shall only be fired with natural gas.
  - ii. The rated output of each affected turbine shall not exceed 10,310 hp, ISO rated conditions.
  - iii. Natural gas usage for each affected turbine shall not exceed 63 mmscf/month and 740 mmscf/year.

1.6 Emission Limitations

- a. Emissions from the affected turbines shall not exceed the following limits. These limits are based on the maximum heat input rate, manufacturer's or standard AP-42 emission factors, and continuous operation. The hourly limits on emissions of NO<sub>x</sub>, CO, VOM, PM, and SO<sub>2</sub> shall not apply during startup of a turbine, when emissions shall be minimized in accordance with Condition 1.5(a).

Pollutant	Limits		
	Lbs/hour	Tons/year	
		Each	Total
Nitrogen Oxides (NO <sub>x</sub> )	9.45	41.4	81.8
Carbon Monoxide (CO)	15.9	69.7	139.4
Volatile Organic Materials (VOM)	3.5	15.3	30.6
Particulate Matter (PM)	0.6	2.5	5.0
Sulfur Dioxide (SO <sub>2</sub> )	0.3	1.3	2.6

- b. Compliance with these emission limits shall be determined in order of priority, using appropriate emission factors reflecting actual operation of the turbines, which shall be

derived from emission testing conducted in accordance with Condition 1.7-1, manufacturer's data, or standard emission factors.

- c. This permit is issued based on operation of Engines 1217, 1218 and 1219 following this project may be accompanied by levels of NO<sub>x</sub> and CO emissions that are above the levels that were indicated by the Permittee in the application for Construction Permit 04020034. Those emission levels were calculated based on the draft rules that the Illinois EPA has prepared to comply with USEPA's NO<sub>x</sub> SIP Call. Illinois' rules to comply with the NO<sub>x</sub> SIP Call were subsequently adopted, as 35 IAC Part 217, Subpart Q. The adopted rules provide for emissions averaging plans, pursuant to 35 IAC 217.390. Under an emission averaging plan the Permittee could comply with an overall NO<sub>x</sub> emission rate for 17 compressor engines located at its three pipeline stations in Illinois. This provides greater flexibility in the NO<sub>x</sub> emission rate achieved by individual engines than would have been provided under the draft rules. As a consequence, the utilization of Engines 1217, 1218 and 1219 and their NO<sub>x</sub> and CO emissions may increase from the levels that were previously indicated, as the Permittee manages the operation of its stations to comply with 35 IAC Part 217, Subpart Q, and adjust operations for the presence of the affected turbines.

Expected Changes in Emissions of Engines 1217, 1218, and 1219

Pollutant	Past Emissions <sup>1</sup>			Future Emissions		
	Each Engine		Total (Tons/yr)	Each Engine		Total (tons/yr)
	Lbs/hr	Tons/yr		Lbs/hr	Tons/yr	
NO <sub>x</sub>	15.0	65.7	197.1	60.0	262.7	788.1
CO	18.5	82.1	246.3	26.2	114.58	343.7

<sup>1</sup> Emissions are based on the potential emissions indicated in the application for Construction Permit 04020034

- d. Compliance with annual limits shall be determined on a monthly basis from the sum of the data for the current month plus the preceding 11 months (running 12 month total).

1.7-1 Testing Requirements

- a. Pursuant to 40 CFR 60.8, within 60 days after achieving the maximum production rate at which the affected turbines will be operated, but not later than 180 days after initial startup of turbines, the owner or operator shall conduct initial performance test(s) and submit the Illinois EPA a written report of the results of such test(s).

b. The Permittee shall conduct the initial performance test(s) in accordance with the applicable requirements of 40 CFR 60.4400 and 60.4415.

c. USEPA methods and procedures shall be used for testing, including the following methods, unless other USEPA supported methods are approved by the Illinois EPA as part of the its review of the test plan.

Carbon Monoxide	USEPA Method 10
Nitrogen Oxides	USEPA Method 7E
Volatile Organic Material	USEPA Methods 18 and 25A
Organic Hazardous Air Pollutants	USEPA Method 18
Opacity	USEPA Method 9

d. The Illinois EPA shall be notified prior to these tests to enable the Illinois EPA to observe these tests. Written notification for the expected date of testing shall be submitted a minimum of thirty (30) days prior to the expected date. Written 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 testing.

e. Three copies of the Final Reports for these tests shall be forwarded to the Illinois EPA, within 60 days after the completion of testing. 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 turbine operating conditions during testing, including, including fuel consumption (standard ft<sup>3</sup> of natural gas) or firing rate (million Btu/hr), calculated load (brake horsepower), and key operating parameters of the turbine.

v. Data and calculations, including copies of all raw data sheets and records of laboratory analysis, sample calculations, and data on equipment calibration.

- a. The Permittee shall conduct observations of operation and opacity of the affected turbines upon written request of the Illinois EPA. The Permittee may schedule these observations to take place during normal operation of the affected turbines.

#### 1.8-1 Monitoring Requirements

- a. The Permittee shall demonstrate compliance with the NSPS standard for NO<sub>x</sub> in accordance with 40 CFR 60.4340.
- b. If the Permittee elects operation in accordance with a parametric monitoring plan, as provided for by 40 CFR 60.4340(b), the Permittee shall comply with the applicable requirements for parameter monitoring plans in 40 CFR 60.4355.

#### 1.8-2 Fuel Sampling and Analysis

- a. The Permittee shall determine the total sulfur content of the fuel combusted in the turbines in accordance with 40 CFR 60.4360, 60.4365 and 60.4370.

#### 1.9 Recordkeeping Requirements

- a. The Permittee shall comply with the applicable recordkeeping requirements of the NSPS, 40 CFR 60 Subpart KKKK, for the affected turbines.
- b. The Permittee shall maintain the following records related to startup of each affected turbine, which at a minimum shall include:
  - i. Records of the source's established startup procedures for the affected turbine.
  - ii. Records for each startup of the affected turbine, including date and description of startup, e.g., startup following scheduled maintenance outage.
- c. The Permittee shall maintain records of the following items for each affected turbine to demonstrate compliance with the requirements of this permit:
  - i. A. An operating log, which shall include the operating hours for the turbine (hours/month, hours/year).
  - B. Inspection, maintenance, and repair log, including date and nature of activity.
  - ii. A. Natural gas fuel usage, (scf/month and scf/year).

- B. Number of startups totaled per month and per year.
- iii. A. Manufacturer's data for the turbine including emissions guarantees, horsepower or rated heat input capacity (mmBtu/hr), and operating and maintenance procedures suggested by the manufacturer.
- B. A file containing the hourly emission rate used by the Permittee to determine emissions of the turbine, for each pollutant, with supporting documentation.
- D. Monthly and annual NO<sub>x</sub>, CO, PM, SO<sub>2</sub>, VOM, and HAPs emissions from the turbine, with supporting documentation and calculations.
- d. The Permittee shall keep records for all opacity measurements made in accordance with USEPA Method 9 for the affected turbines that it conducts or that are conducted at its behest by individuals who are qualified to make such observations. For each occasion on which such measurements are made, these records shall include the formal report for the measurements if conducted pursuant to Condition 1.7-2(a), or otherwise the identity of the observer, a description of the measurements that were made, the operating condition of the affected engine, the observed opacity, and copies of the raw data sheets for the measurements.
- e. All records and logs required by this permit shall be retained at a readily accessible location at the source for at least five years from the date of entry and shall be made available for inspection and copying by the Illinois EPA or USEPA upon request. Any records 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 or USEPA request for records during the course of a source inspection.

#### 1.10 Reporting Requirements

- a. The Permittee shall comply with the applicable notification and reporting requirements of the NSPS, 40 CFR 60 Subpart KKKK, for the affected turbines.
- b. If there is a deviation of the requirements of this permit, not otherwise addressed pursuant to the reporting requirements of the NSPS, the Permittee shall submit a report to the Illinois EPA within 30 days after deviation. The report shall include a description of the deviation, the emissions released in accordance with the recordkeeping requirements, a copy of the relevant records, and a

description of steps taken to reduce emissions and future occurrences.

- c. Two copies of all reports, notifications, etc required by this permit 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:

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

1.11 Operational Flexibility/Anticipated Operating Scenarios

- a. This permit authorizes installation of manufacturer supplied replacement turbine or turbine components for the affected turbines, that takes place either as part of scheduled maintenance of the turbine or in the event of malfunction or unscheduled outage and subsequent repairs. This authorization does not address activities for which a construction permit is not required, such as routine preventive maintenance, minor replacement of turbine components, or activities that do not involve, either directly or indirectly, emission-related components or activities that do not involve, either directly or indirectly, emission-related components or assemblies of the turbines.
- b. This authorization is limited to activities that can be accommodated by the original installation of an affected turbine and that are performed in conjunction with an ongoing program of maintenance, repair, and replacement, so as to not constitute a modification of the engine with respect to the PSD or NSPS. The replacement turbine or turbine components must be in good operating condition and come from either the manufacturer or authorized dealer/service provider. This authorization does not extend to installation of a replacement turbine that is a different make and model than the original engine or to activities that are intended to, or would have the result of, increasing the design capacity of the affected turbine.
- c. This authorization does not address activities for which a construction permit is not required, such as

routine preventive maintenance, minor replacement of turbine components or assemblies, or activities that do not involve, either directly or indirectly, emission-related components or activities that do not involve, either directly or indirectly, emission-related components or assemblies of the turbine.

- d.
  - i. This authorization does not relax or otherwise revise any requirements and conditions that apply to the operation of the affected turbines, including applicable emission limits, monitoring, testing, recordkeeping, and reporting requirements of this permit, which shall continue to apply to the affected engine.
  - ii. This authorization also does not excuse the Permittee from any new regulatory requirements that are adopted and applicable to the affected engine
- e. The Permittee shall expeditiously have performance testing conducted on an affected turbine following replacement of the turbine, as required pursuant to the NSPS, 40 CFR 60 Subpart A and KKKK, if requested by the Illinois EPA or USEPA.
- f.
  - i. The Permittee shall maintain following records at the source for the replacement activities authorized by this permit:
    - A. A file containing the paperwork for original and replacement turbine or turbine components, including documentation for turbine model numbers, manufacturers date, serial numbers, and copies of the specifications for replacements.
    - B. Details of activities performed pursuant to this permit including, date that the turbine is removed from the service and the date the turbine is returned to service.
  - ii. Notwithstanding the provisions of the CAAPP permit, the records required by Condition 1.11(f)(i) shall be retained for at least five years after the date that the turbine is permanently removed from the service.
- g. The Permittee shall notify the Illinois EPA prior to carrying out activities pursuant to this Condition 1.11. This notification shall be submitted at least 15 days in advance or as soon as it is practicable to

do so, e.g., in the event of turbine failure. This notification shall include:

- i. A description of the activities that are to be performed and the expected schedule for the activities.
  - ii. A confirmation that the activities fall within the authorization provided by this permit, the replacement is or will be in good operating conditions, and the outage of a turbine will not prevent or interfere with compliance with applicable requirements for control of emissions, with supporting information.
- h. The authorization provided by Condition 1.11 for each affected turbine will terminate when the turbine is permanently removed from service or 30 days after notification from the Illinois EPA that this authorization is being terminated, whichever occurs first. As related to the replacement activities authorized by this permit, this condition supersedes Standard Condition 1.
- 1.12 a. The Permittee may operate the affected turbines and existing compressor Engines 1217, 1218, and 1219 with revised NO<sub>x</sub> and CO emission limits, pursuant to this construction permit until the CAAPP permit for the source is revised to address the affected turbines and changes to the existing compressor engines.
- b. The Permittee may operate the affected turbines with replacement turbines or turbine components, as authorized by Condition 1.11 until the CAAPP permit for the source is revised to address these provisions for the affected turbines.

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

Edwin C. Bakowski, P.E.  
Acting Manager, Permit Section  
Division of Air Pollution Control

Date Signed: \_\_\_\_\_

ECB:CPR:KMP:

cc: Region 3

**ATTACHMENT 1**Evaluation of Net Change in NO<sub>x</sub> and CO Emissions (Tons/year)**Table 1** - Future NO<sub>x</sub> and CO emissions from the new turbines (Turbine 1221 and 1222) and existing engines (Engines 1217, 1218, and 1219):

Units	Emissions (Tons/year)	
	NO <sub>x</sub>	CO
Turbine 1221 and 1222	82.8	139.3
Engines 1217, 1218, and 1219 <sup>1</sup>	788.1	343.7
Total	870.9	483

<sup>1</sup> The operation of Engines 1217, 1218 and 1219 following this project may be accompanied by levels of NO<sub>x</sub> and CO emissions that are above the levels that were indicated by the Permittee in the application for Construction Permit 04020034. Those emission levels were calculated based on the draft rules that the Illinois EPA has prepared to comply with USEPA's NO<sub>x</sub> SIP Call. Illinois' rules to comply with the NO<sub>x</sub> SIP Call were subsequently adopted, as 35 IAC Part 217, Subpart Q. The adopted rules provide for emissions averaging plans, pursuant to 35 IAC 217.390. Under an emission averaging plan the Permittee could comply with an overall NO<sub>x</sub> emission rate for 17 compressor engines located at its three pipeline stations in Illinois. This provides greater flexibility in the NO<sub>x</sub> emission rate achieved by individual engines than would have been provided under the draft rules. As a consequence, the utilization of Engines 1217, 1218 and 1219 and their NO<sub>x</sub> and CO emissions may increase from the levels that were previously indicated, as the Permittee manages the operation of its stations to comply with 35 IAC Part 217, Subpart Q, and adjust operations for the presence of the affected turbines.

**Table 2** - Past actual NO<sub>x</sub> and CO emissions from the engines that will be removed after this project (Engines 1208, 1209, 1212, 1213, 1214, 1215, 1216, and 1220) and existing engines (Engines 1217, 1218, and 1219):

Units	Emissions <sup>2</sup> (Tons/year)	
	NO <sub>x</sub>	CO
Engines 1208, 1209, 1212, 1213, 1214, 1215, 1216, and 1220	1319.5	182.3
Engines 1217, 1218, and 1219	160.3	201.3
Total	1657.4	383.6

<sup>2</sup> Actual emissions are based on the 24-consecutive months within the 10-year period prior to commencing construction of Turbines 1221 and 1222. The baseline actual emissions are the average annual actual emissions for year 2006-2007. (Refer to Table B-2 of the application.)

**Table 3** - Net Change in NO<sub>x</sub> and CO Emissions:

Time Period	Emissions (tons/year)	
	NO <sub>x</sub>	CO
Future ( <b>Table 1</b> )	870.9	483
Past ( <b>Table 2</b> )	1657.4	383.6
Change	-786.5	99.4
PSD Significant Threshold	40	100