

PREVENTION OF SIGNIFICANT DETERIORATION**Draft**PERMITTEE

Natural Gas Pipeline Company of America/Horizon Pipeline, LLC.
Attn: Kristine Akridge
370 Van Gordon Street, P.O. Box 281304
Lakewood, CO 80228-8304

Application No.: 01030010

I.D. No.: 197817AAA

Applicant's Designation: Station 113

Date Received: March 5, 2001

Subject: Gas turbines upgrade and new turbine installation

Date Issued: ----

Location: 23725 West County Farm Road, R.R. 8. Shorewood, Will County, 60431

This Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of a new Solar Taurus turbine model 70-T10302S and upgrade nine existing Solar Saturn model 10-T1400 turbines as described in the above-referenced application. This Permit is subject to standard conditions attached hereto and the following special condition(s):

In conjunction with this permit, approval is given with respect to the Prevention of Significant Deterioration of Air Quality Regulations (PSD) to construct and operate the above referenced project, in that the Illinois Environmental Protection Agency (Agency) finds that the application fulfills all applicable requirements of 40 CFR 52.21. This approval is issued pursuant to the Clean Air Act, as amended, 42 U.S.C. 7401 et. seq., the Federal regulations promulgated there under at 40 CFR 52.21 for Prevention of Significant Deterioration of Air Quality (PSD), and a Delegation of Authority agreement between the United States Environmental Protection Agency and the Illinois EPA for the administration of the PSD Program. This approval becomes effective in accordance with the provisions of 40 CFR 124.15 and may be appealed in accordance with the provisions of 40 CFR 124.19. This approval is also based upon and subject to the following findings and the conditions, which follow:

Findings

1. Natural Gas Pipeline Company of America (NGPL) and Horizon Pipeline, LLC (Horizon), have requested a permit to construct a new larger Solar Taurus Turbine and upgrade the existing nine smaller Solar Saturn Turbines, at the NGPL Compressor Station 113 located in Shorewood, Illinois.
2. Natural Gas Pipeline Company of America's Station 113 is located in Shorewood, Will County. The area is currently designated attainment for carbon monoxide (CO) and nitrogen oxide (NOx). The County has a Class II designation for Prevention of Significant Deterioration (PSD) permit review.
3. The proposed project will emit 368 tons/year and 184 tons/year of CO and NOx emissions respectively from the NGPL compressor station 113. The project is therefore subject to PSD review as a major modification of an existing minor source for CO emissions, emitting more than 250 tons/year

and a significant net emission increase for the NOx, emitting an increase of more than 40 tons/year.

4. After reviewing all the materials submitted by NGPL and Horizon, the Illinois EPA has determined that the project, as proposed, would (i) be in compliance with applicable Illinois Pollution Control Board emission standards and (ii) utilize Best Available Control Technology (BACT).
5. The air quality analysis submitted by NGPL and Horizon and reviewed by the Illinois EPA shows that the proposed project will not cause violations of the ambient air quality standards for carbon monoxide and nitrogen oxide. The air quality analysis also shows compliance with the allowable nitrogen oxide increment.
6. The Illinois EPA has determined that the project, as proposed, would comply with applicable Illinois Air Pollution Control Regulations and the federal rules for Prevention of Significant Deterioration of Air Quality (PSD), 40 CFR 52.21.
7. A copy of the application and the Illinois EPA's formal review of the application and a draft of this permit were placed in a location in the vicinity of the project, and the public was given notice and an opportunity to examine this material and to submit comments and to request a public hearing on this matter.

The Illinois EPA is issuing this approval subject to the following conditions and consistent with the specifications and data included in the application. Any departure from the conditions of this approval or terms expressed in the application would need to receive prior written authorization by Illinois EPA.

1.0 Unit Specific Conditions

1.1 Units: Ten (10) Natural Gas Compressor Turbines

1.1.1 Description

Natural gas fired compressor turbines at Station 113 are used to raise the pressure of the natural gas and move it along the pipeline, transporting natural gas from production areas to utilities and other customers.

1.1.2 List of Emission Units and Pollution Control Equipment

Emission Unit	Description	Applicable Regulations	Rated Output
ENG-10	One new Solar Taurus Turbine Equipped with Low-NO _x Combustor	NSPS 40 CFR 60 Subparts A and GG	10,300 Hp (ISO Rated)
ENG-1 through ENG-9	Nine existing Solar Saturn Turbines	NSPS 40 CFR 60 Subparts A and GG	1,450 Hp Each (ISO Rated)

1.1.3 Applicability Provisions and Applicable Regulations

a. The "affected gas turbines" for the purpose of these unit-specific conditions are the ten natural gas turbines that are 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 turbines 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 turbines 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.
- e. This permit is issued based on construction and operation of the affected turbines being a major modification that will emit more than the major source thresholds (i.e. 250 tons/year for CO and a increase of more than 40 tons of NOx). As a result the source will be required to obtain a Clean Air Act Permit Program (CAAPP) permit.

1.1.4 Non-Applicability of Regulations of Concern

This permit is issued based on the affected gas turbines not being subject to 35 IAC 212.321 because due to the nature of this process, such rule cannot reasonably be applied.

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 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 source [40 CFR 60.11(d)].
- b. i. The affected gas turbines shall only be fired with natural gas.
 - ii. Rated heat input capacity of the affected turbines shall not exceed 72.7 million Btu/hr for the larger turbine and 15.2 million Btu/hr for each of the smaller turbine (based on

lower heating value of the natural gas, determined at 60°F).

- iii. The nine smaller turbines(ENG-1 through ENG-9) shall not operate for more than 4,380 hr/yr average(total of 39,420 hours per year combined).

1.1.6 Emission Limitations

- a i. Emissions from the larger turbine (ENG-10)shall not exceed the following limits:

<u>Pollutants</u>	<u>Lb/Hr</u>
NOx	8.79
CO	10.70
SO2	0.33
VOM	0.20
PM	0.64

- ii. The larger turbine shall be equipped, operated and maintained with dry low-NOx burners.

- iii. Hourly emissions of NOx and CO shall not exceed 0.100 lb/million Btu and 0.122 lb/million Btu, respectively. (These limits are equivalent to emission rate of 0.51 and 0.63 grams per horsepower-hour, respectively).

- b. i. Emissions from each smaller turbine shall not exceed the following limits:

<u>Pollutants</u>	<u>Lb/Hr/Turbine</u>
NOx	7.36
CO	16.29
SO2	0.063
VOM	0.039
PM	0.121

- ii. The Permittee shall minimize operation of the smaller turbines below the preferred operating rate, which is 12 million Btu per hour percent load and higher (equivalent to 70 percent load and higher).

- iii A. Hourly emissions of CO from the smaller turbine when it is operating in the preferred operating range shall not exceed the following limits expressed in pound per million Btu per hour.

0.44 lb/million Btu if the ambient temperature is 75°F or above (This limit is equivalent to 2.2 gm/HP-hr).

0.9 lb/million Btu if the ambient temperature is less than 75°F but greater than 25°F (This limit is equivalent to 4.5 gm/HP-hr).

1.4 lb/million Btu if the ambient temperature is 25°F or below (This limit is equivalent to 6.7 gm/HP-hr).

B. When operating outside the preferred operating range CO emissions shall not exceed 2.054 lb/million Btu (This limit is equivalent to 11.25 gm/HP-hr).

iv. Emission of NOx from the smaller turbine when it is operating in the preferred operating range shall not exceed 0.439 lb/million Btu (This limit is equivalent to 2.15 gm/HP-hr).

The above requirements for emission of CO and NOx represent the application of the Best Available Control Technology (BACT) as required by Section 165 of the Clean Air Act.

c. Annual emissions from the affected gas turbines shall not exceed the following limits:

<u>Pollutants</u>	<u>Ton/Yr</u>
NOx	183.6
CO	368
SO2	2.67
VOM	4.93
PM	5.18

These limits are based on the maximum operating rate and continuous operation, 8,760 hr/yr for the larger turbine and 39,420 hr/yr total for the nine smaller turbines.

The VOM limit also addressed blowdowns, which are not addressed by the emission limits in Conditions 1,1,6(a) and (b).

1.1.7 Testing Requirements

a i. Within 60 days after operating an affected gas turbines 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:

ii. If the initial testing for the smaller turbines was not performed when the ambient temperature was

expected to be 25°F, emission testing shall also be performed during winter month when the ambient temperature is expected to be 25°F or below.

iii. If a substitute turbine is installed that has not previously been tested (refer to Condition 1.1.11), within 60 days after operating the substitute turbine at the greatest load at which it will normally be operated but not later than 80 days its initial startup;

b. NO_x and CO emissions shall be measured at peak load, one intermediate load level and at the lowest load readily achieved during testing. VOM emissions shall also be taken at this lowest load.

c. The following USEPA methods and procedures shall be used for testing of emissions. For each turbines, 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 25A

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 proposal for approval by the 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.

- 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 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 test conditions, including:
 - A. Fuel consumption (standard ft³);
 - B. Firing rate (million Btu/hr);
 - C. Ambient temperature.
 - 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)(2), the Permittee shall monitor sulfur content and nitrogen content of the fuel being fired in the affected gas turbines as follows unless such monitoring is waived or a custom schedule for sampling and analysis of fuel is approved by USEPA, in which case the Permittee shall comply with the terms of such approval.

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, including hours of operation, firing rate, ambient temperature and number of blowdowns/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. Heat content of the natural gas;
- e. The content of nitrogen and sulfur in the natural gas fuel used in the affected gas turbines shall be monitored pursuant to Condition 1.1.8;
- 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 60.7 (a) and (b).
- b. The Permittee shall submit an Annual Emission Report, in accordance with 35 IAC Part 254, with this report, the Permittee shall provide a summary of the hours of operation for each turbine, for smaller turbines, the average percentage of time turbines operated below 12 million Btu/hr and if this percentage is more than 20 percent of the actual operating hours or 200 hours, whichever is greater, an explanation showing why operation below 12 million Btu/hr could not be further minimized.

- c. 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 turbines may not comply with Condition 1.1.3(c) [40 CFR 60.334(c)(2)].
- ii. Emissions of NO_x from each affected gas turbines in excess of the limits specified in Condition 1.1.6(b).
- d. 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
9511 West Harrison
Des Plaines, Illinois 61614
Telephone: 847/294-4000 Fax: 847/294-4018

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

Pursuant to this permit, the Permittee is also authorized to construct and operate a "substitute turbine" in the place of an installed, subject to the following;

- a. For this purpose, a substitute turbine means a model of turbine that is identical or similar to the larger turbine or a smaller turbine, as appropriate, that has a heat input equal to or less than the installed turbine and that is provided by the turbine supplier as part of an established contractual agreement with the Permittee for support of the installed turbines.
- b. The Permittee shall notify the Illinois EPA within 30 days of installing a substitute turbine. This notification shall identify the substitute turbine, including model number, rated heat input capacity (LHV at 60°F) and serial number, description of the circumstance of the previously installed turbine and the nature of the maintenance or repairs that are expected to be performed. This notification shall also

include a copy of the emission test report for the substitute turbine, if emission testing has previously been performed on the substitute turbine. (If the substitute turbine has undergone reconstruction since it was last tested, additional emission testing may still be required (See Condition 1.1.7(a)(iii))).

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 as 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;
 - ii. For NO_x and CO, the emission factors and rates developed from those measured during emission testing, if the affected turbine is properly operated. Otherwise, emissions shall be determined using the most appropriate emission factors selected based on good engineering judgment.
 - iii. For SO₂, the sulfur content of natural gas as determined in accordance with Condition 1.1.8.
 - iv. For VOM and PM, appropriate emission factors, e.g., the emission factor from AP-42 Table 3.1-2a (7/2000) or engine specific factors.
- c. Blowdown Emissions

Emission of VOM from blowdown of the turbine, as required prior to startup of a turbine, shall be based on the following factors unless alternative data is more appropriate:

A. New turbine

13 thousand scf/blowdown x 0.9 lb
VOM/thousand scf gas = 11 lb VOM/blowdown

VOM emissions (lb/yr) = 11 lb
VOM/blowdown x (number of blowdowns per
year)

B. Existing turbines

4.38 thousand scf/blowdown x 0.9lb
VOM/thousand scf gas = 3.94 lb
VOM/blowdown/turbine

VOM emissions (lb/yr) = 3.94 lb
VOM/blowdown x (number of combined nine
turbines blowdowns per year)

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