

217/782-2113

CONSTRUCTION PERMIT - NSPS SOURCE

PERMITTEE

Midwest Gas Transmission Company - Station 2115
Attn: Heather N. Schneider
1001 Louisiana
Houston, Texas 77002

Application No.: 99050051 I.D. No.: 045803AAA
Applicant's Designation: 2115 UPRATE Date Received: February 7, 2000
Subject: Allison 501-KB Gas Stationary Turbine
Date Issued: September 7, 2000
Location: P.O. Box 523, Paris

Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of modification of existing stationary gas turbine to uprate from 3500 HP to 4400 HP as described in the above-referenced application. This Permit is subject to standard conditions attached hereto and the following special condition(s):

1.0 Unit Specific Condition

1.1 Unit 02: Gas Turbine

1.1.1 Description

Construction permit to uprate the existing turbine currently rated at 3500 HP to 4400 HP.

1.1.2 List of Emission Units and Pollution Control Equipment

Emission Unit	Description	Rated Heat Input
02	Gas Turbine	44.67 mmBtu/Hr

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, modification, or reconstruction after October 3, 1977, and that has a 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.

i. Standard for Nitrogen Oxides:

A. Pursuant to 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 as follows:

Fuel-Bound Nitrogen (Percent by Weight)	F (NO _x Percent by Volume)
$N \leq 0.015$	0
$0.015 < N \leq 0.1$	0.04 (N)
$0.1 < N \leq 0.25$	$0.04 + 0.0067(N - 0.1)$
$N > 0.25$	0.005

Where:

N = The nitrogen content of the fuel (percent by weight).

ii. Standard for Sulfur Dioxide

- A. Pursuant to 40 CFR 60.333(a), no owner or operator 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; or
- B. Pursuant to 40 CFR 60.333(b), no owner or operator shall burn in any stationary gas turbine any fuel which contains sulfur in excess of 0.8 percent by weight.
- c. No person shall cause or allow the discharge of more than 3.6 kg/hr (8 lb/hr) of organic material into the atmosphere from any emission unit, except as provided in 35 IAC 218.302, 218.303, or 218.304 and the following exemption: If no odor nuisance exists the limitation of 35 IAC 218 Subpart G shall only apply to photochemically reactive material [35 IAC 218.301].

1.1.4 Non-Applicability of Regulations of Concern

- a. As a consequence of the limits in Condition 1.1.6, this permit is issued based on the uprating of the affected gas turbine not constituting a new major source or major modification subject to Prevention of Significant Deterioration (PSD), 40 CFR 52.21.
- b. The affected gas turbine is not subject to 35 IAC 216.121, emissions of carbon monoxide from fuel combustion emission units, because the affected gas turbine is not by definition a fuel combustion emission unit.
- c. The affected gas turbine is not subject to 35 IAC 217.121, emissions of nitrogen oxides from new fuel combustion emission sources, because the actual heat input of each unit is less than 73.2 MW (250 mmBtu/hr) and the affected gas turbine is not by definition a fuel combustion emission unit.
- d. This permit is issued based on the affected gas turbine not being subject to 35 IAC 212.321 because due to the unique nature of this process, such rules 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 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, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source [40 CFR 60.11(d)].
- b. An affected gas turbine shall only be fired with natural gas.

1.1.6 Emission Limitations

Operation and emissions of the affected gas turbine shall not exceed the following limits:

Pollutant	(Lb/Hr)	(Ton/Yr)
NO _x	18.39	56.00
CO	6.35	19.34
VOC	0.70	2.13
SO ₂	0.03	0.09

These limits are based on the maximum actual heat input, the maximum hours of operation (6,090 hr/yr), and the manufacturer's guaranteed emission data (based on stack testing). Compliance with the annual limits shall be determined from the running total of 12 months of data.

As a consequence of uprating the affected turbine, the net increase in NO_x is 37.98 tons/year based on a proposed annual increase to 56.00 tons/year after the uprate, relative to an actual emission rate of 18.02 tons/year prior to the uprate. Emission increases of CO and other criteria pollutants are well below their PSD significance thresholds.

1.1.7 Testing Requirements

- a. To compute the nitrogen oxide emission limit standard, the Permittee shall use analytical methods and procedures that are accurate to within 5 percent and are approved by the Illinois EPA or the USEPA to

determine the nitrogen content of the fuel fired [40 CFR 60.335(a)].

- b. The Permittee shall determine compliance with the sulfur content standard as follows: ASTM D2880-71 shall be used to determine the sulfur content of liquid fuels and ASTM D1072-80, D3031-81, D4084-82, or D3246-81 shall be used for the sulfur content of gaseous fuels. The applicable ranges of some ASTM methods mentioned above are not adequate to measure the levels of sulfur in some fuel gases. Dilution of samples before analysis (with verification of the dilution ratio) may be used, subject to the approval of the Illinois EPA or the USEPA [40 CFR 60.335(d)].
- c. To meet the requirements of 40 CFR 60.334(b), the owner or operator shall use the methods specified in 40 CFR 60.335(a) and (d)) to determine the nitrogen and sulfur contents of the fuel being burned. 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)].

1.1.8 Monitoring Requirements

Pursuant to 40 CFR 60.334(b)(2) and approved custom schedule, the Permittee shall monitor sulfur content and nitrogen content as follow for the fuel being fired in an affected gas turbine:

- a. Monitoring of fuel nitrogen content shall not be required while natural gas is the only fuel fired in the gas turbine.
- b. Sulfur monitoring.
 - i. Analysis for fuel sulfur content of the natural gas shall be conducted using one of the approved ASTM reference methods for the measurement of sulfur in gaseous fuels, or an approved alternative method. The reference methods are: ASTM D1072-80; ASTM D3031-81; ASTM D3246-81; ASTM D4084-82 as referenced in 40 CFR 60.335(B)(2).
 - ii. Effective the date of this custom schedule, sulfur monitoring shall be conducted twice monthly for six months. If this monitoring

shows little variability in the fuel sulfur content, and indicates consistent compliance with 40 CFR 60.333, then sulfur monitoring shall be conducted once per quarter for six quarters.

- iii. If after the monitoring required in Condition 1.1.8(b)(ii) above, or herein, the sulfur content of the fuel shows little variability and, calculated as sulfur dioxide, represents consistent compliance with the sulfur dioxide emission limits specified under 40 CFR 60.633, sample analysis shall be conducted twice per annum. This monitoring shall be conducted during the first and third quarters of each calendar year.
 - iv. Should any sulfur analysis as required above indicates noncompliance with 40 CFR 60.333, the owner or operator shall notify the Illinois EPA of such excess emissions and the custom schedule shall be re-examined by the USEPA. Sulfur monitoring shall be conducted weekly during the interim period when this custom schedule is being re-examined.
- c. If there is a change in fuel supply, the owner or operator must notify the state of such change for re-examination of this custom schedule. A substantial change in fuel quality shall be considered as a change in fuel supply. Sulfur monitoring shall be conducted weekly during the interim period when this custom schedule is being re-examined.
 - d. Records of sample analysis and fuel supply pertinent to this custom schedule shall be retained for a period of three years, and shall be available for inspection by personnel of federal, state, and local air pollution control agencies.

1.1.9 Recordkeeping Requirements

The Permittee shall maintain records of the following items for the affected gas turbine:

- a. Natural gas fuel usage for the affected gas turbine, ft³/mo and ft³/yr;

- b. Records of the monitoring requirements of Condition 1.1.8.
- c. Operating hours of the affected gas turbine.
- d. Monthly and annual aggregate NO_x, PM, SO₂, and VOM emissions from the affected gas turbine shall be maintained, based on fuel consumption, operating hours, and the applicable emission factors in Condition 1.1.12, with supporting calculations.

1.1.10 Reporting Requirements

The Permittee shall promptly notify the Illinois EPA, Compliance Section of noncompliance with the control and operating requirements as follows:

- a. The Permittee shall follow all applicable reporting requirements pursuant to 40 CFR 60.334(c).
- b. Emissions of NO_x from the affected gas turbine in excess of the limits specified in Condition 1.1.6 based on the current month's records plus the preceding 11 months within 30 days of such an occurrence.

1.1.11 Operational Flexibility/Anticipated Operating Scenarios

N/A

1.1.12 Compliance Procedures

Compliance with the emission limits shall be based on the recordkeeping requirements in Condition 1.1.9 and standard emission factors and formulas for normal operation of the engine, unless other more representative emission data becomes available listed below:

Natural gas combustion emissions.

To determine compliance with Condition 1.1.6, the natural gas combustion emissions from the affected gas turbine shall be calculated based on the following emission factors:

<u>Pollutant</u>	<u>Emission Factor (Lb/Hr)</u>
NO _x	18.39

CO	6.35
SO ₂	0.03
VOM	0.70

These emissions factors are based on the most recent stack test conducted on the engine.

If you have any questions on this, please call Minesh Patel at 217/782-2113.

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

DES:MVP:jar

cc: Region 3