TECHNICAL SUPPORT DOCUMENT (TSD)

ISSUED MARCH 2009
(REVISED AUGUST 2009)

I. GENERAL COMMENTS:

A. Company Information

1. El Paso Natural Gas Company (Vail Compressor Station)
2. 10200 South Rita Road, Tucson, Arizona 85706

B. Background

This facility previously operated under five-year air quality permit issued in 2003. Since conception the facility has operated as a natural gas compressor station.

Historical records indicate that El Paso Natural Gas Company has not had any major air quality violations. Past minor enforcement actions worth noting are presented in III.A of the TSD.

This technical support document is a review of the permit application dated June 26, 2008, received on July 01, 2008.

C. Attainment Classification

This facility is located in an area which is in attainment for all pollutants.

II. SOURCE DESCRIPTION

El Paso Natural Gas Company (EPNG) provides natural gas transportation services for natural gas suppliers and end users throughout the southwestern United States. Vail station is one of the natural gas compressor stations in the EPNG network. Its purpose is to compress natural gas to meet the pressure and volume demands of the customer. Compression is accomplished by three (3) turbines that drive the compressor units. Because these turbines have been automated, Vail station is an unattended location. Primary electric power at the Vail station is purchased power i.e. EPNG Vail station does not have auxiliary engines for power generation.

The Standard Industrial Classification (SIC) code for EPNG Vail station is 4922. The North American Industry Classification System (NAICS) code for EPNG Vail station is 48621.

A. Process Description

From a common pipeline system, natural gas can flow into each of three centrifugal compressors connected in series. As indicated above, the compressors are driven by three (3) natural gas fueled turbine engines. Each turbine engine operates independently or in series depending on the amount of natural gas being transported to various customers along the pipeline system.

The gas turbine stacks are the primary sources of air pollutant emissions. The primary pollutants present in the stack gases resulting from combustion of natural gas are Nitrogen Oxide (NO_X) and Carbon Monoxide (CO). Aldehydes, SO_2, and VOCs are other trace pollutants present in the stack gases. Other equipment on site is comprised mainly of valves, compressor seals, connections and associated piping. Emissions from these units are mainly trace amounts of VOCs.

B. Air Pollution Control Equipment

Not applicable to the EPNG Vail station, as there is no air pollution control equipment at this facility.

III. REGULATORY HISTORY

The EPNG Vail station was first permitted in 1974 and has undergone regular inspections to date. The facility has been in compliance with applicable regulatory requirements throughout its regulatory history.

The facility is currently in compliance with their permit conditions.

A. Testing & Inspections

There are no emissions limits or standards for the two primary air pollutants Nitrogen Oxide (NO_X) and Carbon Monoxide (CO) that are emitted from the from turbine engines.

On April 1, 2003, each natural gas fired turbine at the EPNG Vail facility was tested as per the specific conditions in the air quality operating permit. The Permittee used EPA approved reference test methods to conduct the performance tests. The primary air pollutants tested include NO_X and CO.

The results of the performance test meet compliance with the conditions of the permit.

B. Excess Emissions

The facility has submitted no reports of excess emissions.

IV. EMISSIONS ESTIMATES

Primary Pollutants:

NO_X	Nitrogen Oxide	VOC	Volatile Organic Compounds
CO	Carbon Monoxide	H_2CO	Formaldehyde (Federally listed Hazardous Air Pollutant)
SO_2	Sulfur Dioxide		

Hazardous Air Pollutants: (As identified in AP-42, 1/95 (fifth) edition, Table 3.1-3:

1,3-Butadiene, Acetaldehyde, Acrolein, Benzene, Ethylbenzene, Formaldehyde, Naphthalene, PAH, Propylene Oxide, Toluene, Xylenes.

A. Test Data

EPNG submitted test data (not performance tests) for each gas turbine engine.

	Facility Wide Emissions
NO_X = Test data plus 30% safety factor (≈30 lb/hr)(4.38) = 131.4 tpy	394.2 tpy
CO = Test data plus 66% safety factor (≈10 lb/hr)(4.38) = 43.8 tpy	131.4 tpy
SO_2 = (0.846 E^{-3} lb/MMBtu)[1] (13.472 MMBtu/hr)(4.38) = 0.05 tpy	0.15 tpy
VOC = (2.1 E-3 lb/MMBtu)(13.472 MMBtu/hr)(4.38) = 0.124 tpy	0.37 tpy
H_2CO = (0.04 g/hp-hr)(1 lb/453.6 g)(5290 hp)(4.38) = 2.043 tpy	6.13 tpy

1 (SO_2 emission factor = 0.94S, where S=0.9)

B. AP-42 Emission Factors

Criteria pollutant emissions are calculated below using AP-42 factors from the 1/95 (fifth) edition, Table 3.1-1 and 3.1-2a. Formaldehyde (H_2CO) is the largest contributor of the hazardous air pollutants listed in the EPA AP-42, Table 3.1-3. The emissions of H_2CO are provided as an indication of significance only. Emissions for all other listed HAPs are likely to be significantly lower and are therefore omitted in this emission determination. SO_2 and VOC emissions are calculated from EPA AP-42, Table 3.1-2a.

Emission factors were calculated assuming a maximum engine power rating of 5290 hp = 13.472 MMBtu/hr

	Facility Wide Emissions
NO_X = (3.2 E^{-1} lb/MMBtu)(13.472 MMBtu/hr)(4.38) = 18.88 tpy	56.64 tpy
CO = (8.2 E^{-2} lb/MMBtu)(13.472 MMBtu/hr)(4.38) = 4.83 tpy	13.14 tpy
SO_2 = (0.846 E^{-3} lb/MMBtu)(13.472 MMBtu/hr)(4.38) = 0.05 tpy	0.15 tpy
VOC = (2.1 E-3 lb/MMBtu)(13.472 MMBtu/hr)(4.38) = 0.124 tpy	0.37 tpy
H_2CO = (7.1 E^{-4} lb/MMBtu) (13.472 MMBtu/hr)(4.38) = 0.04 tpy	0.13 tpy

C. Emissions Test Data Dated April 1, 2003

SO_2 and VOC emissions are calculated from EPA AP-42, Table 3.1-2a.
Formaldehyde emissions are calculated using data from Table 18 of EPA-450/4-91-012, assuming an engine power of 5290 hp (see Table 11-1, page 8, of EPNG's Title V permit application.).

The worst case performance data (dated April 22, 2003) was for the A-1 (Serial Number 95062) turbine.

	Facility Wide Emissions
NO_X = 19.83 lbs/hr = 86.855 tpy	260.56 tpy
CO = 7.43 lbs/hr = 32.543 tpy	97.63 tpy
SO_2 = (0.846 E^{-3} lb/MMBtu)(13.472 MMBtu/hr)(4.38) = 0.05 tpy	0.15 tpy
VOC = (2.1 E-3 lb/MMBtu)(13.472 MMBtu/hr)(4.38) = 0.124 tpy	0.37 tpy
H_2CO = (0.04 g/hp-hr)(1 lb/453.6 g)(5290 hp)(4.38) = 2.043 tpy	6.13 tpy

D. Emissions Summary

Table 1
Potential Emissions Summary – EPNG Vail Station GE M3002-RA Turbines

Pollutant	EPNG Title V Application (tpy)	AP-42 (Fifth Edition) Table 3.2-2 (tpy)	Performance Test Data (+ 10% Safety Factor) (tpy)
NO_X	394.2	56.64	286.62
CO	131.4	13.14	107.39
SO_2	0.15	0.15	0.17
VOC	0.37	0.37	0.41
H_2CO	6.13	0.13	6.74

PTE estimates assume 8760 hrs/yr operation. There are three GE-M3002-RA gas turbines as the Vail station facility. The emissions in the table above are for all three turbine engines.

With the inclusion of the sought 30 % and 66 % safety factor for NO_X and CO respectively, the data in Table 1 indicates that the emission calculations submitted by EPNG in their Title V permit application for the Vail station, exceed the emission levels measured during performance testing and exceed the emissions calculated

with current AP-42 factors. The NO_X and CO emissions on a per unit basis were taken from the previous permit; however these lbs/hr emission rates are not representative of the emission rates in the referenced stack test.

PDEQ has not approved and therefore not processed the sought increase in NO_X and CO emissions (using a 30% and 66% safety factor for NO_X and CO respectively for the following reasons:

1. Historic records of actual emissions reported in the emissions inventory (EI) are presented below.

Table 2
Actual Emissions (tpy) – EPNG Vail Station GE M3002-RA Turbines

Pollutant	Year					
	2002	2003	2004	2005	2006	2007
NO_X	3.04	2.96	9.19	10.25	17.88	18.75
CO	0.78	1.15	2.08	2.59	6.72	6.67
SO_2	0.03	0.03	0.04	0.05	0.15	0.11
VOC	0.02	0.02	0.03	0.59	0.65	0.63
H_2CO	ND	ND	0.06	0.07	0.17	0.14
C_2H_4O	ND	ND	ND	0.07	0.18	0.14

ND No Data C_2H_4O Acetaldehyde (Federally listed Hazardous Air Pollutant)

The data presented in Table 2 indicates that the emissions of the primary pollutants have typically increased over the years; however the source has operated significantly below the potential emission levels presumably since it's inception in 1974.

2. The emission rate (per unit basis) used in the emissions inventory are process simulation estimations from a computer program. These emission estimations were accepted to represent the facility emissions prior to performance test data being available. The sole performance test data (dated April 22, 2003) is more representative of the potential emissions from the facility.

The potential emissions for the facility shall be taken as those calculated from using the performance test data (dated April 22, 2003), including a modest 10% safety factor to represent maximum operating conditions.

E) Emissions from Insignificant Activities:

The following emission activity is insignificant for the following reason:

Facility Shut Down:

When the turbine or entire facility is shut down, all emissions from the equipment and piping is vented to the atmosphere. EPNG has presented data in the renewal application that demonstrates this event, referred to as 'blow down', resulting in insignificant emissions of VOCs approximately 0.14 tons of VOCs (EPNG application dated July 2008, Tab E).

Lubricating Oil Tanks:

Any other activity which the Control Officer determines is not necessary, because of its emissions due to size or production rate, to be included in an application in order to determine all applicable requirements and to calculate any fee under this title

V. APPLICABLE REQUIREMENTS

State Implementation Plan, Pima County:

Rule 321	Emissions-Discharge: Opacity Limiting Standards and Applicability
Rule 343	Visibility Limiting Standard
Rule 344	Odor limiting Standard

Non-Federally Enforceable Regulations:

Pima County Code (PCC) Title 17, Chapter 17.16:

17.16.030	Odor Limiting Standards
17.16.040	Standards and Applicability (Visible Emissions)
17.16.050	Visibility Limiting Standards
17.20.010	Source Sampling, Monitoring and Testing
17.28.065	Excess Emissions

Requirements specifically identified as not applicable

The three gas turbines were installed in 1953 and as such are not subject to the provisions of any of the new source performance standards (NSPS). A NSPS for gas turbines was promulgated on 9/10/1979 and is listed as Subpart GG of 40 CFR 60 and contains NO_X and SO_2 standards. The Pima County Code (PCC) that covers gas turbine operations is PCC 17.16.340: Standards of performance for existing stationary rotating machinery. This PCC rule considers emissions of the following: particulate matter, visible emissions and sulfur dioxide. There is no reference to NO_X or CO emissions.

VI. PERMIT CONTENTS

A. Emission Limits/ Standards:

Particulate Matter Standard	SIP Rule 322, PCC 17.16.340.C.1
Visibility Standards	SIP Rule 321 & PCC 17.16.340.E; SIP Rule 343, PCC 17.16.050.D
Fuel Limitation	PCC 17.12.180.A.2
Odor Limiting Standard	SIP 344 & PCC 17.16.030

B. Monitoring and Recordkeeping Requirements: PCC 17.12.180.A.3 & 4

Visibility Limiting Standard (Revised July 2009)
The source applied for a minor revision to the language in the current permit issued on April 1, 2009.

Fuel Sulfur Content Monitoring
Operational Hour Monitoring
Recordkeeping

C. Reporting Requirements: PCC 17.12.180.A.5 & PCC 17.12.210

Semiannual Compliance Certifications
Fuel Sulfur Content
Operational Hours
Performance Test Results
Monitoring Results
Annual Emissions Inventory

D. Testing Requirements: PCC 17.20.010

There are no emission limits or standards for NO_X, and CO. The last performance test conducted on the turbines was conducted in April, 2003. The ADEQ policy on mass emissions testing (Policy 0102.000, June 5, 1996) requires testing gas turbines for NO_X every third year. Since the Vail station is operated on an intermittent basis, fixing a specific time schedule may result in EPNG operating the turbines solely for the purpose of complying with the requirements of the testing section. Therefore, the testing requirement of the turbines is based on an agreed upon trigger between EPA Region 9, PDEQ and EPNG. EPNG will be required to test when the Vail station turbines are operated beyond 360 cumulative hours during the permit term. While designing the aforementioned time schedule, PDEQ understands that pipeline operating conditions fluctuate, and the turbines may have to be fired on short notice. In order to be prepared to test on short notice, it may be advisable for EPNG to submit any required test plans well in advance of any anticipated dates of turbine operations.

Conditional NO_X and CO Testing (when turbine is operated beyond 360 cumulative hours).
Odor testing if requested by Control Officer.

E. Alternate Operating Scenarios:

None, EPNG retains the capacity to operate its compressor engines at maximum capacity for the maximum number of available hours.

F. Miscellaneous Comments:

Permitting History:

April 1974:	Source submitted first permit application for the facility.
January 1995:	Source submitted renewal application for first 5-year permit.
June 2003:	Source submitted renewal application for 5-year permit.
July 2008:	Source submitted renewal application for 5-year permit.

Particulate matter:

It can be demonstrated that the particulate emissions standard cannot be exceeded by showing that the particulate matter potential to emit (PTE) is less than the maximum allowable particulate matter standard.

The maximum allowable particulate matter standard for the Vail compressor station is determined using the process weight rate equations of PCC 17.16.340.C.1 and the total heat input of the turbine engines.

The particulate matter standard in PCC 17.16.340.C.1 is equivalent to Rule 332 of the SIP provisions and, as such, is federally enforceable. 5,290 horsepower is roughly equivalent to 13.472 million BTU/ hr or 40.4 million BTU/ hr for the three engines. Applying the process weight rate rule yields:

$E = 1.02 \times (40.4)^{0.769} = 17.540\ lb_{PM}/hr$ or $76.83\ tpy_{PM}$

Thus the compressor station has an allowable emission rate of 76.83 tpy of particulate matter. It's probably not unreasonable to anticipate most, if not all, of the PM to be PM_{10} since we are considering a combustion source; however to be conservative, the PTE calculation below presents the total PM emissions. The particulate matter PTE is calculated using AP-42 emission factor, Table 3.1-2a:

$PM_{(TOTAL)} = 6.6\ E^{-3}$ lb/MMBtu)(13.472 MMBtu/hr)(4.38) = 0.389 tpy

Facility wide Emissions = 0.389 x 3 = 1.17 tpy

Since the facility wide PTE is less than the maximum allowable particulate matter standard, the particulate matter standard will not be exceeded and hence monitoring, recordkeeping and testing of particulate matter emissions are not required in the permit.

Fuel Limitation:

"Pipeline-quality" natural gas has to conform to standards approved by the Federal Energy Regulatory Commission (FERC). The Vail compressor station which is supplied with pipeline quality natural gas is subject to the FERC standards for sulfur content and heating value of fuel[2]. The FERC standard is more stringent than the Pima County Code with respect to sulfur content. One of the FERC standards limits the sulfur content in the gas to less than 0.75 grains/100 scf (equivalent to 0.0026 weight percent of sulfur). Another standard specifies that the heating value be greater than or equal to 970 Btu per cubic foot. Pima County Code (PCC) 17.16.340.I requires recording the daily sulfur content and the lower heating value of the fuel being fired. EPNG Vail Station runs the turbine engines with fuel drawn from their pipeline. Maintaining a copy of FERC approved Tariff agreement on-site shall be considered and accepted as compliance with PCC 17.16.340.I.

PCC 17.16.340.J requires reporting cases when the sulfur content of the fuel being fired exceeds 0.8 percent by weight. FERC approved tariff assures sulfur content less than 0.0026 percent by weight. This is 0.325% of the allowable (reporting) limit in the PCC 17.16.340.J. Thus maintaining a copy of the FERC approved Tariff agreement on-site would be an adequate means of complying with the monitoring requirements for the particulate and fuel use standards.

Permit Revision Dated July 2009

On June 12, 2009 the Permittee applied for a minor permit revision to the language in the current permit (issued on April 1, 2009). This revision was processed as requested as the change satisfied all the provisions of a minor permit revision PCC 17.12.255 (identified below):

1. Do not violate any applicable requirement;
   Comment: There are no changes to any applicable requirements as a result of the change.

2. Do not involve substantive changes to existing monitoring, reporting, or recordkeeping requirements in the permit;
   Comment: There are no substantive changes to monitoring, reporting or recordkeeping requirements as a result of the change.

2 Interstate Natural Gas-Quality: Specifications & Interchangeability. Center for Energy Economics (December2004).

3. Do not require or change a case-by-case determination of an emission limitation or other standard, or a source specific determination of ambient impacts, or a visibility or increment analysis;
Comment: The revision does not require a case-by-case determination of an emission limitation or other standard, or a source specific determination of ambient impacts, or visibility increment analysis.

4. Do not seek to establish or change a permit term or condition for which there is no corresponding underlying applicable requirement and that the source has assumed in order to avoid an applicable requirement to which the source would otherwise be subject. The terms and conditions include:
   a. A federally enforceable emissions cap that the source would assume to avoid classification as a modification under any provision of Title I of the Act (Air Pollution Prevention and Control),
   b. An alternative emissions limit approved under regulations promulgated under the Section 112(i)(5) of the Act (Hazardous Air Pollutants);
Comment: The revision does not establish or change a permit term or condition involving an emissions cap or alternative emissions limit.

5. Are not modifications under any provision of Title I of the Act (Air Pollution Prevention and Control);
Comment: This is not a modification under any provision of Title I of the Act.

6. Are not changes in fuels not represented in the permit application or provided for in the permit;
Comment: There will be no changes to the fuel used at the facility.

7. The increase in the source's potential to emit any regulated air pollutant is not significant as defined in Section 17.04.340; and
Comment: The revision does not increase the potential to emit of any regulated pollutant above the significant level.

8. Are not required to be processed as a significant revision under Section 17.12.260.
Comment: PDEQ accepts this revision to be processed as a minor permit revision.

VII. IMPACTS TO AMBIENT AIR QUALITY

None required, as the source is not subject to PSD or NSR.

VIII. CONTROL TECHNOLOGY DETERMINATION

No control technologies needed to be determined. This facility is in an area of attainment and is not a new source.

IX. PREVIOUS PERMIT CONDITIONS

No previous permit conditions that need to be included in this permit.