

TECHNICAL SUPPORT DOCUMENT (TSD)

I. GENERAL COMMENTS

A. Company Information

1. Tucson Electric Power – De-Moss Petrie Generating Station (TEP-DMP)
2. Source Location: Interstate 10 and Grant Road (Admin. Address: 2501 N. Flowing Wells Rd.)
3. Mailing Address: 88 E. Broadway Blvd., Mail Stop HQW602, P.O. Box 711, Tucson, AZ 85702

B. Background

Air quality permit #910 is issued to Tucson Electric Power Company – DeMoss-Petrie Generating Station, (TEP-DMP) the Permittee. The Tucson Electric Power Company (TEP) currently operates a simple cycle gas turbine and ancillary equipment at the DeMoss-Petrie Generating Station (DMP). The generating station is used to supply power at times of peak customer demand. The facility was originally issued a Title V air quality permit on July 7, 2000, for installation and operation of GE Model MS7001EA gas turbine generator unit. The unit was installed between 2000 and 2001 and was deemed commercial on June 7, 2001. The unit is only authorized to use pipeline natural gas as a fuel. The previous permit was renewed on June 4, 2014. The facility is a major source of NO_x, CO, and Greenhouse Gas (GHG) and is subject to 40 CFR Part 70 permitting requirements. TEP has elected to voluntarily limit the operations at DMP to curtail emission of NO_x and CO to levels below the Prevention of Significant Deterioration (PSD) threshold of 250 tons per year each.

C. Attainment Classification

The facility is located in a region that is designated attainment for all criteria pollutants.

II. SOURCE DESCRIPTION

The site is approximately 20.5 acres in size and located on the east side of Interstate 10 and north of Grant Road. The stationary source is a packaged simple cycle gas turbine-generator plant installed at the facility. The turbine generator unit is a General Electric, Model MS7001EA (Turbine Serial No: 297609, Generator Serial No: 336X903), with a rated name plate capacity of 85 MWe. The unit is equipped with dry low-NO_x combustors to reduce oxides of nitrogen below the level required by the New Source Performance Standards (NSPS) for Stationary Gas Turbines (40 CFR 60 – GG) and has continuous emissions monitoring systems (CEMS) installed to measure the emissions of NO_x, CO, and diluent gas (CO₂ or O₂) during operation.

A. Process Description

The gas turbine at the generating station converts energy from the combustion of fuel and compressed air into mechanical energy by using the expanding high pressure and temperature gases to turn a rotor assembly and produce shaft work output. The output drive shaft is coupled to a generator that produces electricity. The turbine is a simple cycle turbine that does not recover heat from the exhaust gases.

The process begins with ambient air being drawn through air filters into the inlet plenum. An evaporative cooler for the gas turbine air intake is used to improve the performance at elevated temperatures. The air is compressed in the axial flow compressor section of the gas turbine. Next, the pressurized air from the compressor section is then expelled into the combustion chamber where it is mixed with fuel and ignited in the reaction zones of the turbine. Then, hot gases from each combustion chamber expand through several nozzle and rotor stages to provide radial thrust to the rotor and are expelled to the exhaust plenum and through a 52 foot high exhaust stack to the atmosphere. Dry low NO_x combustor technology is used to reduce NO_x concentrations to levels below the NSPS standards.

B. Air Pollution Control Equipment

Technically, none; however, the unit is equipped with Dry Low-NO_x combustors. These design features are a passive control measure that act to prevent NO_x from forming and are not considered a control device by definition in 40 CFR 64.1

III. REGULATORY HISTORY

This is the third 5-year Title V permit for TEP-DMP; the first permit was written to allow the Permittee to install the unit.

A. Testing & Inspections

Inspections have been conducted regularly. The previous full compliance inspection (FCE) was conducted in April 9, 2018, with no deficiencies noted with respect to permit conditions. Since the last FCE, PDEQ has received no complaints or excess emission/permit deviation reports for the facility, and no compliance or enforcement actions have been issued to the facility. TEP-DMP is currently in compliance with all permit and regulatory requirements. Annual RATA tests of the performance of the CEMS using reference methods have been performed by TEP since 2001.

B. Excess Emissions

There have been no excess emissions at this facility.

IV. EMISSIONS ESTIMATES

The following table of emission estimates is a result of calculations submitted by TEP and verified by PDEQ in their renewal application. PDEQ has determined based on performance testing data that NO_x is the limiting pollutant and under certain operating conditions the unit can operate 8760 hours without exceeding the NO_x and CO emission limits. The Potential to Emit (PTE) was estimated using AP-42 emission factors and 8760 hours of operation. Actual emissions are calculated from CEMS data to ensure the facility does not exceed the PSD thresholds for NO_x and CO (250 tpy). The following estimates, except for the NO_x and CO limits, are for reference purposes only and are not intended to be enforceable limits. See Section VIII – Miscellaneous Comments of the TSD for further comments on the PTE and emission standards and limits.

Pollutant	Emission Factor lb/MMBTU	Potential to Emit TPY
Nitrogen Oxides (NO _x)	-	<250
Carbon Monoxide (CO)	0.082	<250
Particulate Matter (as PM ₁₀)	0.0066	26
Sulfur Oxides (SO _x)	0.0021 ¹	8
Green House Gas (CO ₂ e)	111.11	433, 059
Volatile Organic Compounds (VOC)	0.0021	8
Lead	Non-Detect	Negligible
Hazardous Air Pollutants (HAPs)	0.00103	4

V. Applicable Requirements

A. Code of Federal Regulations (CFR):

New Source Performance Standards (NSPS)

40 CFR 60 Subpart A, NSPS General Provisions

40 CFR 60 Subpart GG, Standards of Performance for Stationary Gas Turbines

National Emission Standards for Hazardous Air Pollutants (NESHAP)

40 CFR 61 Subpart M, National Emission Standard for Asbestos (Demolition/Renovation)

OTHERS

40 CFR 75, Continuous Emission Monitoring

B. Pima County State Implementation Plan (SIP):

Rule	103	– Authority
Rule	111	– General Applicability
Rule	212	– Sampling, Testing, and Analysis Requirements
Rule	222	– Permit Display or Posting
Regulation	24	– Permit Fee Schedules/Non-Fee Requirements
Rule	301	– Planning, Construction, or Operating Without a Permit
Rule	318	– Vacant Lots and Open Spaces
Rule	321	– Standards and Applicability (Includes NESHAPS)
Rule	332	– Compilation of Mass Rates and Concentrations
Rule	343	– Visibility Limiting Standard
Regulation	50	– Periodic Testing
Rule	623	– Reporting for Emission Inventories
Rule	621	– Reporting for Compliance Evaluations

C. Pima County Code (PCC) Title 17:

17.11.010	Statutory Authority.
17.11.020	Planning, Constructing, or Operating Without a Permit.
17.11.060	Permit display or posting.
17.11.080	Permit shield.
17.11.120	Material permit condition.
17.11.160	Test methods and procedures.
17.11.190	Permits Containing synthetic emission limitations and standards.
17.11.210	Performance tests.
17.12.010	Permit application processing procedures for Class I Permits.
17.12.040	Permit Contents for Class I permits.
17.12.060	Review by the EPA and affected states for Class I Permits
17.12.070	Acid Rain
17.12.080	Compliance plan.

17.12.090	Facility changes allowed without permit revisions.
17.12.100	Administrative permit amendments.
17.12.110	Minor permit Amendments.
17.12.120	Significant permit revision.
17.12.130	Permit reopenings – revocation and reissuance – termination.
17.12.140	Permit renewal and expiration.
17.12.160	Annual emissions inventory questionnaire.
17.12.170	Excess emissions reporting requirements.
17.12.180	Affirmative defenses for excess emissions due to malfunctions, startup, and shutdown.
17.12.220	Fees related to Class I permits.
17.16.020	Noncompliance with applicable standards.
17.16.040	Standards and applicability (includes NESHAP).
17.16.050	Visibility limiting standard.
17.16.080	Vacant lots and open spaces.
17.16.340	Standards of Performance for Stationary Rotating Machinery
17.20.010	Source sampling, monitoring and testing.
17.20.040	Concealment of emissions.
17.20.100	Continuous Monitoring – General Specifications

Chapter 17.28 – Violations and Conditional Orders

Article I – Violations (inclusive)

Article II – Conditional Orders (inclusive)

Article III – Circumvention (inclusive)

D. Not Applicable:

40 CFR 64, Compliance Assurance Monitoring

The unit utilizes low-NO_x combustors to limit the formation of NO_x. These design features are a passive control measure that act to prevent NO_x from forming and are not considered a control device by definition in 40 CFR 64.1.

VI. Acid Rain Provisions

This has been carried over from the previous permit. The name of the Designated Representative and application date of the current acid rain permit application has been updated. The control officer will evaluate the Acid Rain Provisions at each renewal to ensure they are accurate.

VII. Miscellaneous Comments

1. The NSPS limits the NO_x emission rate of the gas turbine. The maximum rated heat rate provided by TEP for the unit is 10,420 Btu/kW-hr. This equates to 10.99 kilojoules/W-hr. The applicable adjusted concentration standard is $0.0075 \times 14.4 / 10.99$ percent by volume NO_x = 98.3 ppmvd. The NO_x concentration shall not exceed 98.3 ppmvd in accordance with NSPS standard and the data supplied in the renewal application.
2. Specific emissions testing of the gas turbine for formaldehyde was conducted in 2001 using standard test methods. The testing verified the PTE emissions were below the 10 tpy emission limit for a single HAP and below the estimates provided using current AP-42 emission factors. Formaldehyde is not a limiting pollutant for the stationary source.
3. Potential to Emit (PTE) calculations were submitted by TEP and reviewed by PDEQ during the permit renewal along with performance test data. The measured emissions confirm that under normal operating conditions, due to the low concentrations of NO_x and CO emitted, the unit could operate 8760 hours without exceeding the NO_x and CO emission limits (avg. measured emissions of 4.9 ppm NO_x and 7.5 ppm CO respectively @ 48% capacity, ref. 7/10/2018 RATA Report).
4. The PTE supplied by TEP for the facility was calculated using AP-42 emission factors and 2036 hours of operation as a limiting basis. The limit was determined using 75 ppm of NO_x (the unadjusted NSPS NO_x concentration standard). PDEQ has calculated the PTE using 8760 hours as the basis for estimating the emissions in consideration of the operating conditions described above.

Note: The actual rolling annual hours of operation of the gas turbine is much lower since it is operated as a peaking unit during periods of high demand and has operated on average less than 200 hours with significantly lower emissions than the PTE estimate.

5. The natural gas fired in the unit meets the definition of pipeline quality natural gas. PDEQ used the total sulfur content limit of the current natural gas FERC tariff agreement as a basis to estimate the PTE of SO₂.