

TECHNICAL SUPPORT DOCUMENT (TSD)

June 2014

I. GENERAL COMMENTS

A. Company Information

Business Name: Tucson Electric Power – North Loop Generating Station (TEP-NLGS)

Facility Address: 10600 N. Casa Grande Highway

Mailing Address: 88 East Broadway, Mail Stop HQW602, P.O. Box 711
Tucson, AZ 85702

B. Background

The Tucson Electric Power Company (TEP) currently operates 4 simple cycle gas turbines and other ancillary equipment at the North Loop Generating Station (NLGS) which produce peaking power and voltage stabilization for TEP's service area. The facility has a combined generating capacity of 102.5 MW (nameplate). This is a renewal of the Title V permit for this facility. The facility was originally issued a Title V air quality permit on March 16, 2001, for the operation of three Westinghouse gas turbine units installed before 1976, and one General Electric (GE) gas turbine unit installed in 2001 as it is currently configured. The previous permit was renewed on December 5, 2008. The facility is a major source of NO_x, CO, and Green House Gas (GHG) when firing natural gas, and a major source of NO_x, SO₂, and GHG when firing fuel oil. The source is subject to 40 CFR Part 70 permitting requirements.

The three Westinghouse gas turbine generators are rated at 27 MWe each and were installed prior to 1976. These units pre-date the New Source Performance Standard (40 CFR Part 60, Subpart GG) and the Acid Rain provisions under 40 CFR Part 72. They are not subject to Compliance Assurance Monitoring (CAM) under 40 CFR Part 64 since they do not have any control devices.

The GE gas turbine generator is rated at 21.5 MWe and subject to New Performance Standards (NSPS) and was installed in 2001. It is equipped with water injection technology to reduce the formation of Nitrogen Oxides (NO_x) from combustion. TEP has voluntarily elected to limit the NO_x and CO emissions below the significance levels (40 tpy NO_x) and (100 tpy CO) in order to avoid triggering a major modification to the unit. TEP employs a NO_x, CO, and diluent CEMS to monitor compliance with the emission limitations.

C. Attainment Classification

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

II. SOURCE DESCRIPTION

A. Process Description

The gas turbines at the generating station convert 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 turbines are simple cycle turbines that expel exhaust gases without heat recovery.

Each gas turbine generator at the facility is a modular self-contained operating system consisting of an axial compressor, combustion turbine, and electric generator. The process begins with ambient air being drawn through air filters into the inlet plenum and compressed in the axial flow compressor section of the gas turbine. Next, the pressurized air from the compressor section is expelled into the combustion chamber where it is mixed with fuel and ignited in the reaction zone of the turbine. Hot gases from each combustion chamber then expand through several nozzle and rotor stages to provide radial thrust to the rotor and are expelled to the exhaust plenum and through an exhaust stack to the atmosphere. Each turbine uses a starter motor that operates briefly to spin the rotor assembly to a set speed until there is enough air blowing through to ignite the fuel in the turbine.

1. NSPS Unit (NLGT4)

The gas turbine generator set is a simple cycle GE LM2500 with a maximum rated nameplate generating capacity of 21.5 Megawatts. The unit uses an electric motor to start up the turbine. The unit is fired exclusively on pipeline quality natural gas and is equipped with water injection technology to reduce NO_x below the levels required by the NSPS (40 CFR 60, Subpart GG). Water is injected at the combustor nozzle at a flow rate that is proportional to the fuel flow or unit load to cool the flame temperature and thereby reduce oxides of nitrogen. Tuning of combustion conditions is done by finding the optimum conditions needed for effective combustion such as air intake, fuel flow, water injection, fuel-air mixture levels, etc. The unit also uses an evaporative cooler to cool inlet air to improve performance in the hot ambient air temperatures. TEP has elected to install and certify a NO_x, CO, and diluent CEMS to monitor the NO_x and CO emission levels for compliance with the NSPS and permit emission limits.

2. Non-NSPS Units (NLGT1, 2, & 3)

The gas turbine generator sets are simple cycle Westinghouse Model W251-B models. Each unit has a maximum rated nameplate generating capacity of 27 MW. The units are primarily fueled by pipeline quality natural gas, but can fire fuel oil or a combination of the two fuels. These units use 635 horsepower diesel fueled engines to start the turbine. These turbines rotate at a higher speed than the generator and use a speed reducer to connect to the generator. The reducer is combined with the lubricating oil reservoir and oil pump assembly and is vented to the atmosphere through a lube oil vapor extractor. The units also use an evaporative cooler to improve performance in the hot ambient air temperatures.

B. Process Rate and Operating Hours

1. NSPS Unit (NLGT4)

The gas turbine's heat rate under full power is approximately 279.5 MMBtu/hr of pipeline quality natural gas (measured from fuel flow data under actual conditions, HHV = 1020 Btu/scf). The unit will be operated as a "peaking" unit. When operating, peaking units operate at or near full-load capacity. Periods of start-up conditions will be brief for this unit (see Section 2.1 of January 23, 2001 application). Maximum emissions are characterized on the basis of the full-load fuel consumption rate of 279.5 MMBtu per hour.

2. Non-NSPS Units (NLGT1, NLGT2 & NLGT3)

The three pre-NSPS turbines consume fuel at a rate of 432 MMBtu per hour when burning natural gas or fuel oil. These units have no operating restrictions (hours or emissions) as they were installed before 1976 and are thus "grandfathered" units not subject to NSPS or PSD regulations. No modifications subject to PSD have taken place since installation.

III. REGULATORY HISTORY

TEP-NLGS is currently in compliance with the permit and regulatory requirements.

A. Testing & Inspections

Inspections have been conducted regularly. The last completed inspection was concluded on May 22, 2013. The last performance test for NO_x and CO was on June 25, 2013. Both the inspection and performance test verified that the facility was in compliance with permit conditions.

B. Excess Emissions

There have been no reports of excess emissions from this facility or reports of permit deviations.

IV. EMISSIONS ESTIMATES

A. Facility Wide Estimates

The following table of emission estimates is a result of calculations submitted by TEP-NLGS and verified by PDEQ and from review of previous PTE documents. PDEQ has updated the carbon monoxide PTE information for unit NLGT4 based on performance testing data. PDEQ also estimated the PTE of the starter engines based on their limited operation and function. Actual emissions are provided by Continuous Emissions Monitoring System (CEMS) data. These values may be used for the following purposes:

- (i). Ascertaining modification status of TEP-NLP pursuant to 40 CFR 70.7(e)(4)(i) & PCC 17.04.340A.212;
- (ii). Comparing source potential-to-emit with emission rates allowable by relevant standards; and
- (iii). Comparing source potential-to-emit with emissions inventory and test data.

This comparison serves as a summary of existing information on emissions from TEP-NLGS. This table is not meant to establish any baseline emission limits. These emission figures (except for the ALLOWABLE emissions) are not meant to be emission limitations of any form. The following table summarizes the potential to emit (PTE), allowable emissions, test results, and the emissions inventory (EI) data. The emission factors used to calculate the potential to emit are from AP-42 (4/2000), unless otherwise noted.

Table I – Facility PTE & Allowable Emissions, (Excludes Unit NLGT4)

| Fuel/Units | Pollutant | Emission Factor lb/MMBTU fuel input | PTE ¹ (TPY) | Allowable |
|---|---|---|---------------------------|--|
| Natural Gas Units: NLGT1, NLGT2, & NLGT3 | PM | 0.0066 | 37.47 | 325.39 lb/hr (1425.2 tpy) ² |
| | NO _x | 0.32 | 1816.47 | N/A |
| | SO _x | 0.0021 ³ | 11.94 | N/A |
| | CO | 0.082 | 465.48 | N/A |
| | CO _{2e} | 111.1106 | 630 717 | N/A |
| | VOC | 0.0021 | 16.06 ⁴ | N/A |
| | Formaldehyde | 0.00071 | 4.00 | N/A |
| | THAP | 0.00103 | 5.8 | N/A |
| No. 2 Fuel Oil Units: NLGT1, NLGT2, & NLGT3 | PM | 0.012 | 68.13 | 325.39 lb/hr |
| | NO _x | 0.88 | 4995.3 | N/A |
| | SO _x | 0.909 | 5159.9 | 3 lb/MMBtu (5676.5 tpy) ⁵ |
| | CO | 0.0033 | 18.72 | N/A |
| | CO _{2e} | 157 | 891 207 | N/A |
| | VOC | 0.00041 | 6.47 ⁴ | N/A |
| | THAP | 0.00129 | 7.32 | N/A |
| | No.2 Fuel Oil Starter Engine Units: NLGT1A, NLGT2A, & NLGT3A (635 hp) | PM | 0.05732 | 0.16 |
| NO _x | | (0.024) ⁶ | 8.34 | |
| SO _x | | (0.00742) ⁶ | 2.58 | 3 lb/MMBTU (2.76 tpy) ⁵ |
| CO | | (0.0055) ⁶ | 1.91 | N/A |
| CO _{2e} | | 165.25 | 457 | N/A |
| VOC | | (0.000642) ⁶ | 0.22 | N/A |
| THAP | | 0.0017 | 0.00 | N/A |
| Natural Gas Only Significance Levels for NLGT4 | | PM | 0.0066 | 15 |
| | NO _x | 0.290 ⁷ (0.087) ⁸ | 40 | 40 |
| | SO _x | 0.0021 ³ | 40 | 40 |
| | CO | 0.082 (0.444) ⁸ | 100 | 100 |
| | VOC | 0.0021 | 40 | 40 |
| | THAP | 0.00103 | 25 | 25 |

Facility PTE & Allowable Emissions (NSPS Unit NLGT4)

- Emission factors specific to the NSPS unit. Values are from AP-42 April/2000 unless otherwise noted. The factors in parentheses are provided for comparison purposes.

| Pollutant | Emission Factor (lb/MMBtu) |
|------------------|--|
| CO | 0.444 ¹ (0.082) ² |
| NO _x | 0.087 ¹ (0.320) ² (0.290) ³ |
| SO ₂ | 0.0021 ⁴ |
| VOC | 0.0021 |
| PM ₁₀ | 0.0066 |
| Total HAPs | 0.00103 |
| CO _{2e} | 111.1106 |

2. The June 1, 2011 performance test measured CO emissions of 224 ppm while operating near full load and heat rate. Test data from 2012 and 2013, measured values at 196 and 174 ppm respectively. This data translates to an emission factor between 0.444-0.351 lb of CO/MMBtu. The unit emits CO at higher mass emission rates than AP-42 estimates and CO is the limiting pollutant for the gas turbine. For calculation purposes, hours of operation were limited to 1580 hours per year to keep CO below 100 tpy. The emissions of the other pollutants are less than the significance levels.

| NLGT4 Annual PTE | |
|------------------|-----------------------------|
| Pollutant | Emissions (tpy) |
| CO | 100 (limiting) ¹ |
| NO _x | 40 (limit) |
| SO ₂ | 0.46 |
| VOC | 0.46 |
| PM ₁₀ | 1.46 |
| Total HAPs | 0.23 |
| CO _{2e} | 24 534 |

Based on the facility PTE, TEP-NLGS is a **Class I Major source** with a synthetic emission limitation on the NSPS turbine to limit NO_x to less than 40 tpy and CO to less than 100 tpy. The table below shows the facility PTE for all processes onsite, limiting CO emissions of unit NLGT4 to 98 tpy (1580 hours).

| Facility PTE | | | | | | | | |
|-----------------|-------|-----------------|-----------------|------------------|--------|-------|------|------------|
| Pollutant | PM | NO _x | SO _x | CO _{2e} | CO | VOC | Lead | Total HAPs |
| Emissions (tpy) | 69.73 | 5043.64 | 5162.96 | 916,198 | 565.48 | 16.74 | .08 | 7.54 |

¹ Emission factors calculated from performance test dated 6/1/2011.

² AP-42 emission factor (uncontrolled).

³ NSPS emission standard using actual measured heat rate of 13.7 KJ/Whr = 78.8 ppm = 0.290 lb/MMBtu@15%O₂.

⁴ Based on pipeline natural gas FERC that limits natural gas delivered fuel to 0.75 grains/100scf.

V. APPLICABLE REQUIREMENTS

A. Code of Federal Regulations (CFR):

| | |
|------------------------|--|
| 40 CFR 60 Subpart A | General Provisions |
| 40 CFR 60 Subpart GG | Standards of Performance for Stationary Gas Turbines (NLGT4 only) |
| 40 CFR 63 Subpart ZZZZ | National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines (RICE) (Applicable to NLGT1A, 2A, and 3A only) |
| 40 CFR 61 Subpart M | National Emission Standards for Hazardous Air Pollutants – Asbestos |
| 40 CFR 82 Subpart F | Protection of Stratospheric Ozone - Recycling and Emissions Reduction |

B. Pima County State Implementation Plan (SIP):

| | |
|----------|--|
| Rule 318 | Vacant Lots and Open Spaces |
| Rule 321 | Standards and Applicability (Includes NESHAPS) |
| Rule 343 | Visibility Limiting Standard |

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

| | |
|-----------|--|
| 17.12.190 | Permits Containing Voluntarily Accepted Emission Limitations and Standards |
| 17.16.020 | Noncompliance with Applicable Standards |
| 17.16.040 | Standards and Applicability (Includes NESHAP) |
| 17.16.050 | Visibility Limiting Standards |
| 17.16.080 | Vacant Lots and Open Spaces |
| 17.16.340 | Standards of Performance for Stationary Rotating Machinery |

VI. NON-APPLICABLE REQUIREMENTS

The following regulations are not applicable to TEP-NLGS:

Code of Federal Regulations:

1. 40 CFR 75 Continuous Emission Monitoring

Portions of this regulation are used in the permit as a reference for emission calculations and missing data procedures for the CEMS on unit NLGT4. TEP-NLGS is required to follow all the procedures as outlined in the permit with respect to emission calculations and missing data procedures only. As such, these are not federally enforceable but are locally enforceable as a method of compliance in the permit.

2. 40 CFR 72 Subpart A - Acid Rain Program

This regulation is not applicable to the facility per 40 CFR 72.6(b)(1) and 40 CFR 72.7.

VII. PERMIT CONTENTS

A. Applicability:

TEP-NLGS is required to obtain a permit for the four stationary gas turbines and three stationary rotating machines maintained at the facility, pursuant to PCC 17.12.140.B.1.a. The turbines and generators operated at the facility are subject to the regulations of 40 CFR 60 Subpart GG and PCC 17.16.340. The three older gas turbines use starter motors that are subject to 40 CFR 63 Subpart ZZZZ. The following facility wide regulations; PCC 17.16.050 & PCC 17.16.080 are included exclusively for fugitive dust purposes.

B. Operational Limitations

TEP-NLP is required to keep the NLGT4 turbine's NOx emissions below 40 tpy and CO emissions below 100 tpy. They are also required to keep NOx emissions below the NSPS emission standard (NSPS emission limit using actual measured heat rate of 13.72 KJ/Whr = 78.8 ppm). NLGT4 is limited to the use of pipeline natural gas only. The three older turbines may operate 365 days a year (8760 hours per year) and are limited to the use of fuel oil, natural gas, or a combination of the two. TEP-NLGS demonstrates compliance with this restriction by monitoring the NOx and CO emissions using CEMS monitors for NLGT4 and keeping complete records of any changes in fuel for the other three turbines (See permit for more details). The starter engines are limited to 30 minutes for startup by 40 CFR Subpart ZZZZ and require periodic oil changes and maintenance inspections.

C. Section 1: Non-NSPS Stationary Gas Turbines, NLGT1, NLGT2, NLGT3 and Ancillary Equipment

I. Emission Limits/Standards:

| Citation | Discussion | Authority |
|----------|---|------------------------------|
| I.A | Allowable fuels. This permit provision allows TEP-NLP to use pipeline quality natural gas or fuel oil or a combination of both in the gas turbines without the requirement to apply for a revision. | PCC 17.12.190.B |
| I.B.1 | Sulfur content of fuels limited to less than 0.9 % to limit SO2 emissions in accordance with PCC. | PCC 17.16.340.H. |
| I.B.2 | Sulfur dioxide emissions are limited to less than 1.0 lb SO2/MMBtu when firing low sulfur oil in accordance with PCC | PCC 17.16.340.F. |
| I.C | Hourly PM emissions rate is limited in accordance with PCC. Based on maximum operating capacities, TEP falls well below the allowable limits calculated with this equation. | PCC 17.16.340.C.1. |
| I.D | Opacity limitation in accordance with PCC and SIP. | PCC 17.16.340.E & SIP 321.A. |
| I.E | Requirement to implement and maintain a recording system to record the continuous hours each turbine operates while firing fuel oil. This requirement has been placed in the permit in order to calculate emissions and to monitor hours to determine to when to perform an opacity test while firing fuel oil. | PCC 17.12.180.A.2. |

II. Monitoring Requirements:

| Citation | Discussion | Authority |
|----------|--|--------------------|
| II.A | Requirement to monitor when fuel oil is fired and the number of continuous hours firing fuel oil. | PCC 17.12.180.A.3. |
| II.B | Requirement to monitor sulfur content of fuel fired in accordance with PCC. Recordkeeping to substitute for monitoring requirement | PCC 17.12.180.A.3. |
| II.C | No particulate matter emission rate monitoring is required. Allowable emissions far exceed maximum emissions from units. | - |
| II.D | Requirement for opacity test upon each turbine firing fuel oil for every 168 consecutive hours. This is a reduced frequency opacity testing requirement for the units as the units infrequently fire fuel oil. | PCC 17.12.180.A.3. |

III. Recordkeeping Requirements:

| Citation | Discussion | Authority |
|----------|---|--------------------|
| III.A | Requirement to record the number of continuous hours fuel oil is fired. | PCC 17.12.180.A.4. |
| III.B | Requirement to record sulfur content of fuel fired. Since the sulfur content of fuel delivered by suppliers is constant, TEP-NLGS need only keep FERC agreements for natural gas and fuel specification or fuel analysis for fuel oil that verifies the sulfur content. | PCC 17.12.180.A.4. |
| III.C | None | - |
| III.D | Requirement to record opacity results with at least the information requested. | PCC 17.12.180.A.4. |

IV. Reporting Requirements:

None specific. See Facility Wide Reporting Requirements

V. Testing Requirements:

| Citation | Discussion | Authority |
|----------|---|--------------------------------------|
| V.A | Includes the acceptable EPA approved test method to establish and determine the sulfur content in petroleum products when necessary in accordance with PCC. | PCC 17.16.340.K.1.b. |
| V.B | Establishes EPA Test Method 9 as the method to be used to monitor compliance with opacity standard when required. | PCC 17.12.180.A.5.a |
| V.C | For testing to determine compliance with any applicable standard, a requirement is included that a written request with applicable test methods be made to the Control Officer or the Permittee depending on who is making the request. | PCC 17.12.180.A.3. PCC 17.20.010. |

D. Section 2: Diesel Starter Engines, Subject to 40 CFR 63 Subpart ZZZZ (NLGT1A, NLGT2A, & NLGT3A)

I. Applicability:

| Citation | Discussion | Authority |
|----------|--|---------------------------|
| I.A | Applicability determination for stationary reciprocating internal combustion engines (RICE) at an area source of HAP emissions. | 40 CFR 63.6585(c) |
| I.B | Determination if RICE is a new or existing source based on commenced construction or reconstruction date. | 40 CFR 63.6590(a)(1)(iii) |
| I.C | Applicability date for compliance with the emission limitations and operating limitations set by rule.....(no later than May 3, 2013). | 40 CFR 63.6595(a)(1) |
| I.D | Compliance with the applicable operating limitations identified in Table 2d of the Subpart ZZZZ NESHAP standard. | 40 CFR 63.6603(a) |

II. Emission Limits/Standards:

| Citation | Discussion | Authority |
|----------|---|---|
| II.A | Periodic Oil Change and maintenance inspection and option for oil analysis program is specified in accordance with the Subpart ZZZZ NESHAP standard . | 40 CFR 63.6603and Table 2d |
| II.B | Option to utilize an oil analysis program in order to extend the specified oil change requirement in II.A of this Section | Footnote 1, Table 2d to Subpart ZZZZ of Part 63 & 40 CFR 63.6625(i) |
| II.C | Local Pima County Code opacity compliance requirement for stationary rotating machinery. | PCC 17.12.185.A & PCC 17.16.340.E |
| II.D | Local Pima County Code opacity compliance requirement for diesel fired engines. | PCC 17.12.185.A & PCC 17.16.040 |
| II.E | Local Pima County Code sulfur content limitation. | PCC 17.12.190.B |

III. General Compliance Requirements

| Citation | Discussion | Authority |
|----------|---|-------------------|
| III.A | Requirement to be in compliance with the emission limitations, operating limitations, and other requirements in this Section at all times | 40 CFR 63.6605(a) |
| III.B | Requirement to operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, at all times. | 40 CFR 63.6605(b) |

IV. Monitoring, Installation, Collection, Operation, and Maintenance Requirements:

| Citation | Discussion | Authority |
|----------|--|---|
| IV.A | Requirement to operate and maintain the stationary RICE according to the manufacturer's emission-related written instructions. | 40 CFR 63.6625(e) & 40 CFR 63.6625(e)(3) |
| IV.B | Requirement to install a non-resettable hour meter on the stationary RICE. | 40 CFR 63.6625(f) |
| IV.C | Requirement to minimize the engine's time spent at idle during startup and minimize the engine's startup time. | 40 CFR 63.6625(h) |
| IV.D | Guidance provided if the Permittee selects to utilize the oil analysis program to extend the specified oil change requirement in the Subpart ZZZZ NESHAP standard. | 40 CFR 63.6625(i) & Table 2d to Subpart ZZZZ of Part 63 |
| IV.E | Requirement to conduct a visible emissions check on the exhaust stack of the generator at least quarterly. | PCC 17.12.180.A.3.c |
| IV.F | Requirement for the Permittee to conduct a EPA Reference Method 9 observation of any plumes greater than 40 percent. | PCC 17.12.180.A.3.c |
| IV.G | Requirement for the Permittee to conduct a EPA Reference Method 9 observation upon request of the Control Officer | PCC 17.16.040 |
| IV.H | Compliance determination with the fuel limitation in the Subpart ZZZZ NESHAP standard | PCC 17.12.180.A.3.c |

V. Demonstration of Continuous Compliance with the Emission Limitations and Operating Limitations:

| Citation | Discussion | Authority |
|----------|--|---|
| V.A | Requirement to operate and maintain the stationary RICE according to the manufacturer's emission-related operation and maintenance instructions. | 40 CFR 63.6640(a) & Table 6 to Subpart ZZZZ of Part 63 Row 9 of Table 6 to Subpart ZZZZ of Part 63 |
| V.B | Requirement to operate and maintain the stationary RICE according to the Permittees emission-related operation and maintenance instructions. | Row 9 of Table 6 to Subpart ZZZZ of Part 63 |

VI. Reporting Requirements:

| Citation | Discussion | Authority |
|----------|--|---|
| VI.A | Requirement for the Permittee to report any failure to perform the management practice on the schedule. | Footnote 2, Table 2d to Subpart ZZZZ of Part 63 |
| VI.B | Requirement for the Permittee shall promptly notify and submit written reports to the Control Officer of any instances of excess emissions or deviations from the permit requirements. | PCC 17.12.040 & PCC 17.12.180.A.5 |

D. Section 3: NSPS Stationary Gas Turbine, Subject to 40 CFR 60 Subpart GG (NLGT4)

I. Emission Limits/Standards:

| Citation | Discussion | Authority |
|----------|---|------------------------------------|
| I.A | Applicable NSPS Nitrogen Oxide Concentration Standard. | 40 CFR 60.332(a)(1) |
| I.B | Nitrogen Oxides Synthetic Emission Limit accepted by TEP-NLGS to prevent PSD modification requirements. | PCC 17.12.190.B |
| I.C | Carbon Monoxide Emission Limit accepted by TEP-NLGS to prevent PSD modification requirements. Performance test results indicate that Carbon Monoxide mass emission rates can exceed Nitrogen Oxide emissions under certain operating conditions and make it rather than NOx the limiting pollutant. | PCC 17.12.190.B. |
| I.D | The permit limits the unit to firing only pipeline natural gas. Firing natural gas removes the NSPS requirement to monitor the sulfur content of the fuel being fired. Sulfur content limit taken directly from NSPS standard. | 40 CFR 60.333(b) PCC 17.12.190 |
| I.E. | Operation and Maintenance standards taken directly from the NSPS general provisions. | 40 CFR 60.11(d) PCC 17.16.020.A |

II. Monitoring Requirements:

| Citation | Discussion | Authority |
|----------|--|--|
| II.A | Nitrogen Oxide and Carbon Monoxide Monitoring. | PCC 17.12.180.A.3 |
| II.A.1 | Requirement to certify, operate, and maintain CEMS consisting of NOx monitor and diluent gas (CO2 or O2) to assure compliance with NOx NSPS concentration standard and the NOx emission limit of 40 tpy. | 40 CFR 60.334(b) PCC 17.12.190 PCC 17.12.020.A |
| II.A.2 | Requirement to certify, operate and maintain CEMS CO monitor to assure compliance with emission limit of 100 tpy. | PCC 17.12.190 PCC 17.16.020.A |
| II.A.3 | Data collection, recording, measurement, calculation, and missing data procedures for instrument downtime are specified in the permit to convert CEMS measurements to emissions for verification of compliance with NOx and CO emission standards and limits. | 40 CFR 60.334(b)(3) 40 CFR Part 75 used as a reference and PCC 17.12.180.A.3 |
| II.B | Fuel and Sulfur Content Monitoring. Recordkeeping serves as a substitute for monitoring requirements. | PCC 17.12.180.A.3.c |
| II.C | TEP has elected to use the CEMS and DAHS as a means of monitoring compliance. The systems must be operated, maintained and calibrated while the gas turbine is firing and be operational prior to conducting performance tests. Installation, operation, calibration, procedures, and specifications to measure the NOx and CO emissions and verify the performance of the CEMS and DAHS monitoring and recording devices are specified. | 40 CFR 60.334(b) 40 CFR 60.13 PCC 17.12.190 PCC 17.12.180.A.3 |

III. Recordkeeping Requirements:

| Citation | Description | Authority |
|----------|--|---------------------------------------|
| III.A | Maintaining a copy of the Federal Energy Regulatory Commission (FERC)-approved Tariff agreement that limits the total sulfur content of the transmitted pipeline natural gas to less than 0.8 percent by weight or 20 grains/100 scf or below is required. This removes the NSPS requirement to monitor and sample the fuel for sulfur content and limits the SO2 emission levels below standards. | 40 CFR 60.334(h)(3)(i) |
| III.B.1 | Maintaining records and duration of any startup, shutdown, or malfunction in the operation of the unit, APC, and any inoperability of the continuous monitoring device is required to satisfy NSPS provisions. | 40 CFR 60.7(b) |
| III.B.2 | Maintaining a permanent file of all measurements, including CEMS, fuel flow continuous monitoring system, performance tests, CEMS performance evaluations, calibrations, adjustments, and maintenance performed on these systems is specified in accordance with NSPS and permit requirements. | 40 CFR 60.7(b) PCC 17.12.180.A.4.b |

IV. Reporting Requirements:

| Citation | Discussion | Authority |
|----------|--|--|
| IV.A. | Notification for changes to the facility which may increase emission rates of a pollutant to which a standard applies is mandatory. Notice postmarked 60 days before the change is commenced and in accordance with the NSPS general provisions is required. | 40 CFR 60.7(a)(4) |
| IV.B | Provision included for using a State or local agency notification that is substantially similar to that required in the NSPS. | 40CFR 60.7(g) |
| IV.C.1 | The Permittee is required to submit a major modification permit revision and follow BACT requirements if NOx CO emission limits are exceeded in accordance with PCC. | PCC 17.12.040 & 17.12.180.A.5.b |
| IV.C.2 | A semi-annual excess emission and monitoring systems performance report is required in the requested format in accordance with NSPS standards and general provisions. | 40 CFR 60.334(j)(1) 40 CFR 60.334(j)(5) & 40 CFR 60.7(c) |
| IV.C.3 | Definitions of what shall be reported as an excess emission of nitrogen oxides, monitor downtime, and fuel sulfur content in accordance with the NSPS standard. | 40 CFR 60.13(h) 40 CFR 60.334(b)(3) 40 CFR 60.334(j) |

V. Testing Requirements:

| Citation | Discussion | Authority |
|----------|---|---|
| V.A | Once per permit term performance test when 12 month rolling totals of NOx exceeds 32 tpy or CO exceeds 80 tpy. As the unit is not fired often, it seems burdensome to require PDEQ's practice of conducting a performance test once per permit term. The 32 and 80 tpy "threshold tonnages" of NOx and CO to verify compliance with the NOx and CO emission limits was used as a surrogate to trigger an increase in NOx and CO calculation, monitoring, and performance testing. | 40 CFR 60.335(b) 17.12.180.A.3.a 17.12.190.B 17.20.010 |

E. Section 4: Facility Wide Operations

I. Emission Limits/Standards:

| Citation | Discussion | Authority |
|----------|--|------------------------------|
| I.A | Opacity limit in SIP also applies but is only federally enforceable when the opacity exceeds 40%. | PCC 17.16.040 SIP 321. |
| I.B | Establishes visibility limiting standard to not allow diffusion of visible emissions including fugitive dust beyond the property boundary lines without taking reasonably necessary precautions to control generation of particulate matter. | PCC 17.16.050.D SIP 343 |
| I.C | Control measure requirements for service roads and parking areas in accordance with PCC and SIP. | PCC 17.16.080.A SIP 318.A |

II. Monitoring Requirements:

| Citation | Discussion | Authority |
|----------|---|-------------------|
| II.A | Requirement to perform a visible emissions survey of the effectiveness of dust suppression activities. TEP-NLGS uses effective methods to reduce the possibility of fugitive emissions and so the type of monitoring and frequency has been tailored to the types of activities employed. | PCC 17.12.180.A.3 |
| II.B | Unpaved service roads and parking areas. The facility is covered with aggregate and likelihood of any fugitive dust issues is low. | PCC 17.16.080.A.3 |

III. Recordkeeping Requirements:

| Citation | Discussion | Authority |
|----------|--|-------------------|
| III.A&B | Requirement to record visual survey results with at least the information requested. | PCC 17.12.180.A.4 |

IV. Reporting Requirements:

See Facility Wide Reporting Requirements

V. Testing Requirements:

| Citation | Discussion | Authority |
|----------|---|------------------------------------|
| V.A | Establishes EPA Test Method 9 as the method to be used to monitor compliance with opacity standard when required. | PCC 17.12.180.A.5.a |
| V.B | For testing to determine compliance with any applicable standard, a requirement is included that a written request with applicable test methods be made to the Control Officer or the Permittee depending on who is making the request. | PCC 17.12.180.A.3 PCC 17.20.010 |

F. Section 5: Facility Wide Reporting Requirements

| Citation | Discussion | Authority |
|----------|---|---|
| A | Reporting within 24 hours for excess emissions and two working days for other permit deviations. | PCC 17.12.040 PCC 17.12.180.A.5.b PCC 17.12.180.E.3.d |
| B | Report of all required monitoring every six months as requested by the permit. | PCC 17.12.180.A.5.a |
| C | Defines the dates that semiannual reports are due. | N/A |
| D | Compliance Certifications are due annually and shall be submitted as requested in the permit. | PCC 17.12.220.A.2 & 40 CFR 60.11(g) |
| E | Sources subject to permit requirement shall provide an emissions inventory when requested by the Control Officer. | PCC 17.12.320 |

H. Miscellaneous Comments

1. NSPS Stationary Gas Turbine

A performance test on NLGT4 to verify that the turbine is meeting the NOx emission limits/standards in 40 CFR Subpart GG and verify the performance of the installed CEMS shall be required before the end of a permit term should the total tons per year from the unit equal to or exceed 32 tons per year of NOx or 80 tons of CO. A standard once per permit term requirement to conduct a performance test as is the norm for permits issued by PDEQ was not used for this unit because TEP-NLGS uses the unit infrequently and the CEMS NOx, CO, and diluent monitors are regularly calibrated and maintained. At a rolling total of 32 tpy NOx or 80 tpy CO it is assumed that the turbine has been used enough to determine whether NLGT4 is still meeting the NSPS and permit limits. The CEMS and DAHS monitoring and recording systems are used to monitor whether NLGT4 is operating effectively and based on the results of the CEMS reports submitted quarterly PDEQ may request a performance test be conducted on NLGT4 to verify emission limits/concentrations.

The previous permit did not have a condition to limit the CO emissions to 100 tpy. Previous PTE emission estimates used AP-42 and vendor supplied CO emission factors that indicated the CO emissions were below the NOx emission levels and that NOx would be the limiting pollutant. However a review of recent performance test data showed that based on the CO emission rates, the CO synthetic emission limit would be exceeded prior to the NOx synthetic emission limit being exceeded. CO is now the limiting pollutant for purposes of monitoring emissions to limit the operation of NLGT4 to levels below the major modification significance levels. At current CO emission levels the annual operating hour limitation for NLGT4 is approximately 1580 hours of operation.

PDEQ has placed additional conditions and requirements to limit and monitor the CO emissions to less than 100 tons per 12 month rolling total in the permit.

2. Non-NSPS Stationary Gas Turbines

Sulfur Dioxide

The requirement in PCC 17.16.340.J to report daily periods when the fuel sulfur content of the fuel being fired exceeds 0.8% by weight has not been included in the permit as all fuel that is delivered to Pima County has an enforceable limit of 0.9% by weight. Any fuel over 0.8% but below 0.9% would not be an exceedance of any standard or limitation and so it would be burdensome for sources to report every time the fuel had a sulfur content above 0.8%. An excess emissions report would be submitted should the fuel exceed the 0.9% sulfur content standard. This permit will not allow the use of high sulfur diesel. Moreover, even though the sulfur content limit is 0.9% by weight, jet fuel, natural gas, gasoline and low sulfur diesel #2 delivered to Pima County consistently shows sulfur levels below this limit as shown in past records of fuel supplier specifications which verify sulfur content of the fuel fired. The limitation in Part B: Section 3, I.B.1 of the permit, will ensure high sulfur fuel is not fired allowing the omission of rule PCC 17.16.340.H as well. These rules are incorporated by reference (PCC 17.16.340) in Attachment 1 of the permit.

Compliance with the fuel limitation requirements of Part B: Section 1, I.B.1 of the permit shall ensure compliance with the Sulfur Dioxide Standards of PCC 17.16.340.F; which limit the emission of SO₂ to 1.0 pound per million BTU heat input when burning low sulfur fuel. The definition of low sulfur fuel (PCC 17.04.340.A. "Low Sulfur Fuel") is fuel oil containing less than 0.9 percent sulfur by weight. EPA AP-42 Appendix A, page A-5 states the heating value of diesel fuel is 137,000 BTU per gallon. Thus, 1 million BTU of heat input is equivalent to 7.3 gallons of diesel. At 7.05 lbs per gallon, 51.47 lbs of diesel will produce 1 million BTU. At 0.9% 51.47 lbs of diesel contains 0.46 lbs of sulfur. Combined with Oxygen to form SO₂, and assuming 100% of the sulfur in the fuel forms SO₂, this would yield 0.92 lb SO₂ per 1MMBtu. Thus, low sulfur fuel oil will produce 0.92 lbs of SO₂ per million BTU of heat input. This is roughly 8% less than the prescribed 1.0 pound SO₂ per million BTU (PCC 17.16.340.F). Likewise, distillate, residual, and other such fuel oils range from 0.84 to 0.94 lbs of SO₂ per million BTU. Thus, it is not necessary to include the standard in the permit explicitly but, by reference in Attachment 1 of the permit.

Particulate Matter

Mass emission testing to determine compliance with the particulate matter standard is not normally necessary as standard emission factors for gas turbines yield emission estimates of particulate matter that are far less than the standard allowed by the rule equation. The Control Officer may require the Permittee to quantify its particulate matter emissions if the Control Officer has reasonable cause to believe a violation of a standard has been committed.

VOC

In addition to the VOC's generated from combustion of the gas turbines, an additional 4.13 tpy of VOC emissions were estimated by TEP in the PTE from the speed reducer lube oil vapor extractors and storage of fuel oil in the storage tank. The additional VOC PTE estimates are included in Table I. The estimates were calculated using the maximum amount of make-up lube oil of 200 gallons/year for each of the gas turbine units for the extractors and using Tanks 4.09D to estimate emissions from the fuel oil tank.

VII. IMPACTS TO AMBIENT AIR QUALITY

As this is a permit renewal only, and TEP-NLGS is not a PSD source, impacts to ambient air quality studies are not required at this time.

VIII. CONTROL TECHNOLOGY DETERMINATION

Control Technologies are not required for the source.

IX. PREVIOUS PERMIT CONDITIONS

The previous permit has been re-arranged into the following five Sections or categories: Non-NSPS Stationary Gas Turbines (NLGT1, NLGT2, NLGT3 and ancillary equipment); NESHAP Diesel Starter Engines (NLGT1A, NLGT2A, and NLGT3A); NSPS Stationary gas turbine (NLGT4); Facility Wide Operations; and Facility Wide Reporting Requirements.

The most recent revision of the PDEQ Class I source General Conditions have replaced the prior permit's General Conditions.

An additional section, Section 2 of the Specific Conditions has been added to incorporate requirements for the starter engines now subject to 40 CFR Subpart ZZZZ.

The Previous Permit Condition II.A.4.b and the associated excess emission reporting condition V.A.3.d.i in the Specific Conditions were taken from NSPS 40 CFR 60.334(a) and 60.334(j)i. These conditions were for sources choosing the option to monitor the fuel consumption, and ratio of water or steam to fuel ratio. TEP currently monitors compliance with the standard by operating and certifying using a NOx and diluent CEMS as the monitoring option. The conditions for this option were taken from 40 CFR 60.334(b) and 60.334(j)(1)(iii) are contained in Part B: Section 3, II.A of the specific conditions and have replaced the pervious permit conditions.

The previous permit conditions required the operation of a carbon monoxide CEMS in Part B, II.4.b and III.A.3. However, the previous permit did not contain conditions to calculate or limit the CO emissions to 100 tpy because emissions factors indicated NOx to be a limiting pollutant. Performance testing has verified that under certain conditions CO is the limiting pollutant. A carbon monoxide emission limit of 100 TPY has been added in Part B, Section 3, I.C. All previous permit conditions for the monitoring of emissions for compliance with the NOx emission limit have been amended to require monitoring the emission rate of both NOx and CO pollutants. Annual rolling totals are required of both pollutants for compliance with the respective emission limits of 40 tpy NOx and 100 tpy CO. A requirement has been added to operate and maintain a CO CEMS in Part B, Section 3, II.A.2 of the permit. References and procedures for CO emissions monitoring and calculations have been added throughout the permit as applicable. A condition in Part B, Section 3, II.D.2.r requiring that the CO CEMS meet the specifications and test procedures in accordance with the methods and procedures in 40 CFR 60, Appendix B, Specification 4 was also added for consistency. A more simplified approach for data substitution was implemented in the permit for periods when the NOx or CO CEMS or fuel flow rates are not available to record the emission rates. The previous missing data substitution conditions and methodology for the NOx and fuel flow meter in Section IV.A.1.b of the previous permit were amended to use an agreed upon data substitution set for the NOx and CO CEMS or fuel flow meter when the systems are unavailable to record the emissions data. The amended data substitution condition is now contained in Part B, Section 3, II.A.3.f.

XII. ACID RAIN PROVISIONS

The existing non-NSPS gas turbines are not subject to the Acid Rain Provisions as they are simple combustion turbines that commenced operation before November 15, 1990 (40 CFR 72.6(b)(1)). The new NSPS gas turbine will not be subject to Acid Rain provisions. New utility units are exempt from the Acid Rain provisions if the total name-plate capacity is equal to or less than 25 MWe, do not burn coal-derived gaseous fuel with a sulfur content greater than natural gas and burn gaseous fuel with an annual average sulfur content of 0.05% or less by weight (40 CFR, 72.7(a)). The NSPS unit meets all the preceding conditions and is therefore not subject to Acid Rain provisions.

XIII. COMPLIANCE ASSURANCE MONITORING (CAM) PROVISIONS

CAM provisions do not apply to any of the turbines. 40 CFR Part 64, 64.2(a) defines the applicability of CAM to emissions units. For CAM to apply, a unit must be subject to an emission limit or standard for the applicable regulated pollutant, the unit must use a control device to achieve compliance with that limitation or standard, and the unit must have a pre-control emission potential that would classify it as a major source. The NLGT4 turbine has an emission standard for NO_x in 40 CFR Part 60, Subpart GG, and the turbine may use a control device (i.e., a water injection system) to achieve compliance with the standard, but the unit's potential-to-emit (without considering the emission reductions achieved by the control device) is less than major source levels since the applicant has accepted a synthetic emission limit (40 tpy) and fuel use restrictions to remain below major modification levels. Since the unit will not be classified as a major source, it is not subject to the CAM provisions. The existing turbines are not subject to the CAM provisions as they have no control device.

XIV. ACCIDENT PREVENTION REQUIREMENTS (CLEAN AIR ACT SECTION 112(R))

The source does not handle, store, or use listed substances or materials in quantities exceeding the applicable thresholds.

XV. MACT

TEP-NLGS is not a major source of HAPs and so no major source MACT considerations are necessary. TEP-NLGS is an areas source of HAP's and operates reciprocating internal combustion engines (RICE) in the gas turbines that are subject to 40 CFR Subpart ZZZZ. These engines are by definition black start engines and subject to applicable operation limitations and maintenance requirements but are not subject to any fuel requirements, or specific emission limitations, or required to install any emission control devices.

XVI. INSIGNIFICANT ACTIVITIES

The following insignificant activities listed in the original application, (see Section 1.5 of the January 30, 1995 application), are related to electric utilities and may occur at the site. The following table lists the activities commonly associated with power plants and provides a determination as to whether the control officer considers the activities insignificant. PDEQ will only list in the permit those activities that have an applicable requirement but whose emissions are insignificant compared to the overall emissions at the facility.

| Insignificant Activities Listed in the Application | |
|--|--|
| Type of Activity or Equipment | Insignificant Determination |
| Transformers, switchgear, and water treatment systems. | Yes |
| Out-of-service fuel oil tank. | Yes. Tank is empty. |
| Landscaping, building maintenance and janitorial activities. | Yes. Defined. |
| Manually operated equipment and related activities for buffing, carving, cutting, drilling, machining, routing, sanding, sawing, surface grinding or turning and associated venting hoods. | Yes. Defined. |
| Internal combustion (IC) engine driven compressors, IC engine driven electrical generator sets, and IC engine driven water pumps used only for emergency replacement or standby service. | Yes. Defined. |
| Chemical laboratories including equipment used exclusively for chemical or physical analysis. | Yes. Defined. |
| Fuel burning equipment fired at a rate less than 1.0 MMBtu/hr for less than an 8-hour period. | No. May be subject to PCC 17.16.165. |
| Pressurized storage and piping for natural gas, butane, propane, or LPG. | Yes |
| Petroleum product storage tanks and associated loading operations for lubricating oil, used oil, and transformer oil. | Yes |
| Piping of fuel oils, used oil, and transformer oil. | Yes |
| Storage and handling of drums or other transportable containers where the containers are sealed during storage, and covered during loading and unloading. | Yes |
| Water treatment and storage systems for cooling tower feed or facility service and potable water. | Yes |
| Chemical storage associated with water or wastewater treatment where the water is treated for consumption and/or used within the permitted facility. | Yes |
| VOC emissions from the cooling towers. | No. May be subject to PCC 17.16.430. |
| Individual flanges, valves, seals, pressure relief valves, other individual components not in VOC service that have the potential for leaks | Yes |
| Cafeterias, kitchens, and other facilities used for food or beverage preparation. | Yes |
| Equipment using water, water and soap or detergent, or a suspension of abrasive in water for purposes of cleaning or finishing. | Yes if not related to production. |
| Battery recharging areas. | Yes. Defined. |
| Aerosol can usage. | No. May be subject to PCC 17.16.400. |
| Acetylene, butane, and propane torches. | Yes if used only for general and infrequent maintenance. |
| Equipment used for portable steam cleaning. | Yes. Defined. |
| Blast cleaning equipment using a suspension of abrasive in water and any exhaust system or collector serving them exclusively. | No. May be subject to PCC 17.16.100.D. |
| Lubricating system reservoirs. | Yes |
| Hydraulic system reservoirs. | Yes |
| Adhesive use. | Yes if not VOC containing |

| Insignificant Activities Listed in the Application | |
|---|---|
| Type of Activity or Equipment | Insignificant Determination |
| Production of hot/chilled water for onsite use. | Yes |
| Safety devices such as fire extinguishers. | Yes |
| General vehicle maintenance and servicing activities. | Yes |
| Storage cabinets for flammable materials. | Yes |
| Housekeeping activities and associated products for cleaning purposes and operation of vacuum cleaning systems. | Yes providing the vacuum system is not a production unit. |
| Air conditioning, cooling, heating, or ventilation equipment. | Yes providing the air conditioning units have no applicable requirements under Title VI of the Act. |
| General office activities such as paper shredding, copying, photographic activities, and blueprinting. | Yes |
| Restroom facilities and associated cleanup operations, stacks, and vents. | Yes. Defined. |
| Smoking rooms and areas. | Yes. Defined. |
| Normal consumer use of consumer products including hazardous substances as defined in the Federal Hazardous Substances Act (15 U.S.C. 1261 et. Seq.). | Yes. |
| Operation and testing of emergency fire water pumps, firefighting activities, and training conducted at the facility in preparation of fighting fires. | Yes |
| Activities associated with the construction, repair, and maintenance of paved or open areas, including street sweepers, vacuum trucks, and vehicles related to the control of fugitive emissions of such roads or open areas. | Yes except for major sources of PM ₁₀ in PM ₁₀ non-attainment areas. |
| Truck and car traffic on unpaved roads or open areas. | Yes except for major sources of PM ₁₀ in PM ₁₀ non-attainment areas. |
| Rail car traffic and locomotive switching activities. | Yes |