



**TECHNICAL REVIEW AND EVALUATION  
OF APPLICATION FOR  
AIR QUALITY PERMIT NO. 63697**

**UNS Electric, Inc.**

**I. INTRODUCTION**

This renewal Permit No. 63697 is issued to UNS Electric, Inc., the Permittee, for the continued operation of the Valencia Power Plant (VPP) located at 1741 North Grand Avenue in Nogales, AZ. VPP is a major source for emissions of nitrogen oxide (NO<sub>x</sub>), carbon monoxide (CO), and sulfur dioxide (SO<sub>2</sub>).

**A. Company Information**

1. Company Name: UNS Electric, Inc.
2. Facility Name: Valencia Power Plant (VPP)
3. Facility Location: 1741 North Grand Avenue  
Nogales, AZ 85621
4. Mailing Address: P.O. Box 711  
Mail Stop HQW705  
Tucson, AZ 85702

**B. Attainment Classification**

This source is located in a non-attainment area for particulate matter with a diameter less than 10 microns (PM<sub>10</sub>) and particulate matter with a diameter less than 2.5 microns (PM<sub>2.5</sub>). The area is designated attainment or unclassified for all other criteria pollutants.

**II. PROCESS DESCRIPTION**

VPP is a peaking power plant currently operating four (4) simple cycle combustion turbine generator units, three supporting starter combustion ignition engines, and one emergency internal combustion engine.

The four combustion turbines include three Hitachi MS 5001 M-series units rated at 13.5 MW each and one General Electric LM2500 unit rated at 23 MW. Each of the combustion turbines can be fired on natural gas, distillate fuel oil, or a combination of the two fuels. Natural gas is supplied via a pipeline owned by El Paso Natural Gas which runs through Nogales. Distillate fuel oil is stored onsite in two 50,000 gallon storage tanks.

VPP utilizes water injection on each of the four combustion turbines to minimize the production of NO<sub>x</sub> emissions.

To demonstrate compliance with the 365-day rolling total NO<sub>x</sub> and CO emission limits voluntarily accepted by the Permittee, three combustion turbine units (P1, P2, and P3) use a continuous monitoring system to monitor and record the fuel consumption and the ratio of water to fuel being

burned in the turbines and the fourth combustion turbine (P4) uses NO<sub>x</sub> and CO continuous emission monitoring systems (CEMS).

**III. EMISSIONS**

VPP has the potential to emit NO<sub>x</sub>, CO, and SO<sub>2</sub> in excess of the Title V major source threshold of 100 tons per year. To avoid being classified as a Prevention of Significant Deterioration (PSD) major source, the Permittee voluntarily accepted enforceable emission limits on NO<sub>x</sub>, CO, and SO<sub>2</sub> that are less than the PSD major source threshold of 250 tons per year.

The potential to emit of all other regulated air pollutants are below major source thresholds.

The Nogales area in Santa Cruz County is designated nonattainment for PM<sub>2.5</sub> and PM<sub>10</sub>. VPP’s potential to emit of both PM<sub>2.5</sub> and PM<sub>10</sub> is below 100 tons per year. Therefore the facility is a minor source with respect to nonattainment New Source Review (NSR).

VPP is a minor source of hazardous air pollutants (HAP) with a potential to emit less than 10 tons per year for any single HAP and less than 25 tons per year total combined HAPs.

The facility-wide potential to emit is summarized in Table 1 below.

**Table 1: Potential Emissions**

<b>Pollutant</b>	<b>Emissions (tons per year)</b>
<b>PM<sub>10</sub></b>	48.78
<b>PM<sub>2.5</sub></b>	48.78
<b>NO<sub>x</sub></b>	240*
<b>CO</b>	240*
<b>SO<sub>2</sub></b>	200**
<b>VOC</b>	2.2
<b>HAPs</b>	5.09

\*VPP voluntarily accepted a 240 tons per year, calculated daily as a rolling 365-day total, limit on NO<sub>x</sub> and CO emissions.

\*\* VPP voluntarily accepted a 200 tons per year, expressed as a 12-month rolling total, limit on SO<sub>2</sub> emissions.

**IV. APPLICABLE REGULATIONS**

Table 2 displays potentially applicable requirements for each permitted piece of equipment along with an explanation of why the requirement is applicable or why the requirement is not applicable.

**Table 2: Verification of Applicable Regulations**

Unit	Control Device	Rule	Verification
<p>Hitachi MS 5001 Gas Turbine Units (P1, P2, and P3) 13.5 MW Each</p> <p>General Electric LM 2500 Gas Turbine Unit (P4) 20 MW</p>	<p>Water Injection System</p>	<p>New Source Performance Standards (NSPS) Subpart GG</p> <p>NSPS Subpart KKKK 40 CFR 60.4300 and - 4420</p> <p>NESHAP Subpart YYYYY 40 CFR 63.6080 - 63.6175</p> <p>Acid Rain Program A.A.C. R18-2-333 40 CFR 72 – 78</p>	<p>Gas Turbine Units P1, P2, P3, and P4 commenced construction after October 3, 1977 and have a heat input at peak load greater than 10.7 GJ/hr (10 MMBtu/hr). The units are subject to the NO<sub>x</sub> and SO<sub>2</sub> standards of 40 CFR Subpart GG and the associated general provisions in 40 CFR 60 Subpart A.</p> <p>Subpart KKKK applies to stationary combustion turbines that commenced construction, modification or reconstruction after February 18, 2005. Combustion Turbine P4, though installed at the VPP during 2006, was manufactured in 1987. Therefore NSPS Subpart KKKK does not apply to any of the four gas turbine units.</p> <p>Subpart YYYYY applies to stationary combustion turbines located at major sources of HAPs. Since VPP is a minor source of HAP, NESHAP/MACT standards do not apply to any of the four gas turbine units.</p> <p>P4 Unit was manufactured in 1987 but was installed at VPP during 2006. P4 has a generating capacity of 23 MW. 40 CFR 72.6(b).2 states that ‘any unit that commenced commercial operation before</p>

Unit	Control Device	Rule	Verification
			<p>November 15, 1990 and that did not, as of November 15, 1990, and does not currently, serve a generator with a nameplate capacity of greater than 25 MW, is not an affected facility under Acid Rain program.’ Therefore, the acid rain program does not apply to any of the four gas turbine units.</p>
<p>Emergency Diesel Generator Engine (EGEN)</p>	<p>None</p>	<p>40 CFR 60, Subpart IIII  NESHAP Subpart ZZZZ</p>	<p>New Source Performance Standards for Internal Combustion Engines are applicable.  EGEN is considered a “New” internal combustion engine because it was manufactured after June 2006. Per 40 CFR 63.6590(c)(1), the requirements of NESHAP Subpart ZZZZ are met by meeting the requirements of NSPS Subpart IIII.</p>
<p>Black Start Engines (BSP1, BSP2, and BSP3)</p>	<p>None</p>	<p>A.A.C. R18-2-719  NESHAP Subpart ZZZZ</p>	<p>Standards of Performance for Existing Stationary Rotating Machinery.  Subpart ZZZZ applies to these internal combustion engines. These engines are categorized as “Existing Black Start Engines” that are less than 500hp at an area source. Per Subpart ZZZZ, a black start engine is defined as an engine whose only purpose is to start up a combustion turbine. These engines meet that definition.</p>
<p>Fuel Oil Storage Tanks P8 and P9; 50,000 Gallons Each</p>	<p>None</p>	<p>A.A.C. R18-2-730  NSPS Subpart Kb 40 CFR 60.110b - 60.117b</p>	<p>Standards of Performance for Unclassified Sources.  Fuel oil storage tank P8 was constructed after July 23, 1984 and has a capacity greater than 151 cubic meters. However,</p>

Unit	Control Device	Rule	Verification
		A.A.C. R18-2-710	<p>the maximum true vapor pressure of the fuel oil stored is less than 3.5 kPa. Fuel oil storage tank P9 was constructed in 1949. Therefore, in accordance with 40 CFR 60.110b (b), NSPS Subpart Kb does not apply to either Tank P8 or Tank P9.</p> <p>These standards apply to storage tank that are 40,000 gallons or greater and store petroleum liquids with vapor pressure of 1.5 pounds per square inch absolute or greater. Storage tanks P8 and P9 are both 50,000 gallons which store diesel. Since the vapor pressure of diesel is less than 1.5 pounds per square inch absolute, storage tanks P8 and P9 are not subject to the requirements of A.A.C. R18-2-710.</p>
Fugitive Dust Sources	Water Trucks Dust Suppressants	A.A.C. R18-2 Article 6 A.A.C. R18-2-702	These standards are applicable to all fugitive dust sources at the facility.
Abrasive Blasting	Wet blasting; Dust collecting equipment; Other approved methods	A.A.C. R-18-2-702 A.A.C. R-18-2-726	These standards are applicable to any abrasive blasting operation.
Spray Painting	Enclosures	A.A.C. R18-2-702 A.A.C. R-18-2-727	This standard is applicable to any spray painting operation.
Demolition/Renovation Operations	N/A	A.A.C. R18-2-1101.A.8	This standard is applicable to any asbestos related demolition or renovation operations.
Mobile Sources	None	A.A.C. R18-2-801	These are applicable to off-road mobile sources, which either move while emitting air

Unit	Control Device	Rule	Verification
			pollutants or are frequently moved during the course of their utilization.

**V. PREVIOUS PERMIT CONDITIONS**

Permit No. 52663 was issued on October 13, 2011, for the continued operation of this facility. Table 3 below illustrates if a section in Permit No. 52663 was revised, kept, or deleted.

**Table 3: Permit No. 52663**

Section No.	Determination			Comments
	Revised	Keep	Delete	
Att. A.	X			General Provisions - Revised to represent most recent template language.
Att. B, Section I	X			Facility Wide Requirement – Revised to include Alt Method-082 for opacity observations.
Att. B, Section II	X			Gas Turbine Units P1, P2, P3, and P4 – Revised to allow water to fuel ratio for estimating NO <sub>x</sub> and CO emissions from Units P1, P2, and P3. Unit P4 retains the CEMS for monitoring NO <sub>x</sub> and CO.
Att. B, Section III		X		Internal Combustion Engines
Att. B, Section IV		X		Diesel Storage Tanks
Att. B, Section V		X		Fugitive Dust Requirements
Att. B, Section VI		X		Mobile Source Requirements
Att. B, Section VII		X		Other Periodic Activities

**VI. MONITORING REQUIREMENTS**

**A. Gas Turbine Units P1, P2, P3, and P4**

**1. NO<sub>x</sub>**

The permit contains a voluntarily accepted facility wide emission limit of 240 tons per year of NO<sub>x</sub>. This limit applies to the total combined emissions from Gas Turbine Units P1, P2, P3, P4; emergency generator EGEN; and black start compression ignition engines BSP1, BSP2, and BSP3 calculated as a rolling 365-day total. To show compliance with this limit, the Permittee is required to calculate the emissions of NO<sub>x</sub> from Gas Turbine Units P1, P2, and P3 using the heat input and the respective emission factor; to calculate the emission of NO<sub>x</sub> from Gas Turbine Unit P4 using the NO<sub>x</sub> CEMS; and to calculate the emissions of NO<sub>x</sub> from emergency generator EGEN and black start engines BSP1, BSP2, and BSP3 using the operating hour data and the respective emission factors.

2. SO<sub>2</sub>

The turbine units are subject to a SO<sub>2</sub> standard in NSPS Subpart GG, 40 CFR 60.333(b), which requires that no fuel with a sulfur content in excess of 0.8 percent may be combusted in any gas turbine. The permit contains a more stringent fuel sulfur limit of less than or equal to 0.2 percent by weight, which was voluntarily accepted by UNSE. To show compliance with the more stringent limit on fuel sulfur content, the Permittee is required to maintain a copy of the Federal Energy Regulatory Commission approved Tariff agreement that contains the sulfur content of the natural gas consumed in the turbines.

The permit also contains a voluntarily accepted emission limit of 200 tons per year of SO<sub>2</sub> from the Gas Turbine Units P1, P2, P3, and P4. This limit is calculated as a rolling 12-month total. For compliance demonstration with the annual SO<sub>2</sub> emission limit from the Gas Turbine Units P1, P2, P3, and P4, the Permittee is required to use fuel sulfur specification data, fuel usage records, and approved emission factors to calculate total combined SO<sub>2</sub> emissions as a monthly 12-month total.

3. CO

The permit contains a voluntarily accepted facility-wide emission limit of 240 tons per year of CO. This limit applies to the total combined emissions from Gas Turbine Units P1, P2, P3, P4; emergency generator EGEN; and black start compression ignition engines BSP1, BSP2, and BSP3 calculated as a rolling 365-day total. To show compliance with this limit, the Permittee is required to calculate the emissions of CO from Gas Turbine Units P1, P2, and P3 using the heat input and the respective emission factor; to calculate the emissions of CO from Gas Turbine Unit P4 using the CO CEMS; and to calculate the emissions of CO from emergency generator EGEN and black start engines BSP1, BSP2, and BSP3 using the operating hour data and the respective emission factors.

4. Fuel Flow Rate Monitoring Systems

The Permittee must operate a fuel flow rate monitoring system on Gas Turbine Units P1, P2, P3, and P4 for determining the natural gas and/or distillate fuel oil input rate.

**B. Fugitive Dust**

1. The Permittee is required to keep record of the dates and types of dust control measures employed.
2. The Permittee is required to show compliance with the opacity standards by having a Method 9 certified observer perform a quarterly survey of visible emission from fugitive dust sources. The observer is required to conduct a 6-minute Method 9 observation if the results of the initial survey appear on an instantaneous basis to exceed the applicable standard.
3. The Permittee is required to keep records of the name of the observer, the time, date, and location of the observation and the results of all surveys and observations.

4. The Permittee is required to keep records of any corrective action taken to lower the opacity of any emission point and any excess emission reports.

**C. Periodic Activities**

1. The Permittee is required to record the date, duration and pollution control measures of any abrasive blasting project.
2. The Permittee is required to record the date, duration, and quantity of paint used, any applicable MSDS, and pollution control measures of any spray painting project.
3. The Permittee is required to maintain records of all asbestos related demolition or renovation projects. The required records include the “NESHAP Notification for Renovation and Demolition Activities” form and all supporting documents.

**VII. EMISSIONS MONITORING SYSTEMS**

Permit No. 52663 required the use of CEMS to monitor and record the emissions of NO<sub>x</sub> and CO from Gas Turbine Units P1, P2, P3, and P4.

This permit renewal requires the use of a continuous monitoring system to monitor and record the fuel consumption and the ratio of water to fuel being burned in Gas Turbine Units P1, P2, and P3. NO<sub>x</sub> emissions are calculated using the NO<sub>x</sub> limit in Subpart GG as the emission factor. CO emissions are calculated using the 90<sup>th</sup> percentile point measured by the CO CEMS over the last permit term.

This permit renewal continues to require the use of NO<sub>x</sub> and CO CEMS to monitor emissions from Gas Turbine Unit P4.

**VIII. TESTING REQUIREMENTS**

**A. NO<sub>x</sub>**

1. Gas Turbine Units P1, P2, and P3
  - a. First Year and Fifth Year of Permit Term

The Permittee is required to conduct a performance test for NO<sub>x</sub> on each of Gas Turbine Units P1, P2 and P3 during the first year and fifth year of the permit term. Concurrent with the performance test, the Permittee shall determine the fuel consumption and the water to fuel ratio necessary to comply with NSPS NO<sub>x</sub> emission limit.

- b. Second Year, Third Year, and Fourth Year of the Permit Term

During the second, third, and fourth year that either Gas Turbine Units P1, P2, or P3 operates 500 hours or more, the Permittee is required to conduct a performance test on all three Gas Turbine Units P1, P2, and P3.



2. Gas Turbine Unit P4

The Permittee is required to conduct annually a Relative Accuracy Test Audit on the NO<sub>x</sub> and CO CEMS to verify the accuracy of the monitoring equipment.

B. CO

During any year of the permit term that either Gas Turbine Units P1, P2, or P3 operates 500 hours or more, the Permittee is required to conduct a performance test on all three Gas Turbine Units P1, P2, and P3.

IX. COMPLIANCE ASSURANCE MONITORING (CAM)

CAM applies to emission units located at a major source subject to the Title V permitting program, is subject to an emission limit, is equipped with a control device to achieve compliance with the emission limit, and has an uncontrolled potential to emit equal greater than 100 tons per year for a regulated air pollutant, 10 tons per year of a single HAP, or 25 tons per year of all HAPs combined.

None of the gas turbine units at the VPP are equipped with a control device. Therefore, none of the gas turbines are subject to CAM.

X. COMPLIANCE HISTORY

Since Permit No. 52663 was issued on October 13, 2011, forty one inspections (file reviews, report reviews, facility inspections, and test report reviews) have been conducted to ensure compliance with applicable permit conditions. No violations were found.

XI. LIST OF ABBREVIATIONS

A.A.C.	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
AQD	Air Quality Division
CO	Carbon Monoxide
HAP	Hazardous Air Pollutant
hp	Horsepower
MMBtu	Million British Thermal Units
MW	Mega Watt
NO <sub>x</sub>	Nitrogen Oxide
O <sub>3</sub>	Ozone
Pb	Lead
PM <sub>2.5</sub>	Particulate Matter Nominally less than 2.5 Micrometers
PM <sub>10</sub>	Particulate Matter Nominally less than 10 Micrometers
PTE	Potential-to-Emit
SO <sub>2</sub>	Sulfur Dioxide
TPY	Tons per Year
VOC	Volatile Organic Compound