



**TECHNICAL REVIEW AND EVALUATION
OF APPLICATION FOR
AIR QUALITY PERMIT No. 88081**

I. INTRODUCTION

This Class I Renewal permit is for the continued operation of UNS Electric, Inc.'s Valencia Power Plant. Permit No. 88081 renews and supersedes Permit No. 63697.

A. Company Information

Facility Name: Valencia Power Plant
Mailing Address: P.O. Box 711, Mail Stop HQW705
Tucson, AZ 85702
Facility Location: 1741 N Grand Ave
Nogales, AZ 85621

B. Attainment Classification

Valencia Power Plant is located in a non-attainment area for particulate matter with a diameter less than 10 microns (PM10) and particulate matter with a diameter less than 2.5 microns (PM2.5). The area is designated in attainment or unclassified for all other criteria pollutants.

II. PROCESS DESCRIPTION

A. Process Equipment

Valencia Power Plant is a peaking power plant currently operating four (4) simple cycle combustion turbine generator units, three (3) supporting starter compression ignition engines, and one (1) emergency compression ignition internal combustion engine.

The combustion turbines installed on-site include three Hitachi MS 5001 M-series units rated at 13.5 MW each (Units P1, P2, and P3) and one General Electric LM 2500 unit rated at 23 MW (Unit P4). Each unit can be fired on natural gas, distillate fuel oil, or a combination of the two fuels. Natural gas is supplied through a pipeline owned by El Paso Natural Gas which runs through Nogales. Distillate fuel oil is stored on-site in two 50,000 gallon storage tanks.

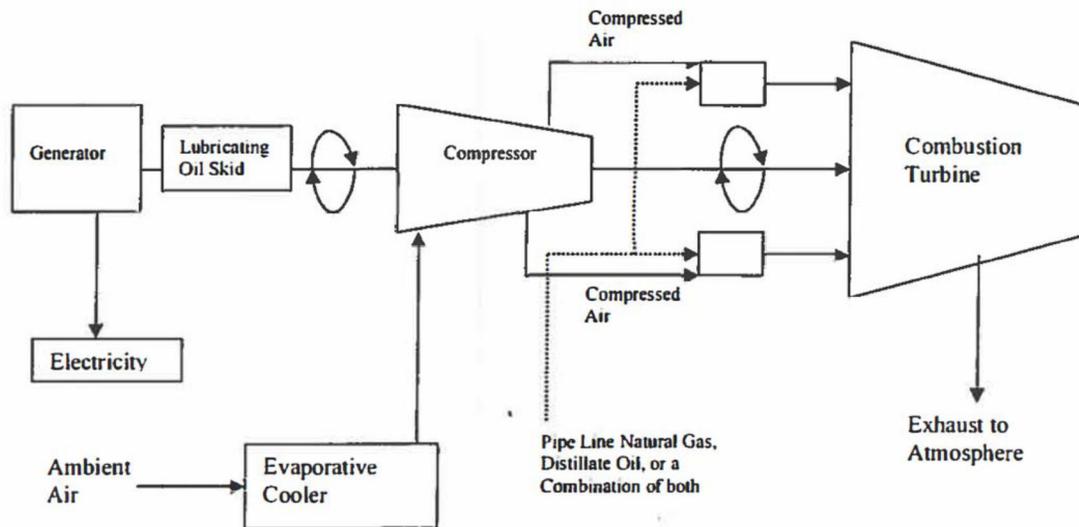
To demonstrate compliance with the 365-day rolling total nitrogen oxides (NO_x) and carbon monoxide (CO) emission limits voluntarily accepted by the Permittee, three combustion turbine units (P1, P2, and P3) use continuous monitoring system to monitor and record fuel consumption and the ratio of water to fuel being burned in the turbines. The fourth combustion turbine (P4) utilizes NO_x and CO continuous emission monitoring systems (CEMS).

B. Control Devices

Each of the combustion turbine units utilizes water injection to minimize emissions of NO_x.

C. Process Flow Diagram

Figure 1: Process Flow Diagram for Valencia Power Plant (per unit)

**III. LEARNING SITE EVALUATION**

In accordance with ADEQ's Environmental Permits and Approvals near Learning Sites Policy, the Department is required to conduct an evaluation to determine if any nearby learning sites would be adversely impacted by the facility. Learning sites consist of all existing public schools, charter schools and private schools the K-12 level, and all planned sites for schools approved by the Arizona School Facilities Board. The learning sites policy was established to ensure that the protection of children at learning sites is considered before a permit approval is issued by ADEQ.

This renewal permit will not result in any increase in emissions as there are no changes to any equipment. Hence the facility is exempt from the learning sites evaluations.

IV. COMPLIANCE HISTORY

Valencia Power Plant submitted nine (9) semiannual compliance reports during the permit term. In addition, the facility also submitted sixteen (16) monitoring reports. No violations were issued as a result of the submitted compliance and monitoring reports.

Valencia Power Plant submitted two (2) permit deviations during the permit term. A permit deviation was received on October 24th, 2019 as a result of the facility failing to report performance test results within 30 days of testing being completed. An additional permit deviation was submitted on November 10th, 2020 as a result of a lapse in EPA Method 9 certification at the facility during the COVID-19 pandemic. No violations were issued as a result of the submitted permit deviations.

Valencia Power Plant received five (5) routine inspections during the permit term. No violations were noted during the inspections.

Valencia Power Plant conducted five (5) performance tests during the permit term. The results of the performance tests are detailed in Table 1 below:

Table 1: Performance Test Results

Emission Unit	Pollutant	Date of Test	Standard	Result	Results of Performance Test
Unit P2	NO _x	10/12/2017	75 ppmvd	46.475 ppmvd	Pass
Unit P3	NO _x		75 ppmvd	45.675 ppmvd	Pass
Unit P1	NO _x	11/15/2017	RATA	RATA	Pass
	CO		RATA	RATA	Pass
Unit P4	NO _x	8/22/2018	75 ppmvd	47.2 ppmvd	Pass
	CO		240 tpy	55.6 tpy	Pass
Unit P1	NO _x	8/15/2019	75 ppmvd	55 ppmvd	Pass
	CO		240 tpy	39 tpy	Pass
Unit P1	NO _x	8/17-	75 ppmvd	42-66 ppmvd	Pass
Unit P2		19/2020,	75 ppmvd	41-59 ppmvd	Pass
Unit P4		8/27/2020	75 ppmvd	33 ppmvd	Pass

V. EMISSIONS

Valencia Power Plant's potential-to-emit (PTE) was calculated using emission factors from AP-42. The facility has a PTE above the major source thresholds of NO_x, CO, and SO₂. In order to avoid classification as a Prevention of Significant Deterioration (PSD) major source, the Permittee voluntarily accepted emission limits on NO_x, CO, and SO₂ that are below the PSD unclassified major source threshold of 250 tons per year. The potential-to-emit of all other regulated pollutants are below the major source thresholds.

The Nogales area of Santa Cruz County is designated nonattainment for PM_{2.5}. Since VPP's combined potential-to-emit of NO_x and SO₂ (pre-cursors to PM_{2.5}) is greater than 100 tons per year, the facility is a major source with respect to nonattainment New Source Review (NSR). When the area is designated as a PM_{2.5} attainment area, Valencia Power Plant will no longer be a major source with respect to nonattainment NSR.

The facility's PTE is provided in Table 2 below:

Table 2: Potential-to-Emit (tpy)

Pollutant	Emissions
NO _x	240 ¹
PM ₁₀	48.76
PM _{2.5}	48.76
CO	240 ¹
SO ₂	200.27 ²
VOC	2.14
Pb	.11
HAPs	5.08
GHG (CO ₂ e)	638,108

1 Valencia Power Plant voluntarily accepted a 240 tons per year limit on NO_x and CO emissions, calculated daily as a rolling 365-day total.

2 Valencia Power Plant voluntarily accepted a 200 tons per year limit on SO₂ emissions from the combustion turbine units, calculated as a rolling 12-month total.

VI. VOLUNTARILY ACCEPTED EMISSION LIMITATIONS AND STANDARDS

The permit contains the following voluntary emission limitations and standards:

A. Facility Wide Emissions

Valencia Power Plant has accepted voluntary emission limits of 240 tons per year of CO and NO_x to avoid triggering PSD major source applicability.

Emissions factors of .326 lb of NO_x/MMBtu and .593 lb of CO/MMBtu have been accepted for the calculation of the mass emissions for the respective pollutants from each gas turbine unit. The NO_x emissions factor is derived from the 75 ppmvd emissions limit established in New Source Performance Standard (NSPS) Subpart GG (Standards for Stationary Turbines), while the CO emissions factor is derived from the historical 90% CO CEMS reading of 224 ppmvd. The performance testing results outlined in Section IV of this document demonstrate that the voluntary emissions factors are sufficiently conservative for the calculation of emissions from the gas turbine units.

B. Gas Turbine SO₂ Emissions

The facility has accepted a voluntary emission limit of 200 tons per year of CO and NO_x for the gas turbine units to avoid triggering PSD major source applicability. A voluntary limit on fuel sulfur content of .2% by weight has been agreed upon to reduce emissions of SO₂. For reference, NSPS Subpart GG imposes a 0.8% by weight limit on fuel sulfur content.

VII. APPLICABLE REGULATIONS

Table 3 identifies applicable regulations and verification as to why that standard applies. The table also contains a discussion of any regulations the emission unit is exempt from.

Table 3: Applicable Regulations

Unit & year	Control Device	Rule	Discussion
<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) 23 MW</p>	<p>Water Injection System</p>	<p>New Source Performance Standards (NSPS) Subpart GG</p> <p>NSPS Subpart KKKK</p> <p>National Emissions Standard for Hazardous Air Pollutants (NESHAP) Subpart YYYY</p> <p>Acid Rain Program</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_x and SO₂ 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 YYYY 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 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>

Unit & year	Control Device	Rule	Discussion
Caterpillar C18DE96 923 HP (EGEN/2010)	None	40 CFR 60 Subpart III NESHAP Subpart ZZZZ	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 III.
Detroit Diesel 8083- 7400 480 HP (BSP1, BSP 2, BSP3/1988)	None	A.A.C. R18-2- 719 NESHAP Subpart ZZZZ	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.

Unit & year	Control Device	Rule	Discussion
Fuel Oil Storage Tanks (P8/1949 and P9/1997)	None	A.A.C. R18-2-730 NSPS Subpart Kb A.A.C. R18-2-710	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, 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. 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.
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	These standards are 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.

VIII. PREVIOUS PERMIT REVISIONS AND CONDITIONS

A. Changes to Current Renewal

Table addresses the changes made to the sections and conditions from Permit No. 63697:

Table 4: Previous Permit Conditions

Section No.	Determination			Comments
	Added	Revised	Deleted	
Att. "A"		X		General Provisions: Revised to represent the most recent template language.
Att. "B" Section I		X		Facility Wide Requirements: Revised to represent the most recent template language.
Att. "B" Section II		X		Gas Turbine Unit Requirements: Revised performance testing requirements for CO for the Gas Turbine Units.
Att. "B" Section III		X		Internal Combustion Engine Requirements: Minor revisions made to language in Emergency Generator permit conditions.
Att. "C"		X		Equipment List: Revised to reflect the most recent equipment operating at the facility and to include equipment information provided.

IX. MONITORING, RECORDKEEPING, AND REPORTING REQUIREMENTS

Table contains an inclusive but not an exhaustive list of the monitoring, recordkeeping and reporting requirements prescribed by the air quality permit. The table below is intended to provide insight to the public for how the Permittee is required to demonstrate compliance with the emission limits in the permit.

Table 5: Permit No. 88081

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Facility-Wide	CO	240 tpy, calculated as a rolling daily average		Keep records of daily and rolling 365-day totals of the hours of operation of Gas Turbine Units P1, P2, and P3, emergency generator EGEN; and startup engines BSP1, BSP2, BSP3.	Report each calendar day during which total combined rolling 365-day total CO emissions exceed 240 tons for the facility.
	NO _x	240 tpy, calculated as a rolling daily average		<p>Calculate the rolling 365-day total emissions of NO_x and CO from Gas Turbine Units P1, P2, P3, P4; emergency generator EGEN; and startup engines BSP1, BSP2, and BSP3.</p> <p>Maintain all CEMS and fuel flow monitoring system performance evaluations, calibration checks, and maintenance activities.</p> <p>Maintain all compliance documents including</p>	Report each calendar day during which total combined rolling 365-day total NO _x emissions exceed 240 tons for the facility.

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
				calculations, report, and supporting documentation.	
Gas Turbine Units	NO _x	75 ppmvd	<p>Install NO_x CEMS on Unit P4.</p> <p>Install fuel flow monitoring systems on each gas turbine unit.</p> <p>Install a continuous monitoring system for units P1, P2, and P3 to monitor and record the fuel consumption and ratio of water to fuel being fired in each gas turbine unit.</p> <p>Performance Testing shall be conducted in the first year of the permit term to demonstrate compliance with the NO_x standards. The water to fuel monitoring system shall be operated concurrently and shall be used to determine the fuel consumption and the water to fuel ratio</p>		<p>Report any unit operating hour for which the average water to fuel ratio falls below the acceptable water to fuel ratio needed to demonstrate compliance with NO_x emissions limits as identified by the initial performance test. Any unit operating hour in which no water is injected into the turbine shall also be reported as an excess emission.</p> <p>Report when CEMS identify the 4-hour rolling average NO_x concentration to exceed the applicable NO_x emissions limit.</p>

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
			<p>necessary to comply with the NO_x emissions limit. Additional testing shall be conducted in the second, third, and fourth year if either unit operates 500 hours or more. During the fifth year of the permit term, testing shall be conducted to determine compliance with the NO_x standard.</p>		
	CO		<p>Performance Testing shall be conducted on units P1, P2, and P3 in the first year of the permit term to demonstrate compliance with the CO emissions factor. Additional testing shall be conducted in the second, third, and fourth year if either unit operates 500 hours or more. During the fifth year of the permit term, testing shall be conducted to determine compliance with the CO emissions factor.</p>		

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
	SO ₂	200 tpy, calculated as a rolling monthly average.		Maintain a vendor-provided copy of the Federal Energy Regulatory Commission (FERC) approved Tariff agreement that contains sulfur content and lower heating value of the pipeline quality natural gas.	Report each calendar month during which total combined rolling 12-month SO ₂ emissions exceeds 200 tons.
Engines (subject to state regulations)	PM	40% opacity – for any period greater than 10 seconds	Conduct periodic opacity monitoring on a quarterly basis.	Maintain records of the lower heating value of the fuel.	Report all 6-minute periods which the opacity exceeded 15%.
	SO ₂	1.0 lb/MMBtu		Record the daily sulfur content of the fuel used in the engines.	Report to the Director any daily period which the sulfur content exceeds 0.8%.
Fugitive Dust	PM	40% Opacity	A Method 9 observer is required to conduct a quarterly survey of visible emissions.	Record of the dates and types of dust control measures employed, and if applicable, the results of any Method 9 observations, and any corrective action taken to lower the opacity of any excess emissions.	
Abrasive Blasting	PM	20% Opacity		Record the date, duration and pollution control	

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
				measures of any abrasive blasting project.	
Spray Painting	VOC	20% Opacity Control 96% of the overspray		Maintain records of the date, duration, quantity of paint used, any applicable MSDS, and pollution control measures of any spray painting project.	
Demolition/ Renovation	Asbestos			Maintain records of all asbestos related demolition or renovation projects including the “NESHAP Notification for Renovation and Demolition Activities” form and all supporting documents	

X. LIST OF ABBREVIATIONS

A.A.C.	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
AERMOD	AMS/EPA Regulatory Model
AERMET	AERMOD Meteorological Preprocessor
AMS	American Meteorological Society
AQD	Air Quality Division
AQRV	Air Quality Related Values
ARM	Ambient Ratio Method
A.R.S.	Arizona Revised Statutes
BACT	Best Available Control Technology
Btu/ft ³	British Thermal Units per Cubic Foot
CAM	Compliance Assurance Monitoring
CEMS	Continuous Emissions Monitoring System
CFR	Code of Federal Regulations
CH ₄	Methane
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CO ₂ e	CO ₂ equivalent basis
EPA	Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
FLM	Federal Land Manager
°F	degrees Fahrenheit
ft	Feet
g	Gram
GHG	Greenhouse Gases
HAP	Hazardous Air Pollutant
HHV	Higher Heating Value
hp	Horsepower
hr	Hour
IC	Internal Combustion
kW	Kilowatt
MW	Megawatts
NAAQS	National Ambient Air Quality Standard
NO _x	Nitrogen Oxides
NO ₂	Nitrogen Dioxide
N ₂ O	Nitrous Oxide
NSPS	New Source Performance Standards
O ₃	Ozone
Pb	Lead
PM	Particulate Matter
PM ₁₀	Particulate Matter less than 10 µm nominal aerodynamic diameter
PM _{2.5}	Particulate Matter less than 2.5 µm nominal aerodynamic diameter
PSD	Prevention of Significant Deterioration
psia	Pounds per square Inch (absolute)
PTE	Potential to Emit
sec	Seconds
SF ₆	Sulfur Hexafluoride

SIA..... Significant Impact Area
SIL..... Significant Impact Level
SO₂..... Sulfur Dioxide Significant Impact Levels
TPY..... Tons per Year
VOC..... Volatile Organic Compound
yr..... Year