TECHNICAL REVIEW AND EVALUATION
FOR
UNS ELECTRIC, INC.
AIR QUALITY PERMIT NO. 32961

I. COMPANY INFORMATION

UNS Electric, Inc. (UNSE), a wholly owned subsidiary of UniSource Energy Corporation, owns and operates the Valencia Power Plant located at 1741 North Grand Avenue in Nogales, AZ. UNSE is a major source for Title V purposes, with potential emissions of nitrogen oxides (NO_x), carbon monoxide (CO), and sulfur dioxide (SO_2) each exceeding 100 tons per year.

A. Company Information

Facility Name: Valencia Power Plant
Mailing Address: 1741 North Grand Avenue, Nogales, AZ 85621

B. Attainment Classification

This source is located in a non-attainment area for PM_{10}.

II. PROCESS DESCRIPTION

The UNSE Valencia Power Plant is a peaking power plant currently operating three (3) simple cycle combustion turbine generator units rated at 13.5 MW each and associated equipment (Gas Turbine Units P1, P2, and P3). This renewal of Title V Permit No. 1000402 incorporates a significant revision to that permit allowing the construction and operation of a new simple cycle combustion turbine generator rated at less than 25 MW (Gas Turbine Unit P4). With this permit renewal and significant revision, UNSE is permitted to construct new Gas Turbine Unit P4 and operate four (4) simple cycle combustion turbines (Gas Turbine Units P1, P2, P3, and P4) firing natural gas and/or distillate fuel oil.

The four combustion turbines located at the Valencia Power Plant include three Hitachi MS 5001 M-series units rated at 13.5 MW each and one General Electric LM2500 or equivalent rated at less than 25 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 (EPNG) that runs through Nogales. Distillate fuel oil is stored onsite in two 50,000-gallon storage tanks.

UNSE utilizes water injection on each of the four facility combustion turbines to control NO_x emissions. Each of the combustion turbines is equipped with NO_x and CO continuous emission monitoring systems (CEMS) for the purpose of demonstrating compliance with annual, 365-day rolling total emission limits voluntarily accepted to avoid major source status under the prevention of significant deterioration (PSD) regulations.

III. EMISSIONS

The Valencia Power Plant has the potential to emit regulated air pollutants, including nitrogen oxides (NO_x), carbon monoxide (CO), and sulfur dioxide (SO_2) in excess of the 100 ton-per-year Title V major source threshold. Enforceable emission limitations have been voluntarily accepted by UNSE to limit NO_x, CO, and SO_2 emissions below applicable PSD major source thresholds. Unrestricted potential emissions of all other PSD regulated pollutants are below major source thresholds. Santa Cruz County is designated nonattainment for PM_{10}. Potential emissions of PM_{10} from the Valencia Power Plant, including the new combustion turbine, are below 100 tons-per-year. Therefore, the facility constitutes a minor source with respect to nonattainment NSR. The Valencia Power Plant is a non-major source of HAP emissions, with potential emissions below 10 and 25 tons-per-year for any single HAP and total combined HAP, respectively.

The Valencia Power Plant combustion turbines are designed to fire natural gas, distillate fuel oil, and a combination of both fuels. The potential to emit for the facility was calculated assuming all four combustion turbines operating continuously at peak heat input rates firing the highest-emitting fuel. Facility-wide potential-to-emit, including the new Gas Turbine Unit P4 is summarized in Table 1 below.

TABLE 1: FACILITYWIDE POTENTIAL TO EMIT

POLLUTANT	POTENTIAL EMISSIONS, TONS PER YEAR**
CO	240*
NO_x	240*
SO_2	200*
VOC	8.6**
PM_{10}	63
Total HAP	4.9**

* Unrestricted PTE exceeds annual emission limit. UNSE has voluntarily accepted limits on NO_x & CO emissions of 240 tons-per-year (365-day rolling total). For SO_2, a limit of 200 tons-per-year has been accepted, expressed as a 12-month rolling total.

** Includes PTE from other minor emission units, e.g., two 50,000 gallon diesel fuel storage tanks and gasoline fuel nozzle unit.

IV. COMPLIANCE HISTORY

Inspections are being regularly conducted at the UNSE to ensure compliance with its applicable permit conditions. UNSE is currently in compliance with the permit conditions cited in Permit #1000402. UNSE has not been issued any Notice of Violation (NOV) to date. The Compliance Test Report for the tests conducted in the years 2001 and 2003 are enclosed.

V. APPLICABLE REGULATIONS

As part of the Title V renewal and significant revision permit applications, the Permittee performed a regulatory review and identified air quality regulations applicable to the existing and proposed new emission units at the Valencia Power Plant. Table 2 summarizes the findings of the Department with respect to the applicability or non-applicability of specific regulations to emission units and emission units groups. Previous permit conditions are discussed under Section VI of this technical review document.

TABLE 2: APPLICABLE REGULATIONS

Unit ID	Start-up date	Control Equip.	Regulation(s)	Applicable? (Y/N)	Verification
Hitachi MS 5001 Gas Turbine Units P1, P2, & P3 13.5 MW Each	1998	Water Injection Systems	NSPS Gen. Provisions A.A.C R18-2-901(1),(2) 40 CFR 60 Subpart A NSPS Subpart GG A.A.C R18-2-901(40) 40 CFR 60.332(a)(1) 40 CFR 60.332(b) 40 CFR 60.333(b) 40 CFR 60.334(a) or 40 CFR 60.334(b) 40 CFR 60.334(d) 40 CFR 60.334(g) 40 CFR 60.334(h) 40 CFR 60.334(i) 40 CFR 60.334(j) 40 CFR 60.335	Y	Gas Turbine Units P1, P2, and P3 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 SO_2 standards of 40 CFR 60 Subpart GG and the associated general provisions in 40 CFR 60 Subpart A.
General Electric LM 2500 or Equivalent Gas Turbine Unit P4 < 25 MW	2005	Water Injection System	NSPS Gen. Provisions A.A.C R18-2-901(1),(2) 40 CFR 60 Subpart A NSPS Subpart GG A.A.C R18-2-901(40) 40 CFR 60.332(a)(1) 40 CFR 60.332(b) 40 CFR 60.333(b) 40 CFR 60.334(a) or 40 CFR 60.334(b) 40 CFR 60.334(d) 40 CFR 60.334(g) 40 CFR 60.334(h) 40 CFR 60.334(i) 40 CFR 60.334(j) 40 CFR 60.335	Y	Gas Turbine Unit P4 commenced construction after October 3, 1977 and has a heat input at peak load greater than 10.7 GJ/hr (10 MMBtu/hr). The unit is subject to the NO_x and SO_2 standards of 40 CFR 60 Subpart GG and the associated general provisions in 40 CFR 60 Subpart A.
			NSPS Subpart KKKK 40 CFR 60.4300 - 60.4420 (Proposed)	N	This new NSPS was proposed on 2/18/2005 (70 FR 8314) but has not been promulgated as of the issuance date of this permit. The Standard may be applicable to Gas Turbine Unit P4 upon promulgation if the selected unit was constructed, reconstructed or modified after 2/18/2005.

Unit ID	Start-up date	Control Equip.	Regulation(s)	Applicable? (Y/N)	Verification
General Electric LM 2500 or Equivalent Gas Turbine Unit P4 < 25 MW (Continued)	2005	Water Injection System	NESHAP Subpart YYYY 40 CFR 63.6080 - 63.6175	N	40 CFR 63 Subpart YYYY applies to stationary combustion turbines located at major sources of HAP emissions. As documented in Section III, the Valencia Power Plant is a minor source of HAP. Therefore, NESHAP/MACT standards are not applicable.
			PSD A.A.C. R18-2-406	N	UNSE has voluntarily accepted limitations (caps) on NO_x, CO, and SO_2 emissions to ensure that facility-wide potential emissions are below the major source threshold of 250 tons per year. New Gas Turbine Unit P4 has been included under the existing emission caps. Therefore, PSD requirements are not applicable.
			Nonattainment NSR A.A.C. R18-2-403	N	The Valencia Power Plant is located in a PM_{10} nonattainment area. As documented in Section III, total facility-wide potential emissions of PM_{10} are less than the major source threshold of 100 tons per year. Therefore, nonattainment NSR requirements are not applicable.
			Acid Rain Program A.A.C. R18-2-333 40 CFR 72 – 78	N	With respect to Acid Rain Program applicability, if UNSE purchases a simple combustion turbine as Gas Turbine Unit P4 that sold electricity prior to November 15, 1990, it would be an unaffected unit in accordance with 40 CFR 72.6(b)(1) regardless of who previously owned the unit and where previously located (or relocated). The refurbishment of an affected unit will not trigger Acid Rain applicability as long as the work being done on the unit can be characterized as a modification, repowering, or reconstruction. If Gas Turbine Unit P4 is an affected unit under the Acid Rain Program, Gas Turbine Unit P4 will meet the “New Units Exemption” criteria in 40 CFR 72.7. Exemption qualification requirements are contained in Attachment “D” of the permit.

Unit ID	Start-up date	Control Equip.	Regulation(s)	Applicable? (Y/N)	Verification
Fuel Oil Storage Tanks P8, P9 50,000 Gallons Each	1949 (P9) 1997 (P8)	None	NSPS Subpart Kb 40 CFR 60.110b - 60.117b	N	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, therefore, in accordance with 40 CFR 60.110b(b), the NSPS is not applicable.
Mobile Sources	Not Applicable	Control Measures	A.A.C. R18-2-801 R18-2-802.A R18-2-804	Y	These regulations are applicable to all mobile sources.
Fugitive Dust Sources	Not Applicable	Control Measures	A.A.C. R18-2-602 R18-2-604 R18-2-605.A R18-2-804.B	Y	The regulations listed are applicable to non point sources.
Other Periodic Activities	Not Applicable	Wet blasting, Enclosure or equivalent approved by Director	A.A.C. R18-2-702.B R18-2-726 R18-2-727 Arizona SIP Provision R9-3-527.C R18-2-1101.A.8	Y	Relevant requirements applicable to abrasive blasting, use of paints, and demolition/renovation

VI. PREVIOUS PERMITS AND CONDITIONS

A. Previous Permits

Table 3 lists the previous permits that have been issued to UNSE, Inc. (or previous owner/operators) for the Valencia Power Plant.

TABLE 3: PREVIOUS PERMITS

PERMIT NUMBER	DATE ISSUED	APPLICATION BASIS
1000402	11/19/1999	Title V Operating Permit
1001233	05/02/2000	Significant Revision
1001556	06/18/2002	Significant Revision
30173	06/27/2003	Permit Transfer

B. **Previous Permit Conditions**

The following is a discussion of the previous operating permit and subsequent revisions that were issued to the source.

<u>Title V Permit #1000402</u>

Condition No.	Determination				Comments
	Revise	Keep	Delete	Stream-line	
Att. A.	x				General Provisions - Revised to represent most recent permitting language
Att. B.I	x				The requirement to have a person on site certified in EPA Method 9 was removed. This requirement was associated with diesel RICE generator units that are no longer in operation. A new general condition to maintain a log of all maintenance related activities was added.
Att. B. II.	x				Revised since the Permittee, through Significant Permit Revision #1001556, accepted yearly emission limits for NO_x, SO_2, and CO.
Att. B. III			x		Deleted the requirements for Alco Diesel Generator Units through minor permit revision #1001233.
Att. B. IV			x		Requirements for diesel storage tank.
Att. B. V		x			Other periodic requirements.

<u>Minor permit revision #1001223 to Title V Permit #1000402</u>

Condition No.	Determination				Comments
	Revise	Keep	Delete	Stream-line	
Att. B. III			x		Deleted the requirements for Alco Diesel Generator Units

Att. C	x				Alco Diesel Engines, Equipment #'s P4, P5, P6, and P7 deleted.

<u>Significant permit revision #1001556 to Title V Permit #1000402</u>

Condition No.	Determination				Comments
	Revise	Keep	Delete	Stream -line	
Att. B. II.A	x				Gas Turbine Unit P4 was added. Conditions were revised and expanded to more accurately reflect applicable requirements in A.A.C. R18-2-901(1) [40 CFR 60 subpart A - NSPS General Provisions].
Att. B. II. B	x				"Fuel Oil #2" was revised to "distillate fuel oil" to provide additional flexibility. Requirement of keeping records of heat input to turbines, quantity of electrical generation by each turbine, and mode of operation-power augmentation or base load removed

Att. B. II. C.	x				Conditions II.C.2.c specifying water injection regimes were removed due to conflict with NSPS. In general, conditions were revised and expanded to more accurately reflect applicable requirements in A.A.C. R18-2-901(40) and 40 CFR 60 Subpart GG, as revised on July 8, 2004 (69 FR 41359). Permit conditions were structured to allow the flexibility to use either of the two NSPS compliance monitoring alternatives provided in revised Subpart GG (i.e., continuous water to fuel ratio monitoring or CEMS). Because A.A.C. R18-2-901 has not been updated to incorporate the July 8, 2004 Subpart GG revisions, transitional State-only enforceable conditions were added containing substantive and conflicting monitoring requirements from the earlier version of the NSPS that remain applicable until the State rule is updated (expected by 9/2006). Initial performance test requirements for Gas Turbine Unit P4 were added. The requirement to install, certify, calibrate, and maintain and operate continuous fuel flow rate monitoring systems was added. The monitoring, recordkeeping, and reporting conditions in Condition II.F are referenced for compliance demonstration with the 240 tpy NO_x limit.
Condition No.	**Determination**				**Comments**
	Revise	**Keep**	**Delete**	**Stream-line**	

Att. B. II. D	x				In general, conditions were revised and expanded to more accurately reflect applicable requirements in A.A.C. R18-2-901(40) and 40 CFR 60 Subpart GG, as revised on July 8, 2004 (69 FR 41359). Because A.A.C. R18-2-901 has not been updated to incorporate the July 8, 2004 Subpart GG revisions, a transitional State-only enforceable condition was added containing a conflicting monitoring requirement from the earlier version of the NSPS that remains applicable until the State rule is updated (expected by 9/2006). More complete permit terms were added specifying calculations, recordkeeping, and reporting requirements for compliance demonstration with the 200 tpy SO_2 limit.
Att. B. II. E	x				The requirement to install, certify, calibrate, maintain, and operate continuous fuel flow rate monitoring systems was added. The monitoring, recordkeeping, and reporting conditions in Condition II.F are referenced for compliance demonstration with the 240 tpy CO limit.
Att. B. II. F	x				The Condition heading was revised to "Monitoring, Recordkeeping, and Reporting Requirements for Annual NO_x and CO Emission Limits" to better represent the expanded content and correlate with the references in Conditions II.C and II.E. Sub-conditions were revised/expanded to include: • Requirement to use CEMS and fuel flow rate monitoring systems to calculate mass emissions of NO_x and CO; • Performance specifications and QA requirements for CEMS; • Calibration and QA procedures for fuel flow rate monitoring systems; and • Calculation, recordkeeping, and reporting requirements.

VII. EMISSION LIMITS AND PERIODIC MONITORING

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

NO_x: The units are subject to the NO_x standard in NSPS Subpart GG, 40 CFR 60.332(a)(1). The permit contains the STD equation and specifies that the variable F (fuel-bound nitrogen NO_x emissions allowance) = 0, and for Gas Turbine Units P1, P2, and P3, STD = 75 ppmv @ 15% O_2.

The permit contains a voluntarily accepted facility-wide emission limit of 240 tons per year of NO_x. This limit applies to the total combined emissions from Gas Turbine Units P1, P2, P3, and P4, calculated as a daily rolling 365-day total.

In accordance with 40 CFR 60 Subpart GG, UNSE has the option of using either continuous water to fuel ratio monitoring or CEMS for compliance demonstration with the NSPS NO_x limit. Because A.A.C. R18-2-901 has not been updated to incorporate the July 8, 2004 NSPS Subpart GG revisions that provide for the optional use of CEMS, the permit contains transitional State-only enforceable conditions requiring the use of continuous water to fuel ratio monitoring and associated excess emissions reporting until the State rule is updated (expected by 9/2006). An initial performance test is required for Gas Turbine Unit P4. Initial performance test and fuel consumption/water to fuel ratio monitoring equipment installation requirements have been met for Units P1, P2, and P3.

For compliance demonstration with the annual NO_x emission limit, the Permittee is required to install and operate CEMS and fuel flow rate monitoring systems which, in conjunction with the DAHS are used to calculate total combined NO_x emissions from Gas Turbine Units P1, P2, P3, and P4 as a daily rolling 365-day total.

The permit requires that NO_x and diluent CEMS be installed, certified, maintained, operated and quality assured in accordance with NSPS requirements. For Units P1, P2, and P3, the CEMS installation and certification requirements have been met.

SO_2: The units are subject to the SO_2 standard in NSPS Subpart GG, 40 CFR 60.333(b), which requires that no fuel with a sulfur content in excess of 0.8% may be combusted in any gas turbine. The permit contains a more stringent fuel sulfur limitation of less than or equal to 0.2%, which was voluntarily accepted by UNSE. The permit also contains a voluntarily accepted facility-wide emission limit of 200 tons per year of SO_2. This limit applies to the total combined emissions from Gas Turbine Units P1, P2, P3, and P4, calculated as a monthly rolling 12-month total.

Monitoring, recordkeeping, and reporting requirements for the fuel sulfur content limit are consistent with NSPS Subpart GG. For compliance demonstration with the annual SO_2 emission limit, the Permittee is required to use fuel sulfur specification data, fuel usage records, and approved emission factors to calculate total combined SO_2 emissions as a monthly rolling 12-month total.

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, and P4, calculated as a daily rolling 365-day total.

For compliance demonstration with the annual CO emission limit, the Permittee is required to install and operate CEMS and fuel flow rate monitoring systems which, in conjunction with the DAHS are used to calculate total combined CO emissions from Gas Turbine Units P1, P2, P3, and P4 as a daily rolling 365-day total.

The permit requires that CO and diluent CEMS be installed, certified, maintained, operated and quality assured in accordance with NSPS requirements. For Units P1, P2, and P3, the CEMS installation and certification requirements have been met.

VIII. COMPLIANCE ASSURANCE MONITORING

CAM is applicable to emission units at Part 70 sources with uncontrolled potential emissions equal to or greater than 100 tons per year (10 & 25 tons per year for HAP) that are subject to a non-exempted emission limitation or standard and that are equipped with a control device to achieve compliance with the subject limitation or standard. The gas turbine units at the Valencia Power Plant have potential emissions of NO_x, CO, and SO_2 in excess of 100 tons per year. There are no controls installed for CO and SO_2 emissions; therefore CAM does not apply to these two pollutants. Gas Turbine Units P1, P2, P3, and P4 are subject to NO_x emission limitations associated with NSPS Subpart GG and PSD minor source status. The facility utilizes water injection systems for NO_x emission control on the turbines, making CAM potentially applicable to these pollutant-specific emission units.

Under NSPS, two compliance monitoring approaches are available for NO_x emissions – continuous water to fuel ratio monitoring or CEMS. For compliance demonstration with the annual NO_x emission limit, the permit specifies the use of CEMS and continuous fuel flow rate monitoring systems. Both continuous water to fuel ratio monitoring as prescribed in NSPS Subpart GG and CEMS qualify as "continuous compliance determination methods" as defined in 40 CFR 64.1. Continuous water to fuel ratio monitoring in conjunction with the initial performance test established correlation provides data correlated directly with the compliance limit on a consistent averaging period. CEMS provide continuous data in the units of the standard with a consistent averaging period for the purpose of NSPS. CEMS in conjunction with fuel flow rate monitoring systems and calculations performed by the DAHS provide continuous data in the units of the applicable standard (tons per year) and with a consistent averaging period. Therefore, in accordance with 40 CFR 64.2(b)(1)(vi), CAM is not applicable to NO_x emissions from the gas turbine units.

IX. COMPLIANCE DEMONSTRATION WITH AMBIENT STANDARDS

A dispersion modeling analysis was conducted by the Permittee at the request of the Department to demonstrate compliance with the NAAQS and the AAAQG. Two potential turbine model selections representing new unit P4 were included in the analysis, GE LM250 and GE TM2500. These models differed only in physical layout (i.e., stack coordinates) and the predicted impacts were not significantly different. UNSE subsequently elected not to install a GE TM2500, and indicated that new Gas Turbine Unit P4 will be a GE LM2500 or equivalent.

<u>Emissions</u>

UNSE conservatively modeled the emissions from each individual unit (3 existing, plus the newly proposed unit) at 100% load, with the maximum time-averaged pollutant emission rate. Because VPP is a peaking power plant, extensive load screening was not conducted. Modeled emission rates are shown in Table 4. Modeled annual emissions of NO_x and SO_2 are based upon permit limits (240 tpy of NO_x, 200 tpy of SO_2). Annual PM_{10} emission rates are the maximum of either AP-42 factors or vendor supplied factors assuming 8760 hours per year of operation. This is a very conservative estimate because as a peaking plant, the turbines are unlikely to be operated continuously 365 days per year. Short-term emission rates are based upon worst-case hourly emissions from either natural gas or distillate oil – giving the facility flexibility to run either fuel. Because CO has higher emissions under reduced loads, CO emission rates are based upon worst-case emissions at 50%, 75%, and 100% load.

Table 4. Criteria Pollutant Emission Rates

	Averaging Time	Hitachi Turbine Unit 1	Hitachi Turbine Unit 2	Hitachi Turbine Unit 3	GE Turbine Unit 4
PM_{10}	24-hour	2.69 lb/hr	2.69 lb/hr	2.69 lb/hr	6.30 lb/hr
	Annual	11.77 tpy	11.77 tpy	11.77 tpy	27.59 tpy
CO	1-hour	94.97 lb/hr	94.97 lb/hr	94.97 lb/hr	101.17 lb/hr
	8-hour	94.97 lb/hr	94.97 lb/hr	94.97 lb/hr	101.17 lb/hr
SO_2	3-hour	45.25 lb/hr	45.25 lb/hr	45.25 lb/hr	39.11 lb/hr
	24-hour	45.25 lb/hr	45.25 lb/hr	45.25 lb/hr	39.11 lb/hr
	Annual	50 lb/hr	50 lb/hr	50 lb/hr	50 lb/hr
NO_x	Annual	60 lb/hr	60 lb/hr	60 lb/hr	60 lb/hr

Emission rates of hazardous air pollutants which are recognized as AAAQG pollutants were modeled with a unit emission rate (1.0 lb/hr) divided evenly among all four stacks (1/4 lb/hr per stack). A X/Q approach was used to determine maximum concentrations of individual pollutants.

Modeled stack parameters are shown in Table 5. The lower stack gas exit temperature and stack gas exit velocity as calculated for either fuel were used in the modeling. Exit velocities were calculated using the maximum heat input for each fuel (corrected for oxygen, moisture, and site pressure) and appropriate F-factors.

Table 5. Modeled Stack Parameters

Parameter	Hitachi Turbine Unit 1	Hitachi Turbine Unit 2	Hitachi Turbine Unit 3	GE Turbine Unit 4*
UTM Easting (m)	506565.4	506537.6	506538.3	506579.3
UTM Northing (m)	3469699.4	3469689.4	3469670.2	3469701.8
Base Elevation (m)	1143.52	1142.98	1143.49	1143.52
Stack Height (m)	9.1	9.1	9.1	13.7
Exit Temperature (F)	960.0	960.0	960.0	975.4
Exit Velocity (m/s)	22.18	22.18	22.18	25.90
Stack Diameter (m)	3.6	3.6	3.6	2.7

*LM2500 shown.

Three years of hourly meteorological observations from Nogales, with upper air observations from Tucson were used in the air quality impact analysis. This differs from the EPA modeling guidelines which recommends five years of meteorology from the nearest NWS airport. As such, the highest model-predicted short term impact should be used to demonstrate compliance with the short-term NAAQS. Because model-predicted impacts are so far below the annual NAAQS, the reviewer did not require five years of meteorological data.

A review of the meteorological data revealed that calm winds (i.e., less than 1.0 m/s) occurred 20% of the time. The calm periods occurred primarily in the early morning hours on many days throughout the year. This is important considering the applicant used a Gaussian plume model (ISCST3), and the Gaussian equation is not valid during calm wind conditions. The model is able to overcome this shortcoming by implementing the EPA calm processing routine, in which the calculation of short-term averaged concentrations are calculated by only considering concentrations for the non-calm hours. This effectively ignores fictitiously high model-predicted concentrations, but yet ignores the actual concentration during these periods as well. Due to the high frequency of calms, a Gaussian plume model may not have been the best choice; a puff model may have been more appropriate. However, because (1) only a few calm hours occur on any given day, and (2) the model-predicted impacts are so far below the NAAQS, use of a Gaussian plume model was allowed.

A three-dimensional receptor grid was established for the project to identify the maximum impacts from the facility. The grid extended from the US-Mexican border (approximately 4 km south of the facility) to 12 km north of the facility, and 10 km both east and west of the facility. Receptors were spaced at 25 meters along the process area boundary, 100 meter spacing from the process area boundary to 1 kilometer, 200 meter spacing from 1 kilometer to 5 kilometer, and 500 meter spacing from 5 to 10 km. Receptor elevations were obtained from USGS digitized terrain data.

Modeling Approach

SO_2

Compliance with the SO_2 standards was demonstrated by modeling the permit limit of 200 tpy of SO_2 as emitted evenly from all four stacks for all averaging periods, and again (in separate model runs) with all emissions coming from individual stacks (annual run only). Four runs were needed to represent all emissions coming from each individual stack (P1, P2, P3, and P4). These scenarios were run twice, once for the LM2500 and once for the TM2500.

NO_2

Compliance with the NO_2 standard was demonstrated by modeling the permit limit of 240 tpy of NO_x as emitted evenly from all stacks and in separate runs assuming all 240 tpy was emitted from an individual stack (P1, P2, P3, and P4, individually). These scenarios were run twice, once for the LM2500 and once for the TM2500.

CO

Compliance with the CO standards was demonstrated by modeling the CO emissions from only the new stack. Two separate runs were conducted, one for the TM2500 and another run for the LM2500.

PM_{10}

Compliance with the PM_{10} standards was demonstrated by modeling the PM_{10}emissions from only the new stack. Two separate runs were conducted, one for the TM2500 and one for the LM2500. Because measured background concentrations were above the NAAQS, background concentrations are not added to predict total impacts.

AAAQG

Compliance with the AAAQG was demonstrated by modeling with a unit emission rate (1.0 lb/hr) divided evenly among all four stacks (1/4 lb/hr per stack). An X/Q approach was used to determine maximum concentrations of individual pollutants. Specifically, maximum time-averaged concentrations were multiplied by the pollutant-specific emission rate to obtain the pollutant concentration.

Results

Table 6 presents a summary of the NAAQS compliance demonstration results. The table shows that the predicted impacts are far below the NAAQS for all pollutants. The results are essentially the same for either the LM2500 or the TM2500, and therefore are not presented individually. For SO_2 and NO_2, the total-predicted impacts (including background concentrations) are less than half of the NAAQS. Because the area is classified as a nonattainment area for PM_{10}, only the model-predicted impacts from the facility are presented. The predicted PM_{10} impacts are less than 2 percent of the NAAQS. This is approximately half of the typical 4% significance threshold that EPA uses for PSD modeling significance thresholds.

Table 6. NAAQS Compliance Summary

Pollutant	Averaging Period	Modeled Conc. (ug/m3)	Bkgrd Conc. (ug/m3)	Total Predicted Impact (ug/m3)	NAAQS (ug/m3)
CO	1-hour	553[a]	8261	8814	40,000
	8-hour	140[a]	3943	4083	10,000
SO_2	3-hour	119[a]	50.0	169	1300
	24-hour	31[a]	10.0	41	365
	Annual	2	4.0	6	80
NO_2	Annual	2.1	31.9	34	100
PM_{10}	24-hour	2.47 [a,b]	n/a	n/a	150
	Annual	0.48 [b]			50

[a] Highest predicted short-term concentration.
[b] Maximum impact from all four combustion units.

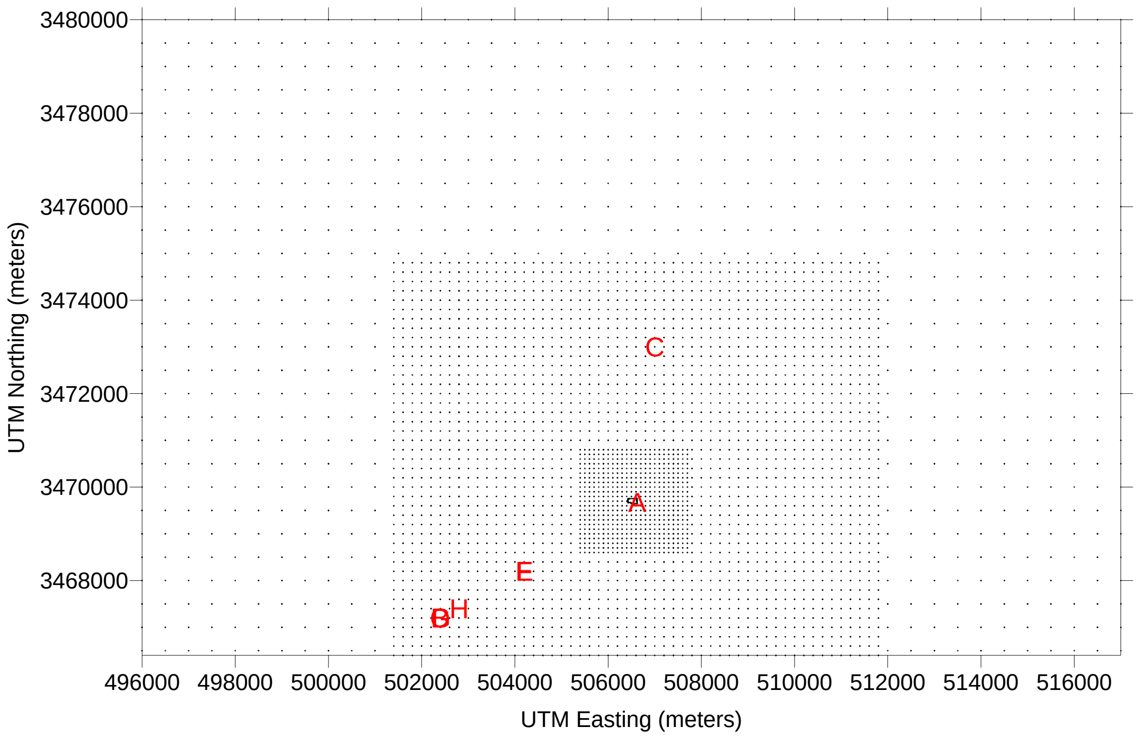
SO_2 Results

The maximum 3-hour SO_2 concentration was 118.6 ug/m3 which occurred using the meteorology of April 7, 2004 between 9 pm and midnight. During this period, winds were light, blowing toward the north during stable conditions. The scenario inherently assumed the emissions were evenly distributed from all four stacks. The location of the maximum is shown in Figure 1 as indicated by the letter C, north of the facility. The maximum 24-hour SO_2 concentration was 30.5 ug/m3, which occurred using the meteorology of January 3, 2002. Winds were light this day, blowing toward the southwest. The location of the maximum is show on Figure 1 southwest of the facility, as indicated by the letter D. The maximum annual concentration of 1.72 ug/m3 occurred using the 2002 meteorology during the simulation in which all SO_2 was emitted from stack P4. The location of the maximum is show in on Figure 1 approximately 2.5 km southwest of the facility as indicated by the letter E.

NO_2 Results

The maximum annual NO_2 concentration was 2.06 ug/m3, which occurred during the simulation assuming all NO_x emissions were coming from stack P4 using the 2002 meteorology. The maximum occurred approximately 2.5 km southwest of the facility, as indicated by the letter F in Figure 1.

Figure 1. Location of Maximum Predicted Impacts



A = CO 1-hr, B = CO 8-hr, C = SO_2 3-hr, D = SO_2 24-hr, E = SO_2 Annual, F = NO_2, G = PM_{10} 24-hr, H = PM_{10} Annual

CO Results

The maximum 1-hour CO impact was 553.5 ug/m3, which occurred using the meteorology of August 1, 2002 at hour 19. During this period, the maximum impact occurred immediately adjacent to the facility. Winds during this period were 11.3 meters per second blowing toward the east. The location of the maximum is indicated by the letter A in Figure 1. The maximum 8-hour CO impact was 140 ug/m3, which occurred using the first 8 hours of meteorology on January 2, 2003. During this period, winds were light, blowing toward the southwest during stable conditions. The location of the maximum 8-hour CO impact is indicated by the letter B in Figure 1.

PM_{10} Results

The maximum model-predicted 24-hour PM_{10} impact was 2.47 ug/m3, which occurred using the meteorology of January 3, 2002. During this period, the winds were light and blowing toward the southwest. The location of the maximum 24-hour PM_{10} concentration is shown in Figure 1 as indicated by letter G. The maximum model-predicted annual PM_{10} impact was 0.48 ug/m3, which occurred using the meteorology of 2002. The location of the maximum impact is shown in Figure 1, as indicated by the letter H.

AAAQG Results

Table 7 presents a summary of the AAAQG compliance analysis. With the exception of annual arsenic impacts, all pollutants were below the AAAQG for all averaging periods. The predicted annual arsenic impact was 3.29 E-04 ug/m3 vs. the AAAQG of 2.00 E-04 ug/m3.

The predicted annual arsenic impacts were based on emissions associated with continuous operation of all four turbines at rated capacity on distillate fuel oil. This is a highly conservative and unrealistic assumption. Furthermore, the AP-42 emission factor used in calculating potential emissions for distillate fuel oil firing is listed as < 1.1E-05 lb/MMBtu.[1] The footnote associated with the emission factor indicates that arsenic was not detected in the underlying test data, and the emission factor is based on ½ of the detection limit.

The Department reviewed other emission factor sources and identified a more representative arsenic emission factor for distillate oil fired turbines in the California Air Resources Board (CARB) CATEF database.[2] The maximum reported emission factor was 2.72 E-04 lb/Mgal, which converts to 1.94 E-06 lb/MMBtu assuming a fuel oil higher heating value of 140,000 Btu/gal. The CARB emission factor is based on test data with positive arsenic detection in contrast to the AP-42 detection limit-based factor. Also, the CARB emission factor more closely aligns with distillate fuel oil-fired boiler arsenic emission factors, which on a heat input basis would not be expected to differ significantly.

Using the ratio of the CATEF emission factor to the AP-42 emission factor used by the Applicant in its analysis, and applying that to the predicted annual arsenic impact yields a revised impact of 5.80 E-05 ug/m3, which is well below the AAAQG of 2.00 E-04 ug/m3.

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[1] EPA AP-42 Chapter 3.1; Table 3.1-5; 4/2000.
[2] http://www.arb.ca.gov/html/databases.htm, ID No. 4457.

Table 7. Summary of AAAQG Modeling Results With TM2500 Turbine

AAAQG Pollutant	1-Hour Impact ($\mu g/m^3$)	1-Hour AAAQG ($\mu g/m^3$)	24-Hour Impact ($\mu g/m^3$)	24-Hour AAAQG ($\mu g/m^3$)	Annual Impact ($\mu g/m^3$)	Annual AAAQG ($\mu g/m^3$)
1,3 Butadiene	2.02E-02	7.20E+00	2.41E-03	1.90E+00	4.78E-04	6.70E-02
Acetaldehyde	5.05E-02	2.30E+03	6.05E-03	1.40E+03	1.20E-03	5.00E-01
Acrolein	8.09E-03	6.70E+00	9.68E-04	2.00E+00	--	--
Benzene	6.94E-02	6.30E+02	8.30E-03	5.10E+01	1.64E-03	1.40E-01
Ethylene Benzene	4.04E-02	4.50E+03	4.84E-03	3.50E+03	--	--
Formaldehyde	8.97E-01	2.00E+01	1.07E-01	1.20E+01	2.13E-02	8.00E-02
Naphthalene	4.41E-02	6.30E+02	5.28E-03	4.00E+02	--	--
Propylene Oxide	3.66E-02	1.50E+03	4.38E-03	4.00E+02	8.68E-04	2.00E+00
Toluene	1.64E-01	4.70E+03	1.97E-02	3.00E+03	--	--
Xylenes	8.09E-02	5.50E+03	9.68E-03	3.50E+03	--	--
Arsenic	1.39E-02	2.80E-01	1.66E-03	7.30E-02	3.29E-04	2.00E-04
Beryllium	3.91E-04	6.00E-02	4.68E-05	1.60E-02	9.26E-06	5.00E-04
Cadmium	6.05E-03	1.70E+00	7.24E-04	1.10E-01	1.43E-04	2.90E-04
Chromium	1.39E-02	1.10E+01	1.66E-03	3.80E+00	--	--
Manganese	9.96E-01	2.50E+01	1.19E-01	8.00E+00	--	--
Mercury	1.51E-03	1.50E+00	1.81E-04	4.00E-01	--	--
Nickel	5.80E-03	5.70E+00	6.94E-04	1.50E+00	1.37E-04	4.00E-03
Selenium	3.15E-02	6.00E+00	3.77E-03	1.60E+00	--	--

The impacts were calculated as follows:

1-hour impacts = Total emissions (lbs/hr) x 1.46 $\mu g/m^3$

24-hour impacts = Total emissions (lbs/hr) x 0.17 $\mu g/m^3$

Annual impacts = Total emissions (lbs/hr) x 0.30 $\mu g/m^3$

Multipliers in above equations represent predicted maximum concentrations ($\mu g/m^3$) based on modeling a unit emission rate (1 lb/hr) distributed evenly (0.25 lbs/hr) among the four turbines.

X. INSIGNIFICANT ACTIVITIES

The following activities were proposed as insignificant by the Applicant and are approved as such by the Department.

1. Electric generating plant ancillary equipment such as transformers, switchgear, and water treatment systems.
2. Landscaping, building maintenance, or janitorial activities (R18-2-101(57) (a)). This includes various activities within the facility.
3. Manually-operated equipment and related activities for buffing, carving, cutting, drilling, machining, routing, sanding, sawing, surface grinding or turning and associated venting hoods (R18-2-101 (57)(f)).
4. 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 (R18-2-101(57(h)). This includes Emergency Fire Water Pumps anticipated to operate for less than one hour each week to ensure readiness.
5. Chemical Laboratories (R18-2-101 (57) (i)). This includes lab equipment used exclusively for chemical and physical analysis.
6. Fuel-burning equipment fired at a rate less than 1.0 MMBtu/hour over an 8-hour period (R18-2-302(B) (2) (a) (v)). Such equipment may include gas-fired space heaters, hot water heaters, and process boilers. Specific equipment, model numbers, maximum potential heat rates, and site locations are not available at the present time.
7. Additional Insignificant Sources. The following is a listing of additional equipment or activities which ADEQ has determined to be insignificant. The Department has made a listing including such sources available to the public, pursuant to the previsions of A.A.C. R18-2-101(57)(j), relative to the definition of "insignificant activity," which states as follows:

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

   UNSE has equipment and activities within the facility which are consistent with the categories as defined below.

   A) Pressurized storage and piping for natural gas, butane, propane, or liquefied petroleum gas.
   B) Petroleum product storage tanks and associated loading operations for lubricating oil, transformer oil, and used oil.
   C) Piping of fuel oils, used oil and transformer oil.
   D) Storage and handling of drums or other transportable containers where the containers are sealed during storage, and covered during loading and unloading.
   E) Water and Wastewater Treatment
   F) Individual flanges, valves, pump seals, pressure relief valves, and other individual components not in VOC service that have the potential for leaks.
   G) Cafeterias, kitchens, and other facilities used for food or beverage preparation.
   H) Equipment using water, water and soap or detergent, or a suspension of abrasives in water for purposes of cleaning or finishing.
   I) Battery recharging areas.

J) Aerosol cans usage.
K) Acetylene, butane, and propane torches.
L) Equipment used for portable steam cleaning
M) Blast-cleaning equipment using a suspension of abrasive in water and any exhaust system or collector serving them exclusively.
N) Lubricating system reservoirs.
O) Hydraulic system reservoirs.
P) Adhesive use.
Q) Production of hot/chilled water for onsite use.
R) Safety devices such as fire extinguishers.
S) General vehicle maintenance and servicing activities.
T) Storage cabinets for flammable products.
U) Office / Administration:

- Housekeeping activities and associated products for cleaning purposes and operation of vacuum cleaning systems.
- Air conditioning, cooling, heating or ventilation equipment.
- General office activities such as paper shredding, copying, photographic activities, and blueprinting.
- Restroom facilities and associated cleanup operations, stacks, and vents.
- Smoking rooms and areas.
- Normal consumer use of consumer products, including hazardous substances as defined in the Federal Hazardous Substances Act (15 U.S.C. 1261 et. Seq.).

V) Firefighting activities and training conducted at the facility in preparation of fighting fires. The various components of this fire fighting system include:

- Emergency Fire Water Pump
- Foam System Fire Water Systems
- Dry Chemical Extinguisher

W) 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.
X) Truck and car traffic on unpaved public and private roadways.
Y) Rail car traffic and locomotive switching activities.

XI. LIST OF ABBREVIATIONS

AAAQGs…………………………………………………Arizona Ambient Air Quality Guidelines
CAM…………………………………………………………Compliance Assurance Monitoring
CARB…………………………………………………………California Air Resources Board
CATEF ……………………………………………………...California Air Toxics Emission Factors
CEMS..…………………………………………………..Continuous Emission Monitoring Systems
CFR…..……………………………………………………………Code of Federal Regulations
CO……………………………………………………………………………Carbon Monoxide
DAHS…………………………………………………………Data Acquisition Handling System
EPA……………………………………………………………Environmental Protection Agency
EPNG………………………………………………………………………El Paso Natural Gas
FR……………………………………………………………………………Federal Register
HAP…………………………………………………………………..Hazardous Air Pollutants
MACT…………………………………………………Maximum Achievable Control Technology
MW……………………………………………………………………………………..Megawatts
NAAQS…………………………………………………National Ambient Air Quality Standards
NESHAP…………………………………National Emissions Standards for Hazardous Air Pollutants
NO_x……………………………………………………………………………….Nitrogen Oxides
NOV…………………………………………………………………………Notice of Violation
NSPS……………………………………………………………New Source Performance Standards
NSR……………………………………………………………………….New Source Review
NWS……………………………………………………………………National Weather Service
PM_{10}…………………………………………………Particulate Matter below 10 micron size
PTE………………………………………………………………………………Potential to Emit
PSD……………………………………………………………Prevention of Significant Deterioration
RICE……………………………………………………Reciprocating Internal Combustion Engines
SO_2………………………………………………………………………………….Sulfur Dioxide
UNSE…………………………………………………………………UniSource Energy Corporation
VOC………………………………………………………………..Volatile Organic Compounds