TECHNICAL SUPPORT DOCUMENT
FOR
UNISOURCE ENERGY DEVELOPMENT COMPANY
BLACK MOUNTAIN GENERATING STATION
AIR QUALITY PERMIT NO. 42864

I. INTRODUCTION

UniSource Energy Development Company, the Permittee, has proposed to construct and operate a peaking power plant identified as the Black Mountain Generating Station (BMGS). The facility will be located approximately ½ mile east of the UNS Electric's Sacramento substation, and approximately 10 miles southeast of the town of Kingman, Arizona and 1.5 miles west of Interstate 40 in Mohave County, Arizona. BMGS is being installed to increase the reliability of the areas electrical distribution system by supplying peaking power, backup power and voltage stabilization for the UniSource Energy Development Company Mohave County service area.

BMGS is classified as a Class I Major Source pursuant to A.A.C. R18-2-101.64. Potential emissions of nitrogen oxides (NO_X) and carbon monoxide (CO) each exceed 100 tons per year (tpy). By voluntary restriction, total allowable NO_X and CO emissions are limited by enforceable permit conditions to less than 250 tpy. Therefore, BMGS does not constitute a major source as defined under A.A.C. R18-2-401 for the purposes of Prevention of Significant Deterioration (PSD) [Title I, Part C of the Clean Air Act (CAA) and A.A.C. R18-2-406].

A. Company Information

1. Facility Name

   Black Mountain Generating Station (BMGS)

2. Facility/Mailing Address

   Approximately 10 miles southeast of Kingman, Mohave County, Arizona

B. Attainment Classification

BMGS will be located in Mohave County, which is designated as attainment or unclassifiable for all criteria air pollutants.

II. FACILITY DESCRIPTION

A. Process Description

BMGS is a proposed peaking power plant comprised of two General Electric model LM-6000PC-Sprint simple cycle combustion turbine generators (Gas Turbine Units 1 & 2), each with a design capacity of approximately 48 MW, for a total combined plant capability of approximately 96 MW. An evaporative cooler for gas turbine air intake may be included with each unit to improve performance at elevated ambient temperatures. Gas Turbine Units 1 and 2 will be fired exclusively on natural gas.

BMGS will include electrical generation and ancillary equipment, an emergency diesel generator (black start generator, 600 kW), a mechanical draft 3-cell cooling tower (recirculation rate = approximately 4,200 gpm), a wastewater evaporation pond, access and plant roads, office and control facilities, a substation and associated distribution lines, warehouses for electric service and gas service building and an outside storage area for transformers and equipment.

B. Air Pollution Control Equipment

Gas Turbine Units 1 and 2 will use water injection systems to control NO_X emissions. The cooling tower will be equipped with a drift eliminator.

III. EMISSIONS

A. Potential Annual Emissions

BMGS has the potential to emit NO_X and CO in excess of the 100 tpy Title V major source threshold. Enforceable emission limitations (emissions caps) were voluntarily proposed by the Permittee to limit total facility NO_X and CO emissions to stay below the applicable PSD major source threshold of 250 tpy as a 365-day rolling total. Total combined emissions of NO_X and CO from Gas Turbine Unit 1 and Gas Turbine Unit 2 are limited to 244 tpy each. Potential emissions from the Emergency Diesel Generator reflect an enforceable operating limitation of less than or equal to 500 hours per year consistent with EPA policy on limiting potential to emit. Total facility-wide potential emissions of NO_X and CO incorporating enforceable permit limitations are each less than 250 tpy. Potential emissions of all other PSD regulated pollutants based on maximum hourly emissions and 8,760 hours per year of operation are below major source thresholds. Facility-wide potential emissions of hazardous air pollutants (HAP) are below 10 and 25 tpy for individual and total combined HAP, respectively. Therefore, BMGS is a minor or area source HAP for the purposes of CAA Section 112 and Article 11 of A.A.C. R18-2.

A summary of annual potential emissions for BMGS, including unit-specific emission rates and facility-wide totals is presented in Table 1.

Table 1. Potential Annual Emissions (tons/yr)

	Gas Turbine Unit 1	Gas Turbine Unit 2	Emergency Diesel Generator	Cooling Tower	Total Annual Emissions
CRITERIA POLLUTANTS					
NO_X	244 (total for Units 1 & 2)		2.12	NA	246
CO	244 (total for Units 1 & 2)		1.16	NA	245
SO_2	5.88	5.88	0.09	NA	11.9
VOC	3.63	3.63	0.16	NA	7.4
PM_{10}	13.1	13.1	0.07	0.46	26.3
$PM_{2.5}$	13.1	13.1	0.07	0.46	26.3
HAZARDOUS AIR POLLUTANTS (HAP)					
1, 3 Butadiene	0.001	0.001	NA	NA	0.002
Acetaldehyde	0.069	0.069	3.77E-05	NA	0.138
Acrolein	0.011	0.011	1.18E-05	NA	0.022
Benzene	0.021	0.021	1.16E-03	NA	0.043
Ethylbenzene	0.055	0.055	NA	NA	0.110

	Gas Turbine Unit 1	Gas Turbine Unit 2	Emergency Diesel Generator	Cooling Tower	Total Annual Emissions
Formaldehyde	1.229	1.229	1.18E-04	NA	2.46
Naphthalene	0.002	0.002	1.94E-04	NA	0.004
PAH	0.004	0.004	3.17E-04	NA	0.008
Propylene Oxide	0.050	0.050	NA	NA	0.100
Propylene	NA	NA	4.17E-03	NA	0.004
Toluene	0.225	0.225	4.20E-04	NA	0.450
Xylenes	0.111	0.111	2.89E-04	NA	0.222
TOTAL HAP					3.6

B. Maximum Emissions by Averaging Period

In addition to annual potential emissions, the Permittee quantified maximum emissions consistent with applicable averaging times for the purpose of ambient impact compliance demonstration (e.g., NAAQS and AAAQG modeling analyses). Maximum criteria pollutant emissions by relevant averaging period are presented in Table 2. Maximum AAAQG pollutant emissions in lb/hr and tpy are presented in Table 3. Table 4 presents the analysis performed by the Permittee to determine maximum hourly emissions from Gas Turbine Units 1 and 2 for all normal operating scenarios, including startup/shutdown scenarios. The maximum lb/hr emission case for all affected pollutants was determined to be operation at 100% load.

Table 2. Maximum Criteria Pollutant Emissions by Averaging Period

	Averaging Period							
Unit	PM_{10} 24-Hour (lb/hr)	PM_{10} Annual (tpy)	CO 1-Hour (lb/hr)	CO 8-Hour (lb/hr)	SO_2 3-Hour (lb/hr)	SO_2 24-Hour (lb/hr)	SO_2 Annual (tpy)	NO_X Annual (tpy)
Gas Turbine Unit 1 [a]	3.00	13.14	26.70	26.70	1.34	1.34	5.88	122.0 [b]
Gas Turbine Unit 2 [a]	3.00	13.14	26.70	26.70	1.34	1.34	5.88	122.0 [b]
Emergency Diesel Generator	0.63	0.16 [c]	4.95	4.95	2.91	2.91	0.73 [c]	5.40 [c]
Cooling Tower (CT) Cell A	3.58E-08	1.57E-07						
CT Cell B	3.58E-08	1.57E-07						
CT Cell C	3.58E-08	1.57E-07						

[a] Except for NO_X, emissions based on worst case hourly emissions that occur when a unit is operating at 100% of full load.
[b] Based on the annual two unit emission cap of 244 tons/year.
[c] Based on annual operating hours of 500 hours/year.

Table 3. Maximum AAAQG Pollutant Emissions by Averaging Period

	Gas Turbine Unit 1		Gas Turbine Unit 2		Emergency Diesel Generator	
Pollutant [a]	Maximum Hourly Emission Rate (lb/hr)	Annual Emissions 8,760 hr/yr basis (tpy)	Maximum Hourly Emission Rate (lb/hr)	Annual Emissions 8,760 hr/yr basis (tpy)	Maximum Hourly Emission Rate (lb/hr)	Annual Emissions 500 hr/yr basis (tpy)
1,3 Butadiene	1.70E-04	7.44E-04	1.70E-04	7.44E-04	--	--
Acetaldehyde	1.58E-02	6.92E-02	1.58E-02	6.92E-02	1.51E-04	3.77E-05
Acrolein	2.53E-03	1.11E-02	2.53E-03	1.11E-02	4.71E-05	1.18E-05
Benzene	4.74E-03	2.08E-02	4.74E-03	2.08E-02	4.64E-03	1.16E-03
Ethylene Benzene	1.26E-02	5.54E-02	1.26E-02	5.54E-02	--	--
Formaldehyde	2.81E-01	1.23E+00	2.81E-01	1.23E+00	4.72E-04	1.18E-04
Naphthalene	5.14E-04	2.25E-03	5.14E-04	2.25E-03	7.77E-04	1.94E-04
PAH	8.69E-04	3.81E-03	8.69E-04	3.81E-03	1.27E-03	3.17E-04
Propylene Oxide	1.15E-02	5.02E-02	1.15E-02	5.02E-02	1.67E-02	4.17E-03
Toluene	5.14E-02	2.25E-01	5.14E-02	2.25E-01	1.68E-03	4.20E-04
Xylenes	2.53E-02	1.11E-01	2.53E-02	1.11E-01	1.15E-03	2.89E-04

Table 4. Maximum Short-Term Emissions Evaluation, Including Startup/Shutdown Case

	Estimated Startup Emission Rate during startup and shutdown - Vendor supplied typical emission data													
	Startup - 5 minutes		Typical Emissions at 25% of Load - 8 minutes		Typical Emissions at 50% of Load - 7 minutes		Typical Emissions at 75% of Load - 7 minutes		Typical Emissions at 100% of Load - 28 minutes		Shutdown - 5-minutes		Startup Case Hourly Emission Rate	Max. Case Hourly Emission Rate
Pollutant	PPM (at 15% O2)	Lbs/hour	PPM (at 15% O2)	Lbs/hour	PPM (at 15% O2)	Lbs/hour	PPM (at 15% O2)	Lbs/hour	PPM (at 15% O2)	Lbs/hour	PPM (at 15% O2)	Lbs/hour	Lbs/hour	Lbs/hour
NOx	56	28	25	17.8	25	25.8	25	34.0	25	40.0	56	28	32.7	40.0
CO	24	5.99	22	9.8	26	16.0	33	27.9	28	26.7	24	5.99	19.9	26.7
SO2	NA	0	0							1.34	NA	0	0.63	1.34
HC	3	0.4	2	0.59	3	0.99	4	1.78	3	1.66	3	0.4	1.24	1.66
PM10	NA	0.95	NA	1.17	NA	1.69	NA	2.17	NA	3.00	NA	0.95	2.16	3.00

C. Emission Calculation Detail

Section 2.0 and Appendix B of the BMGS permit application presented potential-to-emit (PTE) summary information and supporting calculations. With noted exceptions, the Department found the PTE calculations to be accurate and acceptable. Emission calculation details are presented below by emission unit category.

1. Gas Turbine Units 1 and 2

Potential emissions for Gas Turbine Unit 1 and Gas Turbine Unit 2 (identical GE LM-6000 PC-Sprint combustion turbines) were estimated based on a maximum full-load fuel heat input rate of 395.1 MMBtu/hr and either vendor supplied data or emission factors from USEPA's "Compilation of Air Pollutant Emission Factors," commonly referred to as AP-42. For NO_X, total combined emissions from Gas Turbine Unit 1 and Gas Turbine Unit 2 reflect a voluntarily limitation of 244 tpy. PTE calculation details for a single gas turbine unit are documented in Table 5. Emission factor references and example calculations follow the table.

Table 5. Emission Calculation Detail for Single Gas Turbine Unit

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Reference	Max. Hourly Emission Rate (lb/hr)	Annual Emissions 8,760 hr/yr basis (tpy)
NO_X	0.276	lb/MMBtu	1	109.2	244 [a]
CO	0.068	lb/MMBtu	2	26.7	117
SO_2	0.0034	lb/MMBtu	3	1.34	6.0
VOC	0.0021	lb/MMBtu	3	0.83	3.63
PM_{10}	0.0076	lb/MMBtu	1	3.00	13.1
1,3 Butadiene	4.3 E-07	lb/MMBtu	4	1.699 E-04	0.001
Acetaldehyde	4.0 E-05	lb/MMBtu	4	1.580 E-02	0.069
Acrolein	6.4 E-06	lb/MMBtu	4	2.529 E-03	0.011
Benzene	1.2 E-05	lb/MMBtu	4	4.741 E-03	0.021
Ethylbenzene	3.2 E-05	lb/MMBtu	4	1.264 E-02	0.055
Formaldehyde	7.1 E-04	lb/MMBtu	4	2.805 E-01	1.229
Naphthalene	1.3 E-06	lb/MMBtu	4	5.136 E-04	0.002
PAH	2.2 E-06	lb/MMBtu	4	8.692 E-04	0.004
Propylene Oxide	2.9 E-05	lb/MMBtu	4	1.146 E-02	0.050
Toluene	1.3 E-04	lb/MMBtu	4	5.136 E-02	0.225
Xylenes	6.4 E-05	lb/MMBtu	4	2.529 E-02	0.111

Table Notes:
a) Calculated PTE based on 8,760 hrs/yr of operation at full load exceeds the 250 tpy PSD major source threshold. Total combined NO_X emissions from Gas Turbine Units 1 and 2 will be limited to ≤ 244 tpy by enforceable permit conditions.

Emission Factor References
1. Based on applicable NSPS limit of 75 ppmv @ 15 % O_2
2. Emission factors based on Vendor supplied information
3. EPA AP-42, Tables 3.1-1 and 3.1-2a; April 2000.
4. EPA AP-42, Tables 3.1-3; April 2000.

Example Calculations
CO Emissions:
(385.1 MMBtu/hr) * (0.068 lb/MMBtu) = 26.7 lb/hr
(26.7 lb/hr) * (8,760 hrs/yr) * (1 ton / 2,000 lb) = 117 tpy
Formaldehyde Emissions:
(385.1 MMBtu/hr) * (7.1E-04 lb/MMBtu) = 0.28 lb/hr
(0.28 lb/hr) * (8,760 hrs/yr) * (1 ton / 2,000 lb) = 1.23 tpy

2. Cooling Tower

The Department was unable to reproduce the Permittee's potential emission estimate for the single proposed mechanical draft cooling tower. Potential emissions from the cooling tower were recalculated based on the design recirculation rate of 4,231 gallons per minute (gpm), the mist eliminator design efficiency of 0.001% drift, a TDS concentration of 10,000 ppm, and a conservative PM-10 particle size fraction of 50 percent. The revised calculation is documented below.

(4,231 gpm) * (8.34 lb/gal) * (60 min/hr) * (10,000 ppm) * (0.001% drift) = 0.21 lb/hr PM
(0.21 lb PM/hr) * 8,760 hrs/yr) * (1 ton / 2,000 lb) = 0.93 tpy PM
(0.21 lb PM/hr) * (50% PM-10 particle size fraction) = 0.11 lb/hr PM-10
(0.11 lb PM/hr) * 8,760 hrs/yr) * (1 ton / 2,000 lb) = 0.46 tpy PM-10

3. Emergency Diesel Generator

Potential emissions for the Emergency Diesel Generator engine were estimated based on design power output (900 HP/600kW) or heat input capacity (5.98 MMBtu/hr) and vendor supplied or EPA AP-42 emission factors. Annual PTE estimates incorporate a voluntary 500 hr/yr operating limitation. The BMGS permit application did not identify the applicability of NSPS Subpart IIII (40 CFR 60.4200 – 60.4219) to the Emergency Diesel Generator compression ignition internal combustion engine (CI ICE). The Department determined that the standard was applicable to the proposed equipment, and the limitations in NSPS Subpart IIII applicable to the engine model year (expected to be 2007) result in potential emissions for NO_X, CO, and PM below those reported by the Permittee. Potential emissions were recalculated to reflect NSPS limitations as applicable. PTE calculation details for the Emergency Diesel Generator engine are documented in Table 6. Emission factor references and example calculations follow the table.

Table 6. Emission Calculation Detail for Emergency Diesel Generator

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Reference	Max. Hourly Emission Rate (lb/hr)	Annual Emissions 500 hr/yr basis (tpy)
NO_X	6.4	g/kW-hr	1,2	8.47	2.12
CO	3.5	g/kW-hr	1	4.63	1.16
PM	0.2	g/kW-hr	1	0.26	0.07
PM-10	0.2	g/kW-hr	1,3	0.26	0.07
PM-2.5	0.2	g/kW-hr	1,3	0.26	0.07
SO_2	4.05E-04	lb/hp-hr	4,5	0.36	0.09
PAH	2.12E-04	lb/MMBtu	4	1.27E-03	3.17E-04
Benzene	7.76E-04	lb/MMBtu	4	4.64E-03	1.16E-03
Toluene	2.81E-04	lb/MMBtu	4	1.68E-03	4.20E-04

Xylenes	1.93E-04	lb/MMBtu	4	1.15E-03	2.89E-04
Propylene	2.79E-03	lb/MMBtu	4	1.67E-02	4.17E-03
Formaldehyde	7.89E-05	lb/MMBtu	4	4.72E-04	1.18E-04
Acetaldehyde	2.52E-05	lb/MMBtu	4	1.51E-04	3.77E-05
Acrolein	7.88E-06	lb/MMBtu	4	4.71E-05	1.18E-05
Naphthalene	1.30E-04	lb/MMBtu	4	7.77E-04	1.94E-04

Emission Factor References
1. NSPS Subpart IIII, 40 CFR 60.4205 – requirements for 2007 model year engines > 560 kW.
2. Standard is for NO_X + NMHC; total assumed as NO_X to be conservative.
3. PM-10 and PM-2.5 assumed equal to PM.
4. EPA AP-42, Tables 3.4-1 through 3.4-4; October 1996.
5. SO_2 emission factor reflects fuel sulfur limitation of 0.05% (500 ppm) per NSPS requirement (40 CFR 60.4807).

Example Calculations
CO Emissions:
(3.5 g/kW-hr) * (600 kW) * (1 lb / 453.6 g) = 4.63 lb/hr
(4.63 lb/hr) * (500 hrs/yr) * (1 ton / 2,000 lb) = 1.16 tpy
Formaldehyde Emissions:
(5.98 MMBtu/hr) * (7.89E-05 lb/MMBtu) = 4.72E-04 lb/hr
(4.72E-4 lb/hr) * (500 hrs/yr) * (1 ton / 2,000 lb) = 1.18E-04 tpy

IV. APPLICABLE REGULATIONS

Section 4.0 of the BMGS permit application presented a regulatory analysis and generally identified Federal and State air quality regulations applicable to the proposed source and emission units. Table 7 summarizes the findings of the Department with respect to the applicability or non-applicability of specific regulations to emission units and emission unit groups.

Table 7. Regulatory Analysis

Unit ID	Const. Date	Control Device	Regulation(s)	Applicable (Y/N)	Verification
Gas Turbine Unit 1 (Unit 1) and Gas Turbine Unit 2 (Unit 2)	2002	Water Injection Systems	NSPS Gen. Provisions A.A.C R18-2-901(1),(2) 40 CFR 60 Subpart A	Y	Gas Turbine Units 1 and 2 are subject to NSPS Subpart GG as outlined below. Therefore, the General Provisions in 40 CFR 60 Subpart A are applicable. Applicable requirements of 40 CFR 60 Subpart A are contained in Section III.B of Attachment "B" of the permit.
			NSPS Subpart GG A.A.C R18-2-901(40) 40 CFR 60.330	Y	Gas Turbine Units 1 and 2 commenced construction after October 3, 1977 and have a heat input at peak load greater than 10.7 GJ/hr (10 MMBtu/hr). Both Gas Turbine units are subject to 40 CFR 60 Subpart GG, incorporated by reference in A.A.C. R18-2-18-901(40). Although the most

Unit ID	Const. Date	Control Device	Regulation(s)	Applicable (Y/N)	Verification
					recent version of 40 CFR 60 Subpart GG (revised July 8, 2004) has not yet been incorporated by reference in Article 9, the Department expects incorporation in 2007, well before the 2008 BMGS commence operation date. The Department has concluded that dual requirements reflecting both the pre-July 8, 2004 standard and current federal standard are unnecessary.
			NSPS Subpart GG 40 CFR 60.332(a)(1) 40 CFR 60.332(b)	Y	Gas Turbine Units 1 and 2 are electric utility stationary gas turbines with heat input at peak load greater than 100 MMBtu/hr; therefore, the NO_X emission standard in 40 CFR 60.332(a)(1) is applicable. The NSPS NO_X limitation is contained in Condition III.D.1.a of Attachment "B" of the permit.
			NSPS Subpart GG 40 CFR 60.333(b)	Y	40 CFR 60.333 specifies SO_2 standards for affected facilities. The Permittee has elected to comply with the fuel sulfur specification in 40 CFR 60.333(b). The NSPS SO_2 limitation is contained in Condition III.E.1 of Attachment "B" of the permit.
			NSPS Subpart GG 40 CFR 60.334(b)	Y	The Permittee has elected to use CEMS to demonstrate compliance with the applicable NSPS NO_X limitation. In accordance with 40 CFR 60.334(b)(3)(iii), the CEMS will meet the requirements of 40 CFR Part 75. Section III.D.3 of Attachment "B" of the permit contains monitoring, recordkeeping, and reporting requirements for NO_X emissions, including NSPS requirements.
			NSPS Subpart GG 40 CFR 60.334(h)	Y	The Permittee has elected to comply with the NSPS Subpart GG SO_2 limitation by demonstrating that the gaseous fuel meets the definition of "natural gas" in 40 CFR 60.331(u). Section III.E.2 of Attachment "B" of the permit contains monitoring, recordkeeping, and reporting requirements for SO_2 emissions.
			NSPS Subpart GG 40 CFR 60.334(j)	Y	The permit requires the use of CEMS to demonstrate compliance with the NSPS Subpart GG NO_X limitation. Therefore, the excess emissions and monitor downtime reporting provisions of 40 CFR 60.334(j) are applicable.
			NSPS Subpart GG 40 CFR 60.335	Y	In accordance with 40 CFR 60.335 and 40 CFR 60.8, an initial performance test for NO_X emissions is required for Gas Turbine Units 1 and 2. Condition III.D.4 of Attachment "B" of the permit contains performance testing requirements for the gas turbine units.

Unit ID	Const. Date	Control Device	Regulation(s)	Applicable (Y/N)	Verification
			NSPS Subpart KKKK 40 CFR 60.4300 - 60.4420	N	NSPS Subpart KKKK applies to stationary combustion turbines with heat input at peak load equal to or greater than 10.7 gigajoules (10 MMBtu) per hour which commenced construction, modification, or reconstruction after February 18, 2005. According to information provided in the permit application, Gas Turbine Units 1 and 2 were manufactured in June 2002. Therefore, in accordance with EPA policy, the units were constructed prior to February 18, 2005 and are not subject to NSPS Subpart KKKK.
			Acid Rain Program A.A.C. R18-2-333 40 CFR 72 – 78	Y	Gas Turbine Units 1 and 2 are new utility units with nameplate capacities greater than 25Mw. Therefore, BMGS is an affected source under the Acid Rain Program (CAA Title IV) and Gas Turbine Units 1 and 2 are affected units. Specifically, BMGS is subject to 40 CFR 72 (Permits Regulation), 40 CFR 73 (Sulfur dioxide allowance system), and 40 CFR 75 (continuous emission monitoring). In accordance with Acid Rain Program requirements, BMGS must hold sufficient annual SO_2 allowances (not less than the total annual emissions from the unit for the previous calendar year), perform continuous emission monitoring in accordance with 40 CFR 75, and conduct associated recordkeeping and reporting. The provisions of 40 CFR Part 76 - Acid Rain Nitrogen Oxides Emission Reduction Program apply only to coal-fired units and therefore are not applicable to NHGC. The NHGC Phase II acid rain provisions are contained in Attachment "D" of the permit.
			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 of this TSD, BMGS is a minor or area source of HAP. Therefore, NESHAP Subpart YYYY is not applicable.
			Nonattainment NSR A.A.C. R18-2-403 A.A.C. R18-2-404	N	As documented in Section I.D of this TSD, BMGS will be located in an area designated as attainment or unclassifiable for all criteria pollutants. Therefore, nonattainment NSR requirements are not applicable.

Unit ID	Const. Date	Control Device	Regulation(s)	Applicable (Y/N)	Verification
			PSD A.A.C. R18-2-406 A.A.C. R18-2-407	N	The Permittee has voluntarily accepted limitations (caps) on NO_X and CO emissions to ensure that facility-wide potential emissions stay below the major source threshold of 250 tons per year. Enforceable synthetic minor limitations for NO_X and CO emissions from Gas Turbine Units 1 and 2 are contained in Conditions III.D.1.b and III.F.1 of Attachment "B" of the permit, respectively. These limitations, in conjunction with separately enforceable limitations on PTE from the Emergency Diesel Generator contained in Section V of Attachment "B" of the permit, ensure that the facility-wide PTE for NO_X and CO are each below 250 tons per year. For all other pollutants, unrestricted PTE based on maximum hourly emissions and 8,760 hrs/yr of operation are below major source thresholds. Therefore, PSD requirements are not applicable.
			Compliance Assurance Monitoring (CAM) 40 CFR 64	N	Gas Turbine Units 1 and 2 will use water injection systems for NO_X emissions control and are subject to a qualifying emission limitation or standard. However, the permit specifies the use of CEMS, which qualify as a "continuous compliance determination method" as defined in 40 CFR 64.1. Therefore, in accordance with 40 CFR 64.2(b)(vi), CAM is not applicable.
			A.A.C. R18-2-719	N	A.A.C. R18-2-719 contains standards of performance for existing stationary rotating machinery, including combustion turbines. Gas Turbine Units 1 and 2 are subject to an applicable NSPS under Article 9 of A.A.C. R18-2; therefore, in accordance with the definition of "existing source" in A.A.C. R18-2-101.41, Article 7 existing source standards are not applicable.
Cooling Tower (CT1)	TBD	Drift Eliminator	A.A.C. R18-2-702.B.3 A.A.C. R18-2-702.C	Y	The cooling tower is subject to the generally applicable opacity emission standard because it is not subject to an applicable NSPS under Article 9 of A.A.C. R18-2 or any specific standard under Article 7. The opacity standard for the cooling tower is contained in Condition IV.B.1.b of Attachment "B" of the permit.
			A.A.C. R18-2-730.A.1	Y	The cooling tower is subject to the generally applicable PM emission standard because it is an unclassified process source. The PM standard for the cooling tower is contained in Condition IV.B.1.a of Attachment "B" of the permit.
			A.A.C. R18-2-730.G	Y	The general requirement related to air pollution impacts to adjoining property and the ability of the Director to require the installation of abatement equipment is applicable.

Unit ID	Const. Date	Control Device	Regulation(s)	Applicable (Y/N)	Verification
Emergency Diesel Generator (EGEN1)	TBD	None	<u>NSPS Gen. Provisions</u> A.A.C R18-2-901(1),(2) 40 CFR 60 Subpart A	Y	The Emergency Diesel Generator engine is subject to NSPS Subpart IIII as outlined below. Therefore, the General Provisions in 40 CFR 60 Subpart A are applicable as identified in 40 CFR 60.4218 and Table 8 of NSPS Subpart IIII. The requirements of NSPS Subparts A and IIII as applicable to the Emergency Diesel Generator are contained in Section V.B of Attachment "B" of the permit.
			<u>NSPS Subpart IIII</u> 40 CFR 60.4200	Y	The Emergency Diesel Generator engine is a compression ignition (CI) Internal combustion engine (ICE) that commenced construction after July 11, 2005 and was manufactured after April 1, 2006. Therefore, NSPS Subpart IIII is applicable.
			<u>NSPS Subpart IIII</u> 40 CFR 60.4205	Y	The Emergency Diesel Generator engine is a 2007 model year or later CI ICE with a displacement less than 30 liters per cylinder. Therefore, in accordance with 40 CFR 60.4205(b), the unit is subject to the emission standards for new nonroad CI engines in 40 CFR 60.4202 (i.e., Tier II Standards) for all pollutants for the same model year and maximum engine power (600kW).
			<u>NSPS Subpart IIII</u> 40 CFR 60.4207	Y	As a subject CI ICE, the Emergency Diesel Generator engine must meet the fuel requirements in 40 CFR 60.4207, i.e., diesel fuel ≤ 500 ppm sulfur after October 1, 2007 and ≤ 15 ppm sulfur after October 1, 2010.
			<u>NSPS Subpart IIII</u> 40 CFR 60.4209 and 40 CFR 60.4211	Y	As the owner/operator of a subject CI ICE, the Permittee must meet the applicable NSPS Subpart IIII monitoring and compliance requirements identified in Section III.V.B.3 of Attachment "B" of the permit.
			A.A.C. R18-2-719	N	A.A.C. R18-2-719 contains standards of performance for existing stationary rotating machinery, including internal combustion engines. The Emergency Diesel Generator engine is subject to an applicable NSPS (NSPS Subpart IIII). Although this NSPS has not yet been incorporated by reference in Article 9 of A.A.C. R18-2, the Department expects that the standard will be incorporated in 2007. Therefore, the Subpart will be incorporated in Article 9 well before the commence operation date of the source in 2008. Accordingly, per the definition of "existing source" in A.A.C. R18-2-101.41, Article 7 existing source standards are not applicable.

Unit ID	Const. Date	Control Device	Regulation(s)	Applicable (Y/N)	Verification
Fugitive Dust Sources	NA	Control Measures	A.A.C. R18-2-604.A R18-2-604.B R18-2-605 R18-2-606 R18-2-607 R18-2-612	Y	The regulations listed are applicable to any source of fugitive dust at the facility (non point sources). These requirements are contained in Section VI of Attachment "B" of the permit.
Mobile Sources	NA	Control Measures	A.A.C. R18-2-801 R18-2-802.A R18-2-804.A R18-2-804.B	Y	These regulations are applicable to all mobile sources. These requirements are contained in Section VII of Attachment "B" of the permit.
Other Periodic Activities	NA	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. These requirements are contained in Section VIII of Attachment "B" of the permit.

V. MONITORING REQUIREMENTS

A. Gas Turbine Units 1 and 2

1. Operational Limitation Monitoring Requirements

Gas Turbine Units 1 and 2 are limited to burning only pipeline quality natural gas meeting the definition of "natural gas" in 40 CFR 60.331(u). The Permittee is required to maintain a daily record of the type of fuel used in each gas turbine unit.

2. NSPS NO_X Monitoring Requirements

The permit requires the use of CEMS to monitor NO_X and diluent (O_2 or CO_2) concentrations in the exhaust stacks of Gas Turbine Units 1 and 2. The CEMS are required to demonstrate compliance with both NSPS Subpart GG (as provided in 40 CFR 60.334(b)) and the synthetic minor tpy NO_X limitation. The requirement to use a continuous compliance demonstration method avoids any potential concern about CAM (40 CFR Part 64) applicability to the water injection system controlled gas turbines.

For the NO_X and diluent CEMS, the Permittee must meet the requirements of 40 CFR Part 75 as provided in 40 CFR 60.334(b)(3)(iii). The permit specifies data validation, data reduction, and excess emissions/monitor downtime reporting requirements consistent with the provisions of 40 CFR 60.334(b)(2), 40 CFR 60.334(b)(3), and 40 CFR 60.334(j).

3. Synthetic Minor NO_X Limit Monitoring Requirements

The permit requires the installation and operation of fuel flow rate monitoring systems for determining the natural gas input rate to each gas turbine unit. The fuel flow rate monitoring systems must be calibrated and quality assured in accordance with 40 CFR 75 Appendix D. The Permittee is required to determine the gross caloric value (GCV) of the natural gas at least once per month also in accordance with 40 CFR Part 75 Appendix D. To demonstrate compliance with the synthetic minor NO_X emission cap for Gas Turbine Units 1 and 2, the Permittee is required to use the CEMS required for NSPS Subpart GG and 40 CFR Part 75 in conjunction with the fuel flow rate monitoring systems and a data acquisition and handling system (DAHS) to calculate mass emissions in units of lb/MMBtu, lb/hr, lb/day, and tons per daily rolling 365-day total. For periods of monitoring system downtime, the permit specifies the use of the missing data procedures in 40 CFR Part 75 as applicable. An exceedance of the synthetic minor NO_X limit is defined as each calendar day during which the total combined rolling 365-day total NO_X emission rate from Gas Turbine Units 1 and 2 exceeds 244 tons.

4. Synthetic Minor CO Limit Monitoring Requirements

The permit requires the use of CEMS to monitor CO and diluent (O_2 or CO_2) concentrations in the exhaust stacks of Gas Turbine Units 1 and 2 to demonstrate compliance with the synthetic minor tpy CO limitation. For the CO CEMS, the Permittee must meet the requirements of 40 CFR Part 60, including 60.13, Appendix B, and Appendix F. The permit requires the installation and operation of fuel flow rate monitoring systems for determining the natural gas input rate to each gas turbine unit. The fuel flow rate monitoring systems must be calibrated and quality assured in accordance with 40 CFR 75 Appendix D. The Permittee is required to determine the gross caloric value (GCV) of the natural gas at least once per month also in accordance with 40 CFR Part 75 Appendix D. To demonstrate compliance with the synthetic minor CO emission cap for Gas Turbine Units 1 and 2, the Permittee is required to use the CEMS in conjunction with the fuel flow rate monitoring systems and a data acquisition and handling system (DAHS) to calculate mass emissions in units of lb/MMBtu, lb/hr, lb/day, and tons per daily rolling 365-day total. For periods of monitoring system downtime, the permit specifies the use of the missing data procedures in 40 CFR Part 75 as applicable. An exceedance of the synthetic minor CO limit is defined as each calendar day during which the total combined rolling 365-day total CO emission rate from Gas Turbine Units 1 and 2 exceeds 244 tons.

5. SO_2 Monitoring Requirements

To demonstrate compliance with the applicable NSPS SO_2 limit in 40 CFR 60.333(b), the Permittee is required to demonstrate that the gaseous fuel burned in Gas Turbine Units 1 and 2 meets the definition of "natural gas" in 40 CFR 60.331(u). Two options are provided to make this demonstration consistent with 40 CFR 60.334(h)(i) and 40 CFR 60.334(h)(ii). The options include maintaining a current valid purchase contract, tariff sheet, or transportation contract specifying maximum total sulfur content of 20 gr/100 scf or less or maintaining a record of representative fuel sampling data showing the same.

B. Cooling Tower

To demonstrate compliance with the Cooling Tower opacity standard, a certified EPA Reference Method 9 observer is required to perform an initial visual survey of visible emissions. Subsequent surveys are required no less frequently than once per calendar quarter. For each survey, if visible emissions are detected, an EPA Reference Method 9 observation must be performed. Exceedance of the opacity standard triggers corrective action and reporting requirements.

C. Emergency Diesel Generator

For the Emergency Diesel Generator, the Permittee is required to meet the monitoring, recordkeeping, and reporting provisions of NSPS Subpart IIII (40 CFR 60.4209 and 40 CFR 60.4211). Additionally, to demonstrate compliance with the voluntary 500 hr/yr operating limit, the Permittee is required to maintain records of the hours of operation of the unit are reason for operation on a 12-month rolling total. These requirements are contained in Section V.B.3 and V.C.3 of the permit.

VI. TESTING REQUIREMENTS

The Permittee is required to conduct initial performance tests for NO_X emissions on Gas Turbine Units 1 and 2 in accordance with NSPS Subpart GG (40 CFR 60.335) and NSPS Subpart A (40 CFR 60.8). The initial performance tests must be completed within 60 days after achieving the maximum production rate at which the unit will be operated, but not later than 180 days after initial startup. Performance testing requirements for Gas Turbine Units 1 and 2 are contained in Section III.D.4 of Attachment "B" of the permit.

VII. IMPACTS TO AMBIENT AIR QUALITY

A dispersion modeling analysis was conducted by the Permittee to demonstrate compliance with National Ambient Air Quality Standard (NAAQS) and Arizona Ambient Air Quality Guideline (AAAQGs). The modeling analysis design, input parameters, and results are documented in Appendix A of the permit application dated December 20, 2006. Electronic modeling files were received by the Department on a CD labeled "Appendix A.2, BMGS Modeling Input and Output Files," dated December 12, 2006. Modeling was redone in certain situations to reflect revised PTE estimates as noted below. There were no significant findings to negate the Permittee's compliance conclusions. Therefore, the Department concluded that the modeling was performed correctly and the demonstration of compliance with both the NAAQS and the AAAQG is valid.

A. BMGS Modeling File Check List

1. The elevation/receptor information was found to be correct. The modeling domain as created by AERMAP was adequate. The receptor spacing was adequate.
2. The building data, as illustrated in Figure 2, were found to be correct as modeled.
3. The modeling parameters listed in the permit application were consistent with those used in the modeling analyses.
4. When remodeling was done with AERMOD, the maximum modeled concentrations matched the results reported in the permit application.
5. The AERMET meteorological data processing showed to be done correctly, producing no major error listings.
6. The site characteristics as chosen for STAGE3 AERMET processing are consistent with the land types in the vicinity of the proposed project.
7. AAAQG modeling showed no exceedances of the AAAQS. Modeling files showed no abnormalities.
8. Because only one year on meteorological data was used, and it was not specifically demonstrated to be representative on-site data, highest short term impacts were compared to NAAQS instead of high-second-high impacts, as listed in the modeling report. Results are slightly higher, but no impacts exceeded NAAQS.

9. As documented in Section III.C.2 of this TSD, the Department revised the PTE estimate for the Cooling Tower. Modeling was performed with revised PM_{10} emissions. Revised impacts are shown in Table 8.
10. As documented in Section III.C.3 of this TSD, the Department revised the PTE estimate for the Emergency Diesel Generator to reflect NSPS Subpart IIII applicability. The revised estimate of PTE for SO_2 was considerably lower than the Permittee's estimate based on a fuel sulfur content of 0.05% versus 0.4%. The model was rerun with revised SO_2 emissions. Revised impacts are shown in Table 8.

B. BMGS Modeling Results

1. Criteria Pollutants

Revised modeled concentrations for criteria pollutants are presented in Table 8. Ambient impact demonstration conclusions are presented following the table by pollutant.

Table 8. Summary of Maximum Modeled Concentrations and NAAQS Compliance

Emission Specie	Averaging Period	Modeled Conc. ($\mu g/m^3$)	UTM Easting (m)	UTM Northing (m)	Background Conc. ($\mu g/m^3$) [b]	Maximum Ambient Impact ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
PM_{10}	24-hour	21.3	759212.88	3880512.0	53	74.3	150
	Annual	0.4	759212.88	3880512.0	14	14.4	50
CO	1-hour	419	759212.88	3880512.0	1,828	2,247	40,000
	8-hour	312	759212.88	3880512.0	637	949	10,000
SO_2	3-hour	29.1	759212.88	3880512.0	8	37.1	1,300
	24-hour	12.3	759212.88	3880512.0	4	16.3	365
	Annual	0.2	759212.88	3880512.0	0.4	0.6	80
NO_X	Annual	8.5	759212.88	3880512.0	11	19.5	100

[a] Highest concentration.
[b] See Section A.3.3 of permit application for description of background monitoring sites.

<u>PM_{10} Concentrations</u>
The predicted highest 24-hour PM_{10} concentration was 21.3 $\mu g/m^3$ and the maximum annual concentration was 0.4 $\mu g/m^3$. The locations of these predicted concentrations are shown in Figure 1. The predicted concentrations added to the 24-hour and annual background PM_{10} concentrations of 53 $\mu g/m^3$ and 14 $\mu g/m^3$, respectively yield total 24-hour and annual impacts of 74.3 $\mu g/m^3$ and 14.4 $\mu g/m^3$, respectively. These total impacts are below the 24-hour and annual NAAQS for PM_{10} of 150 $\mu g/m^3$ and 50 $\mu g/m^3$, respectively.

CO Concentrations

The predicted highest 1-hour CO concentration was 419 μg/m^3 and the highest, 8-hour CO concentration was 312 μg/m^3. The locations of these predicted concentrations are shown in Figure 1. The predicted concentrations added to the 1-hour and 8-hour background CO concentrations of 1,828 μg/m^3 and 637 μg/m^3, respectively yield total 1-hour and 8-hour impacts of 2,247 μg/m^3 and 949 μg/m^3, respectively. These total impacts are below the 1-hour and 8-hour NAAQS for CO of 40,000 μg/m^3 and 10,000 μg/m^3, respectively.

SO_2 Concentrations

The predicted highest 3-hour SO_2 concentration was 29.1 μg/m^3, the highest 24-hour SO_2 concentration was 12.3 μg/m^3 and the maximum annual SO_2 concentration was 0.2 μg/m^3. The locations of these predicted concentrations are shown in Figure 1. The predicted concentrations added to the 3-hour, 24-hour and annual background SO_2 concentrations of 8 μg/m^3, 4 μg/m^3 and 0.4 μg/m^3, respectively yield total 3-hour, 24-hour and annual impacts of 37.1 μg/m^3, 16.3 μg/m^3 and 0.6 μg/m^3, respectively. These total impacts are below the 3-hour, 24-hour and annual NAAQS for SO_2 of 1,300 μg/m^3, 365 μg/m^3 and 80 μg/m^3, respectively.

NO_X Concentrations

The predicted maximum annual NO_X concentration was 8.5 μg/m^3. The location of this predicted concentration is shown in Figure 1. The predicted concentration added to the annual background NO_X concentration of 11 μg/m^3 yields a total annual impact of 19.5 μg/m^3. This total impact is below the annual NAAQS for NO_2 of 100 μg/m^3.

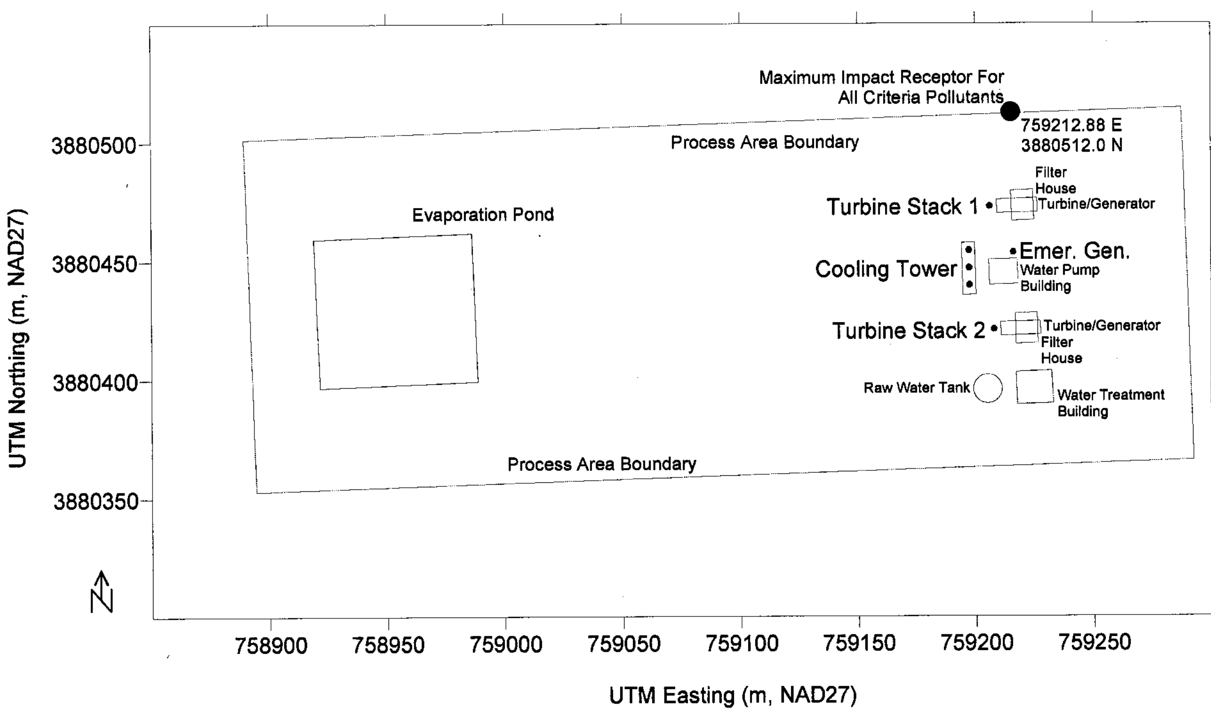

Figure 1. Plan View Showing Location of Maximum Modeled Concentrations

The 3-dimensional building plot created from the modeling files is presented in Figure 2.

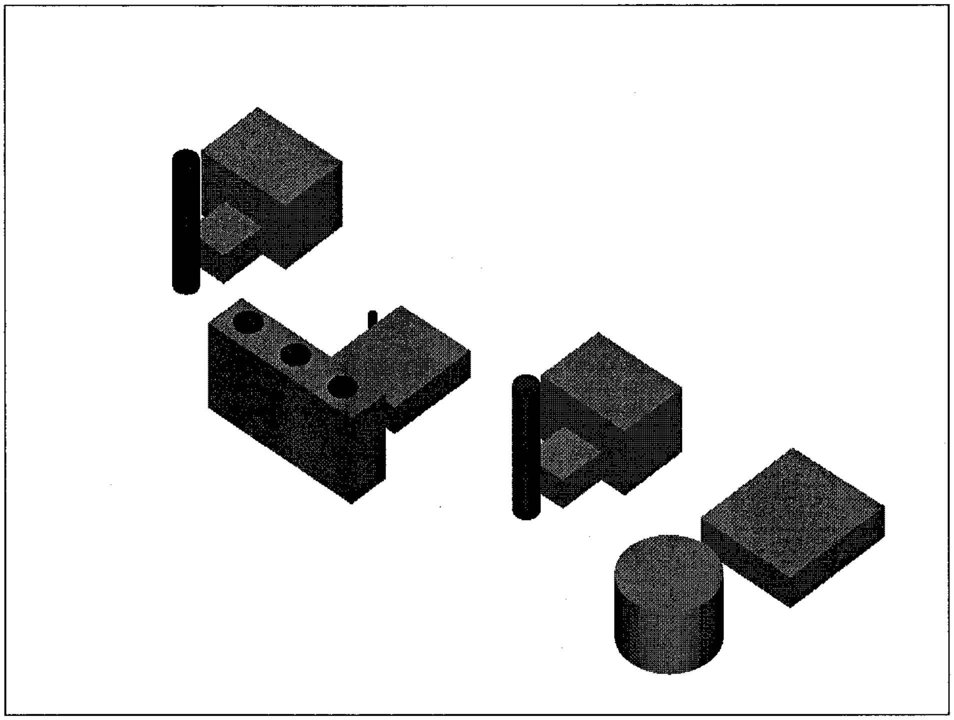

Figure 2. Building Layout Produced from Modeling Files

2. AAAQG Pollutants

AAAQG modeling was based on maximum emission rates for each emission unit and respective averaging period. Summary results of the AAAQG modeling demonstration are presented in Table 9.

Table 9. Summary of AAAQG Modeling Results

AAAQG Pollutant	1-Hour Impact (μg/m^3)	1-Hour AAAQG (μg/m^3)	24-Hour Impact (μg/m^3)	24-Hour AAAQG (μg/m^3)	Annual Impact (μg/m^3)	Annual AAAQG (μg/m^3)
Acetaldehyde	4.01E-02	2.30E+03	5.12E-03	1.40E+03	1.10E-03	5.00E-01
Acrolein	6.42E-03	6.70E+00	1.59E-03	2.00E+00	--	--
Benzene	3.93E-01	6.30E+02	1.56E-01	5.10E+01	3.17E-02	1.40E-01
1,3-Butadiene	4.30E-04	7.20E+00	3.00E-05	1.90E+00	1.00E-05	6.70E-02
Ethylbenzene	3.21E-02	4.50E+03	2.38E-03	3.50E+03	--	--
Formaldehyde	7.12E-01	2.00E+01	5.31E-02	1.20E+01	1.14E-02	8.00E-02
Naphthalene	6.58E-02	6.30E+02	2.62E-02	4.00E+02	--	--
Propylene Oxide	1.41E+00	1.50E+03	5.63E-01	4.00E+02	1.14E-01	2.00E+00
Toluene	1.42E-01	4.70E+03	5.67E-02	3.00E+03	--	--
Xylenes	9.73E-02	5.50E+03	3.88E-02	3.50E+03	--	--

VIII. LIST OF ABBREVIATIONS

(Abbreviations should always be spelled out in the document the first time they are used - a generic list is provided below.)

AAAQG .... Arizona Ambient Air Quality Guideline
A.A.C. .... Arizona Administrative Code
ADEQ .... Arizona Department of Environmental Quality
ADHS .... Arizona Department of Health Services
AQD .... Air Quality Division
AQG .... Air Quality Guidelines
Btu/ft^3 .... British Thermal Units per Cubic Foot
CI .... Compression Ignition
CO .... Carbon Monoxide
CO_2 .... Carbon Dioxide
DEGF .... Degrees Fahrenheit
DEGK .... Degrees Kelvin
FERC .... Federal Energy Regulatory Commission
ft .... Feet
g .... Grams
HAP .... Hazardous Air Pollutant
hp .... Horsepower
hr .... Hour
IC .... Internal Combustion
lb .... Pound
m .... Meter
MMBtu .... Million British Thermal Units
$\mu g/m^3$ .... Microgram per Cubic Meter
MMCFD .... Million Cubic Feet Per Day
NAAQS .... National Ambient Air Quality Standard
NO_x .... Nitrogen Oxide
NO_2 .... Nitrogen Dioxide
O_3 .... Ozone
Pb .... Lead
PM .... Particulate Matter
PM_{10} .... Particulate Matter Nominally less than 10 Micrometers
Psia .... Pounds per square Inch (absolute)
PTE .... Potential-to-Emit
s .... Seconds
SO_2 .... Sulfur Dioxide
TPY .... Tons per Year
TSP .... Total Suspended Particulate
USEPA .... United States Environmental Protection Agency
VOC .... Volatile Organic Compound
yr .... Year