

**TECHNICAL SUPPORT DOCUMENT  
FOR  
NORTHERN ARIZONA ENERGY, LLC  
AIR QUALITY PERMIT NO. 43801**

**I. INTRODUCTION**

Northern Arizona Energy, LLC, the Permittee, has proposed to construct and operate a gas-fired peaking power generation plant, consisting of four (4) combustion turbine generators (CTG) of 48 MW each. The facility will be located approximately 3 miles north of the Griffith Interchange on Interstate 40 in Mohave County, Arizona. The project will interconnect with the Western Area Power Administration (WAPA) transmission system at the Griffith Switchyard. The project is designed to serve peak load requirements of customers in Mohave county and surrounding regional load centers.

**A. Company Information**

1. Facility Name

Northern Arizona Energy Project

2. Mailing Address

Northern Arizona Energy, LLC  
1735 Technology Drive Suite 820  
San Jose, CA 95110

3. Facility Address

Apache and Haul Road  
Golden Valley, AZ 86413  
Approximately 3 miles north of the I-40 Griffith Interchange in Mohave County,  
Arizona.

**B. Attainment Classification**

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

**C. Learning Sites**

The facility has no learning sites located within 2 miles.

**II. FACILITY DESCRIPTION**

**A. Process Description**

The Northern Arizona Energy, LLC (NAE) has proposed to construct the project in a phased manner, and at full capacity, the project will have four (4) combustion turbine generators (CTG) of 48 MW each. The CTGs will be fired exclusively on natural gas. A chiller system will be utilized to cool the incoming air to improve turbine efficiency and preserve peaking output during the hottest ambient temperature days. Other auxiliary equipment includes air filter, chiller coils, water treatment equipment, natural gas compressors, transformers and water storage tanks. Each CTG will also be equipped with a SPRINT (SPRay INTercooling) system to enhance turbine efficiency and power output.

**B. Air Pollution Control Equipment**

The CTGs will have a water injection system to control nitrogen oxide (NO<sub>x</sub>) emissions. In addition, a selective catalytic reduction (SCR) system will be used to further reduce NO<sub>x</sub> emissions. Also, an oxidation catalyst will be used to reduce carbon monoxide (CO) and volatile organic compound (VOC) emissions. The water chiller system will be equipped with a drift eliminator.

**III. EMISSIONS**

**A. Potential Annual Emissions**

The project is owned by NAE. NAE is owned by an entity that is jointly owned by LS Power Corporation and Dynegy Corporation. Griffith Energy is also owned by Dynegy. Due to common management of NAE and Griffith Energy (operating under a Class I Title V permit), and location on contiguous property, the operations at NAE and Griffith Energy have been evaluated as a single “stationary source”. Consequently, NAE operations are also being covered by a Class I Title V Permit. Potential emissions of nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), and particulate matter less than 10 microns (PM<sub>10</sub>), carbon monoxide (CO), and volatile organic compounds (VOCs) each exceed the significant threshold. However, total allowable NO<sub>x</sub>, SO<sub>2</sub>, CO, VOCs, and PM<sub>10</sub> emissions are limited by enforceable permit conditions to less than the significant level. Thus, the NAE operations will not be subject to New Source Review (NSR). Combined potential emissions of hazardous air pollutants (HAP) for NAE and Griffith Energy are below 10 and 25 tpy for individual and total combined HAP, respectively. Therefore, the facility is not a major source of HAP emissions for the purposes of CAA Section 112 and Article 11 of A.A.C. title 18, chapter 2.

The following emission limits are specified in the permit:

**TABLE 1: Emission Limits**

Pollutant	Significant Threshold Tons/year	Emission Limits for 4 CTGs Tons/year
NO <sub>x</sub>	40.0	39.0
CO	100.0	90.0
PM <sub>10</sub>	15.0	14.0
VOCs	40.0	36.0
SO <sub>2</sub>	40.0	36.0

**1. Particulate Matter**

The PM<sub>10</sub> emissions from the proposed project include emissions from the new combustion turbines and chiller system.

**a. Combustion Turbines**

The maximum allowable PM<sub>10</sub> emissions from the 4 CTGs collectively are limited to 14.0 tons per year. Compliance with this limit is to be demonstrated

through use of continuous fuel flow monitoring in conjunction with unit-specific emission factors based on performance testing. Total PM<sub>10</sub> emissions from the 4 CTGs are to be calculated and recorded monthly, based on a 12-month rolling sum.

**b. Water Chiller System**

The potential PM<sub>10</sub> emissions from the chiller system are expected to be 0.47 tons per year, based on 6000 hours of operation (chiller will be operated only when ambient temperature is more than 60° F), and 345 gallons per minute recirculation rate.

**2. Nitrogen Oxides**

The maximum allowable NO<sub>x</sub> emissions from the 4 CTGs collectively are limited to 39.0 tons per year. Compliance with this limit is to be demonstrated through use of a continuous emission rate monitoring system, with total NO<sub>x</sub> emissions from the 4 CTGs to be calculated and recorded daily, based on a 365-day rolling sum.

**3. Carbon Monoxide**

The maximum allowable CO emissions from the 4 CTGs collectively are limited to 90.0 tons per year. Compliance with this limit is to be demonstrated through use of a continuous emission rate monitoring system, with total CO emissions from the 4 CTGs to be calculated and recorded daily, based on a 365-day rolling sum.

**4. Sulfur Dioxide (SO<sub>2</sub>)**

The maximum allowable SO<sub>2</sub> emissions from the 4 CTGs collectively are limited to 36.0 tons per year. Compliance with this limit is to be demonstrated through use of continuous fuel flow monitoring in conjunction with unit-specific emission factors based on performance testing. Total SO<sub>2</sub> emissions from the 4 CTGs are to be calculated and recorded monthly, based on a 12-month rolling sum.

**5. Volatile Organic Compounds (VOCs)**

The maximum allowable VOCs emissions from the 4 CTGs collectively are limited to 36.0 tons per year. Compliance with this limit is to be demonstrated through use of continuous fuel flow monitoring in conjunction with unit-specific emission factors based on performance testing. Total VOC emissions from the 4 CTGs are to be calculated and recorded monthly, based on a 12-month rolling sum.

**IV. APPLICABLE REGULATIONS**

Section 5 of the NAE permit application presented a regulatory analysis and generally identified Federal and State air quality regulations applicable to the proposed source and emission units. Table 2 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 2: REGULATORY ANALYSIS**

<b>Unit ID</b>	<b>Construction Date</b>	<b>Control Device</b>	<b>Regulation(s)</b>	<b>Applicable? (Y/N)</b>	<b>Verification</b>
Gas Turbines CT1, CT2, CT3, CT4	2007	Selective Catalytic Reduction and Oxidation Catalyst	<u>NSPS Gen. Provisions</u> A.A.C R18-2-901(1) 40 CFR 60 subpart A	Y	Units are subject to an NSPS rule. See below.
			<u>NSPS Subpart KKKK</u> 40 CFR § 60.4305	Y	Each combustion turbine has heat input greater than 10 million Btu per hour and will be constructed after 2/18/2005.
			<u>NSPS Subpart KKKK</u> 40 CFR § 60.4320	Y	Each combustion turbine is subject to NO <sub>x</sub> standards for gas-fired units with heat input equal to or greater than 10 million Btu per hour and less than 850 million Btu per hour.
			<u>NSPS Subpart KKKK</u> 40 CFR § 60.4330	Y	Each combustion turbine is subject to SO <sub>2</sub> standards for units located in the continental U.S.
			<u>NSPS Subpart KKKK</u> 40 CFR § 60.4335, 40 CFR § 60.4345, 40 CFR § 60.4350	Y	Each combustion turbine is subject to NO <sub>x</sub> monitoring requirements for units equipped with water injection. Permittee has elected to use continuous emissions monitoring systems.
			<u>NSPS Subpart KKKK</u> 40 CFR § 60.4365	Y	Each combustion turbine is subject to SO <sub>2</sub> monitoring and recordkeeping requirements. Permittee has elected to maintain records of fuel specifications from tariff or contract.
			<u>NSPS Subpart KKKK</u> 40 CFR § 60.4375 40 CFR § 60.4380	Y	Each combustion turbine is subject to NO <sub>x</sub> reporting requirements. Permittee has elected to use continuous emissions monitoring systems.

			<u>NSPS Subpart KKKK</u> 40 CFR § 60.4405	Y	Each combustion turbine is subject to NO <sub>x</sub> performance testing requirements. Permittee has elected to use continuous emissions monitoring systems.
			<u>NSPS Subpart KKKK</u> 40 CFR § 60.4415	Y	Each combustion turbine is subject to SO <sub>2</sub> performance testing requirements.
			<u>NSPS Subpart GG</u> A.A.C R18-2-901(40)	Y	Each combustion turbine was constructed after October 3, 1977 and has a heat input at peak load greater than 10.7 gigajoules per hour. NSPS subpart KKKK includes an exemption from complying with the provisions of subpart GG, but this exemption does not extend to A.A.C R18-2-901(40) until such time as subpart KKKK is incorporated into the A.A.C. The requirements of subpart GG are applicable, but have been incorporated into the permit only by reference, as the exemption is expected to take effect prior to startup of these combustion turbines.
			<u>Acid Rain Program</u> A.A.C. R18-2-333 40 CFR 72 – 78	Y	Each combustion turbine is a utility unit.
			<u>NESHAP Subpart YYYYY</u>	N	40 CFR 63 Subpart YYYYY applies to stationary combustion turbines located at major sources of HAP emissions. NAE is an area (i.e., non-major) source of HAP.
			<u>PSD</u> A.A.C. R18-2-406 A.A.C. R18-2-407	N	Permittee has voluntarily accepted limitations on criteria pollutant emissions to ensure that the project will not result in a significant net emissions increase.
			<u>Compliance Assurance Monitoring</u> 40 CFR 64	N	Each combustion turbine uses a control device only for NO <sub>x</sub> and CO emissions. For each of these pollutants, the permit specifies use of CEMS as “a continuous compliance determination method”. Therefore, CAM is not applicable.

Chiller system and aqueous ammonia storage	2007	Drift Eliminator	A.A.C R18-2-702(B)	Y	Unit is subject to the generally applicable opacity emission standard because it is not subject to any other opacity standard.
			A.A.C R18-2-730	Y	Unit is subject to the generally applicable emission standard and conditions as these are unclassified process sources

**V. MONITORING, RECORDKEEPING, AND REPORTING REQUIREMENTS**

**A. Combustion Gas Turbines**

**1. NSPS Requirements**

As shown in Table 2, each combustion turbine is subject to the NO<sub>x</sub> and SO<sub>2</sub> emission standards and the accompanying monitoring, recordkeeping, and reporting requirements under 40 CFR 60 subpart KKKK. These provisions include a requirement to operate a continuous emission monitoring system for NO<sub>x</sub> emissions, and to maintain records of current valid natural gas purchase contract, specifying maximum total sulfur content to demonstrate compliance with sulfur limit.

**2. Fuel Restriction**

Each combustion turbine is permitted to burn only pipeline quality natural gas.

**3. Synthetic Minor NO<sub>x</sub> and CO Emission Limits**

The Permittee has voluntarily accepted enforceable emission limits that will ensure that the proposed project will not result in a significant net emissions increase that would trigger PSD applicability. The Permittee is required to use continuous emission rate monitoring systems to demonstrate continuous compliance with these limits.

**4. Synthetic Minor PM<sub>10</sub> Emission Limit**

The Permittee has voluntarily accepted an enforceable emission limit that will ensure that the proposed project will not result in a significant net emissions increase that would trigger NSR applicability. The Permittee is required to use continuous fuel flow monitoring systems, in conjunction with performance test results, in order to demonstrate continuous compliance with this limit. For calculating emissions, the most recent performance test results shall be used to calculate emissions.

**5. Synthetic Minor SO<sub>2</sub> and VOC Emission Limits**

The Permittee has voluntarily accepted enforceable emission limits that will ensure that the proposed project will not result in a significant net emissions increase that would trigger NSR applicability. The Permittee is required to use continuous fuel flow monitoring systems, in conjunction with performance test results, in order to demonstrate continuous compliance with this limit. For calculating emissions, the most recent performance test results shall be used to calculate emissions.

**B. Chiller System**

1. The Permittee is required to perform monthly survey of visible emissions from the chiller system. If the opacity appears to exceed the standard, the Permittee is required to conduct EPA Method 9 observation by a certified EPA Reference Method 9 observer.
2. The Permittee is required to perform monthly inspections of the drift eliminators to verify performance. The Permittee must keep records of the results of the inspections and any repairs performed in a written facility log.
3. The Permittee is required to perform monthly analysis and keep records of the total dissolved solids in the chiller system circulation water

**II. PERFORMANCE TESTING REQUIREMENTS**

**A. NSPS Requirements**

Each combustion turbine is subject to the NO<sub>x</sub> and SO<sub>2</sub> emission standards and the accompanying performance testing requirements under 40 CFR 60 subpart KKKK.

**B. PM<sub>10</sub>**

The Permittee is required to perform an initial performance test for PM<sub>10</sub> emissions using EPA 5 and EPA Method 202 within 60 days after achieving 300 fired hours on the CTG. Subsequent performance test shall be performed annually. . If at the end of any month, the 12-month rolling total of PM<sub>10</sub> emissions for the 4 CTGs exceeds 13.5 tons, the test frequency shall change to semi-annual.

**C. VOC**

The Permittee is required to perform an initial performance test for VOC emissions within 60 days after achieving 300 fired hours on the CTG. Subsequent performance test shall be performed annually. Performance test for VOC emissions shall be performed using EPA Methods 25A/25B.

**D. Ammonia**

The Permittee is required to an annual perform test for ammonia slippage.

**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 Section 4 of the permit application. The modeling analysis took into consideration the combined impact of existing Griffith Energy facility and Northern Arizona Energy project, and the background ambient air quality data provided by ADEQ. The modeling analysis was reviewed, and the Department concluded that the modeling demonstrated compliance with both the NAAQS and the AAAQG. The results of the modeling analysis are summarized below:

**Table 3: Summary of Maximum Modeled Concentrations and NAAQS Compliance**

Pollutant	Averaging Period	Modeled Conc. (NAEP+ Griffith) ( $\mu\text{g}/\text{m}^3$ )	Background Conc. ( $\mu\text{g}/\text{m}^3$ )	Total Impact ( $\mu\text{g}/\text{m}^3$ )	NAAQS ( $\mu\text{g}/\text{m}^3$ )	Total Impact (% of Standard)
NO <sub>x</sub>	Annual	8	4	12	100	12%
SO <sub>2</sub>	3-hour	8	246	254	1,300	20%
	24-hour	2	52	54	365	15%
CO	Annual	0.3	6	6.3	80	8%
	1-hour	590	582	1172	40,000	3%
PM <sub>10</sub>	8-hour	94	582	676	10,000	7%
	24-hour	14	46	60	150	40%
	Annual	1	14	15	50	31%

**Table 4: Summary of AAAQG Modeling Results**

AAAQG Pollutant	1-Hour Impact ( $\mu\text{g}/\text{m}^3$ )	1-Hour AAAQG ( $\mu\text{g}/\text{m}^3$ )	24-Hour Impact ( $\mu\text{g}/\text{m}^3$ )	24-Hour AAAQG ( $\mu\text{g}/\text{m}^3$ )	Annual Impact ( $\mu\text{g}/\text{m}^3$ )	Annual AAAQG ( $\mu\text{g}/\text{m}^3$ )
1,3-Butadiene	1.78E-03	7.20E+00	2.90E-04	1.90E+00	2.00E-05	6.70E-02
Acetaldehyde	1.67E-01	2.30E+03	2.76E-02	1.40E+03	2.0E-05	5.00E-01
Acrolein	2.76E-03	6.70E+00	4.63E-03	2.00E+00	--	--
Ammonia	--	--	1.69E+00	1.40E+02	--	--
Benzene	6.57E-02	6.30E+02	1.16E-02	5.10E+01	1.04E-03	1.40E-01
Ethylbenzene	1.51E-01	4.50E+03	2.58E-02	3.50E+03	--	--
Formaldehyde	9.46E-01	2.00E+01	1.57E-01	1.20E+01	1.12E-02	8.00E-02
Hexane	7.26E-01	5.30E+03	1.20E-01	1.40E+03		
Naphthalene	8.15E-03	6.30E+02	1.46E-03	4.00E+02	--	--
Propylene Oxide	4.45E+00	1.50E+03	2.37E-01	4.00E+02	3.77E-02	2.00E+00
Toluene	6.12E-01	4.70E+03	1.04E-01	3.00E+03	--	--
Xylenes	3.20E-01	5.50E+03	5.52E-02	3.50E+03	--	--

**VIII. INSIGNIFICANT ACTIVITIES**

The applicant has requested the following activities to be deemed as “insignificant”. According to A.A.C. R18-2-101.57, for an activity to be deemed “insignificant”, there should be no applicable requirement for the activity. This was the basis used to determine if the activities in the following list qualify as an “insignificant” activity under Arizona law.

**TABLE 5: INSIGNIFICANT ACTIVITIES**

Activity	Insignificant Yes/No	Reason and Applicable Regulation
Turbine Compartment Ventilation Exhaust Vents	Yes	A.A.C. R18-2-101.57(j)
Compressed Air System	Yes	A.A.C. R18-2-101.57(j)
Turbine Lube Oil Vapor extractors and Lube Oil Mist eliminator Vents	Yes	A.A.C. R18-2-101.57(j)
Sulfuric Acid Storage tanks Vents	Yes	A.A.C. R18-2-101.57(j)
Welding Equipment	Yes	A.A.C. R18-2-101.57(j)
Water Wash System Storage tank vent	Yes	A.A.C. R18-2-101.57(j)
Fuel Purge Vents	Yes	A.A.C. R18-2-101.57(j)
Oil/Water Separator Waste Oil Collection Tank Vents	Yes	A.A.C. R18-2-101.57(j)

**IX. LIST OF ABBREVIATIONS**

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<sup>3</sup> ..... British Thermal Units per Cubic Foot  
CO ..... Carbon Monoxide  
CO<sub>2</sub> ..... Carbon Dioxide  
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  
µg/m<sup>3</sup> ..... Microgram per Cubic Meter  
MMCFD ..... Million Cubic Feet Per Day  
NAAQS ..... National Ambient Air Quality Standard  
NO<sub>x</sub> ..... Nitrogen Oxide  
O<sub>3</sub> ..... Ozone  
PM ..... Particulate Matter  
PM<sub>10</sub>..... Particulate Matter Nominally less than 10 Micrometers  
PTE..... Potential-to-Emit  
SO<sub>2</sub>..... Sulfur Dioxide  
TPY ..... Tons per Year  
TSP ..... Total Suspended Particulate  
USEPA ..... United States Environmental Protection Agency  
VOC..... Volatile Organic Compound  
yr..... Year