DRAFT TECHNICAL REVIEW AND EVALUATION
OF APPLICATION FOR
AIR QUALITY PERMIT No. 110023

I. INTRODUCTION

This new Class I air quality permit is issued for the construction and operation of Arizona Electric Power Cooperative, Inc. (AEPCO) - Mohave Energy Park (MEP). The facility is located at 2897 E. King Street in Mohave Valley, Arizona 86440.

MEP will involve the construction and operation of a natural gas-fired electric generating facility. The facility is designed to provide sustained power during periods of peak demand and when renewable energy is unavailable. The facility will have a total generating capacity of approximately 195 megawatts (MW) from four (4) simple cycle combustion turbines. These will burn pipeline-quality natural gas and will be equipped with a selective catalytic reduction (SCR) system to control nitrogen oxide (NO_X) emissions and an oxidation catalyst to control carbon monoxide (CO) and volatile organic compound (VOC) emissions. A continuous emission monitoring system (CEMS) will be installed to monitor NO_X and CO along with heat input to demonstrate compliance with applicable emission limits. The project also includes the installation of one (1) emergency generator and one (1) emergency fire pump. Both of these will fire ultra-low sulfur diesel (ULSD) and be limited to a maximum of 100 hours per year for performance testing and maintenance purposes.

Based on the facility's potential to emit (PTE), NOx and CO emissions exceed major source thresholds as defined under the Arizona Administrative Code (A.A.C.) R18-2-101(76). Therefore, MEP is classified as a major source and thus, it is required to obtain a new Class I air quality permit in accordance with A.A.C. R18-2-302.B.1. Moreover, the facility's PTE exceeds the minor New Source Review (NSR) permitting exemption thresholds for NOx and CO. Thus, triggering Minor NSR in accordance with A.A.C. R18-2-334.A.1. An air dispersion modeling was conducted to demonstrate that the facility will not cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS).

A. Company Information

Facility Name:	Arizona Electric Power Cooperative, Inc. – Mohave Energy Park
Mailing Address:	1000 S. Highway 80 Benson, Arizona 85602
Facility Location:	2897 E. King Street Mohave Valley, Arizona 86440

B. Attainment Classification

The facility is located in Mohave County, an area that is designated as attainment for all criteria pollutants.

II. PROCESS DESCRIPTION

A. Combustion Turbines

The facility proposed to install 4 natural gas-fired combustion turbines with a maximum capacity of 482.5 MMBtu/hr each. Each combustion turbine will be equipped with SCR and an oxidation catalyst. CEMS and heat input monitoring systems will be used to continuously monitor NOx and CO emissions and determine hourly NOx and CO mass emission rates. Each combustion turbine will have the potential to emit NO_X, CO, fine particulate matter with diameters 10 micrometers or less (PM_{10}), fine particulate matter with diameters 2.5 micrometers or less ($PM_{2.5}$), VOCs, sulfur dioxide (SO_2), and hazardous air pollutants (HAPs).

B. Emergency Generators

The facility will operate two (2) standby diesel-powered emergency generators. The emergency generator will provide backup electrical power to facility-wide systems, while the emergency fire pump engine will provide mechanical power to fire suppression water pump systems. Both generators will have the potential to emit NO_X, CO, PM_{10}, $PM_{2.5}$, VOCs, SO_2, and HAPs.

C. Air Pollution Controls

Table 1 provides the air pollution controls to reduce emissions of the following pollutants:

Table 1: Air Pollution Controls for Combustion Turbines GT-1 through GT-4

Air Pollution Control	Pollutants Controlled
Selective Catalytic Reduction (SCR)	NO_x
Oxidation Catalyst	CO and VOCs

III. POTENTIAL TO EMIT (PTE)

A. Combustion Turbines

Emissions from the combustion turbines were calculated using vendor-provided emission rates assumed during operation and startup/shutdown events. PTE for NOx, CO, VOCs, PM_{10}, and $PM_{2.5}$ are calculated based on normal turbine operation at full load with emissions controlled by the SCR system for NOx and an oxidation catalyst for CO and VOCs emissions. PTE for SO_2 was evaluated based on heat input rate for the combustion turbines and vendor-certified stack emissions data. Emissions resulting from start-up and shutdown events for the combustion

turbines were evaluated based on equivalent of three start-up and shut down events per day per unit (1,095 events per year, per unit).

B. Emergency Generators

Emissions from the emergency diesel generator and emergency diesel fire pump were estimated based on maximum of 100 hours per year for testing and maintenance including 500 hours of operation per year. Emissions for these were calculated using U.S Environmental Protection Agency (U.S. EPA), AP-42, Section 3.4 for Large Stationary Diesel and Stationary Engines and 40 CFR 60 Subpart IIII for Stationary Compression Ignition Internal Combustion Engines.

C. 40 CFR 60 Subpart TTTTa

The facility is subject to CO_2 limits from 40 CFR Subpart TTTTa. It is required to operate the units in such a manner that they are not subject to the limits for base load combustion turbines, which will require the units to supply no more than 40 percent of their output as net electric sales. EPA published a proposal to repeal Subpart TTTTa on June 17, 2025, and is reportedly planning on finalizing the repeal. Thus, there is a substantial probability that the operational limits in Subpart TTTTa will no longer apply to the new units after the permit is issued. To ensure that NSR requirements accurately reflect the generating station's future PTE, ADEQ therefore has assumed that the new units may be operated continuously.

Table 2 provides the facility's potential to emit.

Table 2: Potential to Emit (tpy)

Pollutant	PTE	Significant Thresholds	Permitting Exemption Threshold	Major New Source Review Threshold	Minor NSR Triggered?
NO_X	134.4	40	20	250	Yes
CO	190.7	100	50	250	Yes
PM_{10}	71.5	15	7.5	250	Yes
$PM_{2.5}$	71.5	10	5	250	Yes
SO_2	8.4	40	20	250	No
VOCs	21.8	40	20	250	Yes
Total HAPs	4.4	10 (single) / 25 (combined)	N/A	N/A	N/A

IV. MINOR NEW SOURCE REVIEW (NSR)

Minor new source review is required if the emissions of a new source have the potential to emit any regulated air pollutant at an amount greater than or equal to the permitting exemption threshold (PET) in Table 2 above.

The applicant has the option to implement reasonably available control technology (RACT) or conduct an ambient air impact assessment demonstrating the emissions resulting from the operation of the source will not interfere with attainment of the National Ambient Air Quality Standards (NAAQS) in order to satisfy the requirements of minor NSR requirements. In the case, the facility elected to conduct an ambient air assessment to satisfy the requirements of minor NSR Requirements. In order to comply with the 1-hour NO_X NAAQS, the facility has elected to take a 30.06 lb/hr emission limit on NO_X. A detailed discussion of the ambient air impact assessment can be found in Section IX below.

V. VOLUNTARILY ACCEPTED EMISSION LIMITATIONS AND STANDARDS

The permit contains the following voluntarily accepted emission limitations and standards:

A. Fuel Limitation

The facility has accepted a voluntary limitation restricting the combustion turbines to the use of only pipeline-quality natural gas.

B. Carbon Monoxide Emissions for Combustion Turbines GT-1 through GT-4

The facility has accepted not to emit greater than 190 tpy of CO on a 365-day rolling basis as measured by a certified CEMS. In order to comply with the 1-hour and 8-hour CO NAAQS, the Permittee has accepted a 67.87 lb/hr limitation from any stack on the new combustion turbines.

C. Nitrogen Oxides Emissions for Combustion Turbines GT-1 through GT-4

The facility has accepted not to emit greater than 133 tpy of NO_X on a 365-day rolling basis as measured by a certified CEMS. In order to comply with the 1-hour NO_X NAAQS, the Permittee has accepted a 30.06 lb/hr limit from any stack on the new combustion turbines.

D. Particulate Matter Emissions for Combustion Turbines GT-1 through GT-4

The facility has accepted not to emit greater than 72 tpy of PM_{10} on a 12-month day rolling basis. In order to comply with the 24-hour PM_{10} and $PM_{2.5}$ NAAQS, the Permittee has accepted a 4.08 lb/hr limit from any stack on the new combustion turbines.

VI. APPLICABLE REGULATIONS

Table 3 identifies applicable regulations and why each one applies.

Table 3: Applicable Regulations

Unit	Control Device	A.A.C. / NSPS / NESHAP	Discussion
Combustion Turbines	SCR System/Oxidation Catalysts	NSPS 40 CFR 60 Subpart TTTTa;	These standards are applicable to new construction and reconstruction stationary combustion turbine electric generating units constructed after May 23, 2023 with a base load rating greater than 250 MMBtu/hr of fossil fuel and that serve a generator capable of selling greater than 25 MW of electricity to a utility power distribution system.
		NSPS 40 CFR 60 Subpart KKKKa	These standards are applicable to stationary combustion turbines that commenced construction, modification, or reconstruction after December 13, 2024.

Unit	Control Device	A.A.C. / NSPS / NESHAP	Discussion
Emergency Diesel Generator (EGEN) and Emergency Fire Pump (FPEN)	N/A	NSPS 40 CFR 60 Subpart IIII; NESHAP 40 CFR 63 Subpart ZZZZ	These standards are applicable to owners and operators of stationary compression ignition internal combustion engines that commenced construction or were modified or reconstructed after July 11, 2005. These standards are applicable stationary reciprocating internal combustion engines. Pursuant to 40 CFR 63.6590(c), new engines that comply with the requirements of NSPS 40 CFR 60 Subpart IIII satisfy the requirements of NESHAP 40 CFR 63 Subpart ZZZZ.
Fugitive Dust	Dust Suppressants	A.A.C. R18-2 Article 6; A.A.C. R18-2-702	The standards are applicable to all fugitive dust sources at the facility.
Abrasive Blasting	Wet Blasting; Dust Collecting Equipment; Other Approved Methods	A.A.C. R18-2-702; A.A.C. R18-2-726	These standards are applicable to any abrasive blasting operation.
Spray Painting	Enclosures	A.A.C. R18-2-702; A.A.C. R-18-2-727	These standards are applicable to any spray-painting operation.
Demolition and Renovation	N/A	A.A.C. R18-2-1101.A.12	This standard is applicable to any asbestos related demolition or renovation operations.

VII. MONITORING, RECORDKEEPING, AND REPORTING REQUIREMENTS

Table 4 contains an inclusive but not an exhaustive list of the monitoring, recordkeeping and reporting requirements prescribed by the air quality permit. The table below is intended to provide insight to the public for how the facility is required to demonstrate compliance with the emission limits in the permit. Records are required be kept for a minimum of five (5) years as outlined in Attachment "A" of the permit.

Table 4: Permit No. 110023

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Combustion Turbines	NOx	30.06 lb/hr (individual) 133 tpy on 12-month rolling basis (all combustion turbines)	Install, certify, maintain and operate a CEMs for NO_X from combustion turbines GT-1 through GT-4. Install, calibrate, maintain, and operate fuel flow monitors.	Calculate and maintain records of 365-day rolling basis emissions of NO_X from combustion turbines GT-1 through GT-4.	Report periods of excess emissions. Submit semiannual excess emissions and monitoring system performance reports.
	CO	67.87 lb/hr (individual) 190 tpy on 12-month rolling basis (all combustion turbines)	Install, certify, maintain and operate a CEMs for CO from combustion turbines GT-1 through GT-4. Install, calibrate, maintain, and operate fuel flow monitors.	Calculate and maintain records of 365-day rolling basis emissions of CO from combustion turbines GT-1 through GT-4.	Report periods of excess emissions. Submit semiannual excess emissions and monitoring system performance reports.

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
	$PM/PM_{10}/PM_{2.5}$	4.08 lb/hr (individual) 72 tpy on 12-month rolling basis (all combustion turbines)	Conduct initial and annual performance tests. Calculate 12-month rolling totals of PM_{10} emissions.	Record performance test data.	12-month rolling sum of emissions.
	SO_2	0.060 lb SO_2/MMBtu	Conduct an annual performance test. Maintain records of fuel combusted.	Maintain records demonstrating that the total sulfur content is below limitation.	N/A
	CO_2	Low Load (Supply 20% or Less): 120 lb CO_2/MMBtu	Monitor hourly CO_2 mass emissions using hourly heat input rate.	Maintain records of information used to demonstrate compliance, including emissions rates, calculations, and applicable monitoring data.	N/A
		Intermediate Load (Supply Greater than 20% and up to 40%): 1,170 lb CO_2/MWh of gross energy output.	Install, certify, maintain and operate a CEMS *or* calculate hourly CO_2 mass emissions using hourly heat input rate and the F-Factor methodology in Appendix G to 40 CFR 75.	Maintain records of information used to demonstrate compliance, including emissions rates, calculations, and applicable monitoring data.	Submit quarterly compliance report demonstrating compliance with emissions limitations and energy output.

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
			Install, calibrate, maintain, and operate a sufficient number of watt meters to continuously measure and record the hourly electric output.		
Emergency Generator (EGEN) and Emergency Fire Pump (FPEN)	SO_2	0.0015% by weight fuel	Install a non-resettable hour meter.	Maintain records of the lower heating value of the fuel. Maintain records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter.	Report any exceedance of the sulfur content of the fuel being fired.
Fugitive Dust	PM	40% Opacity	N/A	Record of the dates and types of dust control measures employed, and if applicable, the results of any observations, and any corrective action taken to lower the opacity of any excess emissions.	N/A
Abrasive Blasting	PM	20% Opacity	N/A	Record the date, duration and pollution control measures of	N/A

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
				any abrasive blasting project.	
Spray Painting	VOCs	20% Opacity Control 96% of the Overspray	N/A	Maintain records of the date, duration, quantity of paint used, any applicable material safety data sheets, and pollution control measures of any spray-painting project.	N/A
Demolition/ Renovation	Asbestos	N/A	N/A	Maintain records of all asbestos related demolition or renovation projects including the "NESHAP Notification for Renovation and Demolition Activities" form and all supporting documents.	N/A

VIII. COMPLIANCE ASSURANCE MONITORING (CAM)

The CAM rule applies to pollutant-specific emission units (PSEU) at a major Title V source if the unit meets all of the following criteria:

A. The unit is subject to an emission limit or standard for the applicable regulated air pollutant;

B. The unit uses a control device to achieve compliance with the emission limit or standard; and

C. The unit has "potential pre-control device emissions" of the applicable regulated air pollutant equal to or greater than 100% of the amount (tons/year) required for a source to be classified as a major source. "Potential pre-control device emissions" means potential to emit (PTE, as defined in Title V) except emissions reductions achieved by the applicable control device are not considered.

The general purpose of monitoring required by the CAM rule is to assure compliance with emission standards by ensuring that control devices meet and maintain the assumed control efficiencies. Compliance is ensured through requiring monitoring of the operation and maintenance of the control equipment and, if applicable, operating conditions of the pollutant-specific emissions unit. For the PSEUs that have post control potential to emit equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source, for each parameter monitored, the facility shall collect four or more data values equally spaced over each hour. Such units are defined as “large” PSEUs. For all other PSEUs (“small” PSEUs), the monitoring shall include some data collection at least once per 24-hour period.

The facility proposes to operate CEMS for NO_X and CO in order to demonstrate compliance with the applicable emissions limitations. These CEMS will allow the facility to demonstrate continuous compliance. Therefore, in accordance with 40 CFR 64.2(b)(1)(vi), the combustion turbines will not be subject to the CAM rule.

IX. AMBIENT AIR QUALITY IMPACT ANALYSIS

A. General Overview

ADEQ reviewed the ambient air quality assessment submitted by AEPCO in support of its application for a new Class I air quality permit for construction and operation of MEP. The assessment evaluated emissions of the criteria pollutants regulated under the applicable provisions of the Minor NSR of the A.A.C. R18-2-334. Under the Minor NSR program, an ambient air quality assessment must demonstrate either of the following:

- The emissions from the source or minor modification will have an ambient impact below the significant impact levels (SILs);
- The ambient concentrations resulting from the source or minor modification combined with representative background concentrations of criteria pollutants will not interfere with attainment or maintenance of the National Ambient Air Quality Standard (NAAQS).

To satisfy the requirements of Minor NSR, AEPCO conducted an ambient air quality assessment in two steps: a preliminary analysis (often referred to as a significant impact analysis), and if required, a cumulative impact analysis:

- The significant impact analysis estimates ambient concentrations resulting from the proposed project for pollutants that trigger minor NSR review. If the ambient impacts from the project are greater than SILs, then a cumulative impact analysis is conducted.
- The cumulative impact analysis considers the emissions from the proposed project and the emissions from other nearby sources. The modeling results from these emission sources are added to representative regional ambient background concentrations and the total concentrations are compared to the NAAQS.

For the proposed project, the pollutants subject to the Minor NSR program are PM_{10}, $PM_{2.5}$, NO_X, VOCs, CO, and ozone (O_3, due to precursor emissions of NO_X and VOCs). Guidance for performing air quality dispersion modeling analyses is set forth in the EPA's Guideline on Air Quality Models (40 CFR Part 51 Appendix W)[1] and the Air Dispersion Modeling Guidelines for Arizona Air Quality Permits, November 1, 2019 (ADEQ's Modeling Guidelines).[2]

B. Model Selection

The American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) model is the EPA-preferred model for estimating impacts at receptors located in simple terrain and complex terrain (within 50-km of a source) due to emissions from industrial sources. AEPCO used AERMOD for the ambient impact analysis.

The AERMOD modeling system consists of three major components: AERMAP, used to process terrain data and develop elevations for receptors; AERMET, used to process the meteorological data; and the AERMOD dispersion model, used to estimate the ambient pollutant concentrations. The ambient impact analysis was conducted using AERMOD version 24142, the latest version of the modeling system.

C. Source Inputs

1. Project Overview

MEP is a natural gas-fired electric generating facility. The facility is designed to provide sustained power during periods of peak demand and when renewable energy is unavailable. The facility will have a total

1 US. EPA. 2017. Guidelines on Air Quality Models. https://www.epa.gov/sites/default/files/2020-09/documents/appw_17.pdf

2 Arizona Department of Environmental Quality. 2019. Air Quality Modeling Guidelines for Arizona Air Quality Permits. http://static.azdeq.gov/aqd/modeling_guidance.pdf

generating capacity of approximately 195 megawatts (MW) from four simple cycle combustion turbines units.

2. Emissions Sources

Emission sources are four new natural gas-fired simple cycle combustion turbines, an emergency generator, and an emergency fire water pump. Emissions from off-site sources accounted for in the cumulative impact analysis are discussed in Section IX.C.7 below.

3. Load Analysis

A load analysis is required for equipment that may operate under a variety of conditions that could affect emission rates and dispersion characteristics. Based on the performance testing data provided by the turbine vendor, AEPCO conducted a load analysis for four operating scenarios for four new combustion turbines: 100%, 80%, 50%, and startup/shutdown (SUSD). In general, the SUSD scenario represents the worst case due to higher emission rates combined with moderate gas temperatures and exit velocities. However, in some cases, the 50% load scenario represents the worst case because its lower gas temperature and exit velocity are unfavorable for dispersion. The emission rates and stack parameters associated with these worst-case scenarios were used for the significant impact analysis and cumulative impact analysis.

4. Model Scenarios for NO_2

a. Model Scenarios for 1-hour NO_2

The modeled hourly emission rates for each turbine are 4.4 lb/hr, 3.6 lb/hr, and 2.6 lb/hr for 100%, 80%, and 50% loads, respectively. These emission rates are derived from performance testing data provided by the turbine vendor, assuming the use of an SCR system for NOx control. The SUSD scenario assumes that all four combustion turbines initiate a 30-minute startup simultaneously, operate concurrently for 15 minutes at 100% load, and finally initiate a simultaneous 15-minute shutdown. Under this scenario, the estimated hourly emission rate is 30.06 lb/hr for each turbine.

b. Model Scenarios for Annual NO_2

To be consistent with the combined PTE of 132.9 tpy for four gas turbines, an annualized emission rate of 7.6 lb/hr was modeled for each turbine.

5. Model Scenarios for 1-hour and 8-hour CO

The modeled hourly emission rates for each turbine are 2.7 lb/hr, 2.2 lb/hr, and 1.6 lb/hr for 100%, 80%, and 50% loads, respectively. These emission rates are derived from performance testing data provided by the turbine

vendor, assuming the use of oxidation catalyst controls. Same to 1-hour NO_2 modeling, the SUSD scenario assumes that all four combustion turbines initiate a 30-minute startup simultaneously, operate concurrently for 15 minutes at 100% load, and finally initiate a simultaneous 15-minute shutdown. Under this scenario, the estimated hourly emission rate is 67.87 lb/hr.

6. Model Scenarios for PM_{10} and $PM_{2.5}$

The modeled hourly emission rates for each turbine are 4.1 lb/hr, 3.4 lb/hr, and 2.4 lb/hr for 100%, 80%, and 50% loads, respectively. These rates are derived from vendor performance testing data and represent the inherent, uncontrolled emission rates from natural gas combustion. Because there are no post-combustion controls for PM_{10} and $PM_{2.5}$, the modeled emission rate for the SUSD scenario is identical to the 100% load rate of 4.1 lb/hr.

7. Off-Site Sources

Per the Department's request, AEPCO incorporated Calpine's South Point Energy Center (SPEC), located approximately 7 km south of MEP, into the NAAQS modeling. The included emission sources consisted of two combined-cycle gas turbines, a diesel firewater pump, and an 11-cell cooling tower. The Department provided the source parameters for SPEC to AEPCO.

D. Meteorological Data

1. Meteorological Data Selection

For regulatory dispersion modeling analyses, 5 years of National Weather Station (NWS) meteorological data, or at least 1 year of site-specific meteorological data, or at least 3 years of prognostic meteorological data should be used. However, from a technical standpoint, the EPA still considers site-specific datasets as the "gold standard". Per Appendix W Section 8.4.2.d, "*If 1 year or more, up to 5 years, of site specific data are available, these data are preferred for use in air quality analyses*".

The University of Arizona operates the Arizona Meteorological Network (AZMET) throughout Arizona, including two locations close to MEP: Mohave and Mohave 2. AEPCO selected the Mohave 2 AZMET station as the representative meteorological data source for the modeling analysis. Although both stations are roughly 4 miles from MEP and exhibit a primary north-south flow along the Colorado River basin, Mohave 2 provides superior spatial representation for the nearby SPEC source. The Mohave 2 meteorological dataset met the QA/QC and completeness requirements in Meteorological Monitoring Guidance for Regulatory Modeling Applications (EPA-454/R-99-005).

2. Meteorological Data Processing

AEPCO utilized AERMET meteorological preprocessor (v24142) to process five - years of the Mohave 2 data along with cloud cover data from the U.S. National Climatic Data Center (NCDC) for the Kingman Airport, and upper air radiosonde data from the Las Vegas station within the NWS Rawinsonde Network. AEPCO also used the EPA's AERSURFACE tool (v20060) to calculate surface characteristic parameters (albedo, Bowen ratio, and surface roughness) required by AERMET.

E. Ambient Air Boundary and Receptor Network

Applicants are required to demonstrate compliance with NAAQS at receptors spaced along and outside the ambient air boundary (AAB). According to the EPA's revised policy on exclusion from "Ambient Air", "*the atmosphere over land owned or controlled by the stationary source may be excluded from ambient air where the source employs measures, which may include physical barriers, that are effective in precluding access to the land by the general public*" .[3] AEPCO established the AAB, aligning it with the facility's fence line.

AEPCO set up a receptor network to determine areas of maximum predicted concentrations. The grid spacing utilized for the receptors are as follows:

- AAB set at 25 m intervals;
- A receptor grid of 100 m, extending from AAB to 500 m;
- A receptor grid of 250 m, extending from 500 m to 1.5 km;
- A receptor grid of 1000 m, extending from 1.5 km to 5 km.

Per the Department's request, AEPCO also placed receptors with 1,000-meter spacing within the boundaries of the Fort Mohave Indian Tribe's land and the Chemehuevi Indian Tribe's land. This grid density allows for an evaluation of project impacts on tribal lands.

As discussed later, the Department performed an additional modeling analysis for learning sites. Receptors were placed within the sites at 25-meter intervals.

AEPCO used the AERMAP terrain processor to process the USGS National Elevation Data (NED) 1 arc second data to generate the receptor elevations and hill heights.

F. Downwash and Good Engineering Practice (GEP)

All the facility stacks are subject to downwash. All stacks are also below the minimum 65-meter allowable GEP height, therefore all stack heights are fully creditable for air quality modeling. AEPCO evaluated building downwash effects

3 U.S. EPA. 2019. Revised Policy on Exclusion from "Ambient Air"
https://www.epa.gov/sites/default/files/2019-12/documents/ambient_air2019.pdf

based on building and stack location and dimensions, and the EPA's Building Profile Input Program Plume Rise Model Enhancements (BPIP-PRME).

G. Land Use Classification

The rural/urban classification of an area is determined by either the dominance of a specific land use or by population data in the study area. The land-use procedure specifies that the land-use within a three-kilometer radius of the source should be determined using the typing scheme developed by Auer.[4] AEPCO determined the project site area as "Rural" based on the land use method.

H. Background Concentrations

Background concentrations should be representative of regional air quality in the vicinity of a facility. Typically, background concentrations should be determined based on the air quality data collected in the vicinity of the proposed project site. However, if there are no monitors located in the vicinity of the project, a "regional site" may be used to determine background concentrations. Per Appendix W Section 8.3.2 b, a regional site is "*one that is located away from the area of interest but is impacted by similar or adequately representative sources*."

1. Background Concentration for $PM_{2.5}$

$PM_{2.5}$ is a regional air quality pollutant. The closest $PM_{2.5}$ monitoring station to MEP is the Alamo Lake monitor. As detailed in the ADEQ 5-year Network Assessment report, the Alamo Lake monitor is a regional-scale monitor, with coverage extending across the entirety of Mohave County and La Paz County.[5] Therefore, AEPCO selected the Alamo Lake monitor to determine the background concentrations for the project area.

While AEPCO initially calculated $PM_{2.5}$ background concentrations using 2021-2023 data, a subsequent review by the Department revealed that 2023 was an anomalous year, exhibiting an annual average concentration significantly lower than other years. To ensure a representative baseline, the Department recalculated the background concentrations using monitoring data from 2021, 2022, and 2024. The resulting 24-hour average and annual average background concentrations are 11 µg/m³ and 4.0 µg/m³, respectively.

2. Background Concentration for PM_{10}

AEPCO calculated the 24-hr PM_{10} background concentration using the 2022-2024 data from the Bullhead City Monitor. Located approximately 22

4 Auer, A.H. 1978. Correlation of Land Use and Cover with Meteorological Anomalies, Journal of Applied Meteorology, 17:636-643.
5 Arizona Department of Environmental Quality. 2020. ADEQ 2020 5-Year Network Assessment. https://static.azdeq.gov/aqd/5yrna.pdf

km to the north of MEP, PM_{10} concentrations from this monitor provide a representative estimate of background PM_{10} concentrations in the MEP area. The obtained 24-hr PM10 background concentration is 111 µg/m³.

3. Background Concentration for NO_2

AEPCO selected the Buckeye monitor for background determination for NO_2. Located on the western edge of the Phoenix metropolitan area, the Buckeye monitor is an urban monitor with a measurement scale of 4 to 50 kilometers (km). The monitor is near Interstate-10 and State Route 85. Due to the impacts of urban sources, the Department has determined that the NO_2 monitoring data from the Buckeye monitor is adequately representative - and likely a conservative evaluation - of the current background concentrations for NO_2 near MEP.

AEPCO calculated the background concentrations using the 2022-2024 data from the Buckeye monitor. The resulting 1-hour average and annual average background concentrations are 61.4 µg/m³ and 8.02 µg/m³, respectively.

The Department determined that the regional monitors selected by the applicant reflect the background air quality of the project site for NAAQS compliance demonstration purposes; therefore, on-site ambient air monitoring is not required.

I. 1-hour NO_2 Modeling

Based on Appendix W Section 4.2.3.4-d, the following multi-tiered approach is recommended for 1-hour NO_2 modeling:

- Tier 1 Total Conversion: Assume full conversion of NO to NO_2 without any additional justification.
- Tier 2 Ambient Ratio Method (ARM2): Multiply Tier 1 result by representative equilibrium ratios of NO_2/ NO_X value that are based on ambient levels of NO_2 and NO_X derived from national data obtained from the EPA's Air Quality System (AQS).
- Tier 3: Plume Volume Molar Ratio Method (PVMRM) or Ozone Limiting Method (OLM).

AEPCO used the Tier 1 approach, the most conservative screening method.

J. Methodology for Ozone and Secondary $PM_{2.5}$ Impacts Analysis

Per Appendix W Section 5.3.2 and Section 5.4.2, the EPA recommends a two-tiered demonstration approach for addressing single-source impacts on ozone and secondary $PM_{2.5}$. The first tier involves use of technically credible relationships between precursor emissions and a source's impacts that may be published in the peer-reviewed literature; developed from modeling that was previously conducted for an area by a source, a governmental agency, or some other entity and that is deemed sufficient; or generated by a peer-reviewed reduced form model. The second tier involves application of more sophisticated case-specific chemical

transport models (e.g., photochemical grid models) to be determined in consultation with the EPA Regional Office and conducted consistent with new EPA single-source modeling guidance. It is anticipated that the case for using a full quantitative chemical transport model is rare.

One of the first-tier demonstration tools is Model Emissions Rates for Precursors (MERPs). The MERPs can be described as an emission rate of a precursor that is expected to result in a change in ambient O_3 or $PM_{2.5}$ that is less than a specific air quality concentration threshold, such as a SIL. In summary, if the emission rates of precursors for a proposed source are less than MERPs, it is concluded that the proposed source will not cause or contribute to a violation of the NAAQS for ozone or the secondary formation of $PM_{2.5}$ from the proposed source.

The EPA has established empirical relationships between individual sources and their impacts on O_3 and $PM_{2.5}$ for hundreds of hypothetical sources, including three sources in Arizona[6]. Of those three, the source in La Paz County is most representative of MEP, as it is the closest and is located in a similar environment to MEP. The modeled parameters for the La Paz source are summarized in Table 5.

Table 5: Modeled Concentrations for the La Paz Source in EPA's MERPs View Qlik

Pollutants	Precursors	Stack Height (m)	Emissions (tpy)	Modeled Concentrations
Annual $PM_{2.5}$	SO_2	10	500	0.0032[a]
Annual $PM_{2.5}$	NOx	10	500	0.0004[a]
Daily $PM_{2.5}$	SO_2	10	500	0.3128[a]
Daily $PM_{2.5}$	NOx	10	500	0.0393[a]
O_3	VOCs	10	500	0.0208[b]
O_3	NOx	10	500	2.336[b]

[a] The unit for concentrations is $\mu g/m^3$;
[b] The unit for concentrations is ppb.

1. Ozone Impact Analysis

The contribution of each ozone precursor (VOCs and NO_X) is calculated by dividing the maximum impact of the hypothetical source by the hypothetical source's emissions, then multiplying that by the project emissions. As shown in Table 2, the project emissions for VOCs and NO_X are 21.8 tpy and 134.4 tpy, respectively. The 8-hour O_3 impacts from the proposed Project are:

= 0.0208/500×21.8+2.336/500×134.4
= 0.629 ppb

[6] U.S. EPA. MERPs View Qlik. https://www.epa.gov/scram/merps-view-qlik

Because the O_3 impacts are below the O_3 SIL of 1 ppb, it is concluded that the proposed project will not cause or contribute to a violation of the NAAQS for ozone.

2. Secondary $PM_{2.5}$ Impact Analysis

The project emission for SO_2 and NO_X are 8.4 tpy and 134.4 tpy, respectively. The secondary impact for 24-hour $PM_{2.5}$ and annual $PM_{2.5}$ are calculated as follows.

Secondary Impact for 24-hour $PM_{2.5}$:
= 0.313/500×8.4 + 0.039/500×134.4
= 0.016 µg/m^3

Secondary Impact for Annual $PM_{2.5}$:
= 0.0032/500×8.4+0.0004/500×134.4
= 0.00016 µg/m^3

The secondary impacts above were incorporated with the primary impacts from the AERMOD NAAQS modeling and the background concentrations. The resulting total concentrations were subsequently assessed against the NAAQS.

K. Modeling Results

1. Significant Impact Analysis Model Results

As shown in Table 6, 1-hour and 8-hour CO concentrations are below Class II SILs, exempting them from a cumulative impact compliance analysis under minor NSR. However, the proposed project results in significant impacts for NO_2, PM_{10}, and $PM_{2.5}$. Therefore, a cumulative impact analysis was conducted for NO_2, PM_{10}, and $PM_{2.5}$.

Table 6: Significant Impact Analysis Results

Pollutant	Averaging Period	Design Value	Concentration (µg/m^3)		Exceeds SIL?
			Modeled	Class II SIL	
PM_{10}	24-hour	H1H[a]	7.0	5.0	Yes
$PM_{2.5}$	24-hour	H1H[a]	6.0[b]	1.2	Yes
	Annual	H1H[a]	0.37[b]	0.13	Yes
CO	1-hour	H1H[a]	666.4	2,000	No
	8-hour	H1H[a]	251.9	500	No
NO_2	1-hour	H1H[a]	143.9	7.5	Yes
	Annual	H1H[a]	2.3	1.0	Yes

[a]*The highest modeled concentrations across all receptors.*

[b]The modeled impacts for $PM_{2.5}$ included the primary modeled concentrations from AERMOD, and the secondary impacts as calculated in Section I.J.2.

2. Cumulative Impact Analysis Model Results

Table 11 summaries the NAAQS modeled results for NO_2, PM_{10} and $PM_{2.5}$. Representative background concentrations were added to modeled concentration, and the total concentrations were then compared to the NAAQS. As shown in the table, emissions from the proposed project will not cause or contribute to a violation of the NAAQS operating consistent with the operating limitations and conditions in the permit.

Table 7: NAAQS Model Results

Pollutant	Averaging Period	Design Value	Modeled Concentration (µg/m³)	Background Concentration (µg/m³)	Total Concentration (µg/m³)	NAAQS (µg/m³)	Exceeds NAAQS?
$PM_{2.5}$	Annual	H1H[a]	0.49[d]	4.0	4.49	9	No
	24-hour	H8H[b]	4.0[d]	11.0	15.0	35	No
PM_{10}	24-hour	H6H[c]	5.8	111.0	116.8	150	No
NO_2	1-hour	H8H[b]	93.0	61.4	154.4	188	No
	Annual	H1H[a]	2.11	8.02	10.13	100	No

[a] The highest modeled concentration across all receptors.
[b] The highest of the 8th -highest (98th percentile) modeled concentrations across all receptors.
[c] The highest of the sixth highest 24-hour modeled concentration across all receptors over five-year period.
[d] *The modeled impacts for $PM_{2.5}$ included the primary modeled concentrations from AERMOD, and the secondary impacts as calculated in Section I.J.2.*

L. Impacts on Learning Sites

ADEQ has established the Learning Site Policy to ensure that children at learning sites are protected from criteria air pollutants as well as hazardous air pollutants (HAPs). Learning site consists of all existing public schools, charter schools, and private schools at the K-12 level, and all planned sites for schools approved by the Arizona School Facilities Board. If a facility is within 2 miles or less of a learning site, the facility will be subject to the Learning Site Policy.

Two learning sites, Mohave Valley Junior High School and River Valley High School, are located slightly above 2 miles from the project site. To address public concerns, the Department conducted an additional modeling analysis to evaluate the ambient impacts of both criteria air pollutants and HAPs on these learning sites. The modeling results are summarized in Table 8 for criteria pollutants and Table 9 for HAPs. As shown in Table 8, the impacts of criteria pollutants are significantly lower than the NAAQS. Similarly, Table 9 demonstrates that HAP impacts are well below the Acute and Chronic Ambient Air Concentrations (AAAC and CAAC).

Table 8: Ambient Impacts of Criteria Air Pollutants on Learning Sites

Pollutant	Averaging Period	Maximum Modeled Concentration (µg/m³)[a]	NAAQS (µg/m³)
$PM_{2.5}$	Annual	0.053	9
	24-hour	0.28	35
PM_{10}	24-hour	0.56	150
NO_2	1-hour	8.3	188
	Annual	0.09	100

[a]*The highest modeled concentration across all receptors within learning sites over five-year period*

Table 9: Ambient Impacts of HAPs on Learning Sites

HAPs	1-hour Concentration (µg/m3)	AAAC Threshold Concentration (µg/m3)	Exceeds AAAC?	Annual Average Concentration (µg/m3)	CAAC Threshold Concentration (µg/m3)	Exceeds CAAC?
Acetaldehyde	1.89E-02	3.06E+05	No	1.03E-04	8.62E-01	No
Acrolein	2.59E-03	2.30E+02	No	1.63E-05	2.09E-02	No
Benzene	2.21E-02	1.28E+06	No	3.54E-05	2.43E-01	No
Benzo(a)pyrene	4.76E-06	5.00E+03	No	1.38E-09	2.02E-03	No
1,3-Butadiene	6.73E-04	7.51E+06	No	1.21E-06	6.32E-02	No
Ethyl benzene	5.61E-03	2.50E+05	No	7.98E-05	1.04E+03	No
Formaldehyde	5.40E-02	1.70E+04	No	5.08E-04	1.46E-01	No
Naphthalene	2.48E-03	7.50E+04	No	3.90E-06	5.58E-02	No
Toluene	3.11E-02	1.92E+06	No	3.26E-04	5.21E+03	No
Xylene	1.70E-02	1.74E+06	No	1.61E-04	1.04E+02	No

X. LIST OF ABBREVIATIONS

AAAC……Acute Ambient Air Concentrations
AAB……....Ambient Air Boundary
A.A.C.…..... Arizona Administrative Code
ADEQ.....Arizona Department of Environmental Quality
AEPCO……..… Arizona Electric Power Cooperative, Inc.
AERMET ..... AERMOD Meteorological Preprocessor
AERMOD ..... AMS/EPA Regulatory Model
AERSURFACE.....Surface Characteristics Preprocessor for AERMOD
AMS ..... American Meteorological Society
ARM .....Ambient Ratio Method
AZMET……..Arizona Meteorological Network
BPIP .....Building Profile Input Program
CAAC……. Chronic Ambient Air Concentrations
CEMS.....Continuous Emissions Monitoring Systems

CO.....Carbon Monoxide
GEP ..... Good Engineering Practice
HAPs.....Hazardous Air Pollutants
KIGM..... Kingman Airport
lb/MMBtu .....Pound per Million British Thermal Units
MEP……..Mohave Energy Park
MERP.....Model Emissions Rates for Precursors
MW.....Megawatts
NAAQS..... National Ambient Air Quality Standards
NCDC..... National Climatic Data Center
NED ..... National Elevation Dataset
ng/J .....Nanogram per Joule
NO_X ..... Nitrogen Oxides
NO_2 .....Nitrogen Dioxide
NSPS ..... New Source Performance Standards
NSR .....New Source Review
NWS.....National Weather Service
O_3 ..... Ozone
PM_{10} .....Particulate Matter Less Than 10 µm Nominal Aerodynamic Diameter
$PM_{2.5}$ .....Particulate Matter Less Than 2.5 µm Nominal Aerodynamic Diameter
PRIME.....Plume Rise Model Enhancements
PSD..... Prevention of Significant Deterioration
PSEU ..... Pollutant Specific Emissions Units
PTE .....Potential to Emit
PVMRM.....Plume Volume Molar Ratio Method
SCR .....Selective Catalytic Reduction
SIA ..... Significant Impact Area
SIL.....Significant Impact Levels
SPEC……..……South Point Energy Center
SUSD……Startup/Shutdown
TPY ..... Tons per Year
VOCs.....Volatile Organic Compounds
yr ..... Year