# EL PASO ELECTRIC COMPANY

# NEWMAN POWER STATION

# AIR QUALITY ANALYSIS TO SUPPORT A PREVENTION OF SIGNIFICANT DETERIORATION PERMIT AMENDMENT APPLICATION

TCEQ CN600352819; TCEQ RN100211309

JANUARY 2020

PREPARED FOR

**El Paso Electric Company**

PREPARED BY

**SWCA Environmental Consultants**

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Prepared for

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January 2020

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# EXECUTIVE SUMMARY

El Paso Electric Company (EPE) is submitting this air quality analysis (AQA) in support of the New Source Review (NSR)/Prevention of Significant Deterioration (PSD) Permit Amendment Application (PSDTX1090 and NSR Permit 1467) for the existing Newman Power Station, an electric power generating facility located in El Paso County, Texas.

The project will include the construction of a new Mitsubishi 501G series natural gas 230 Megawatt (MW) simple cycle combustion turbine fired by pipeline quality natural gas along with ancillary equipment (the Project). Ancillary equipment includes a diesel-fired firewater pump engine and a natural gas-fired line heater. The turbine will be equipped with dry low-$NO_x$ burners, Selective Catalytic Reduction (SCR), and catalytic oxidation technology to control emissions from combustion.

The Project will be located at the existing electric generating plant called the Newman Power Station located at 4900 Stan Roberts Sr Avenue in El Paso, El Paso County, Texas. El Paso County is currently classified as being in attainment or unclassified with respect to the National Ambient Air Quality Standards (NAAQS) for carbon monoxide (CO), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), ozone ($O_3$), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb).[1] The City of El Paso in El Paso County is designated as a moderate nonattainment for particulate matter less than 10 microns in diameter ($PM_{10}$). The Newman Power Station is located within this $PM_{10}$ Nonattainment Area.

Based on the potential to emit (PTE) of regulated pollutant estimates, the construction of the new equipment qualifies as a major modification at an existing major source and is subject to Major New Source Review under the Prevention of Significant Deterioration (PSD) and nonattainment new source review (NNSR) Programs. Based on the PTE, the Project is subject to PSD review for emissions of $NO_x$, CO, VOC, PM, $PM_{2.5}$, and Greenhouse Gases (regulated as carbon dioxide equivalent [$CO_2e$]). NNSR review is required for emission increases of $PM_{10}$. The EPE Project is not subject to PSD review of $H_2SO_4$ or $SO_2$. PTE estimates represent the Project will be a minor modification for both pollutants. EPE performed a State NAAQS analysis for $SO_2$ emissions to demonstrate that the Project will not cause nor contribute to an exceedance of the State NAAQS;

For all PSD permitting activities, the U.S. Environmental Protection Agency (EPA) and the Texas Commission on Environmental Quality (TCEQ) require the use of the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) dispersion model. AERMOD is a state-of-the-science plume model that incorporates plume dispersion based on planetary boundary layer turbulence structure and scaling concepts. For this modeling study, Lakes Environmental AERMOD View modeling software suite (Version 9.8.3) was used to populate model inputs, run the model, and review the output.

Under PSD regulations, permit applications for major sources must include an air quality analysis demonstrating the proposed facility's emissions of the NSR-regulated air pollutants will not cause or contribute to a violation of the applicable NAAQS or applicable PSD Class II increments.

The scope of the dispersion modeling required for the EPE Project also includes modeling to demonstrate compliance with TCEQ 30 TAC Chapter 112 State Property Line standards for $SO_2$ and $H_2SO_4$ as well as an Air Toxics Effects Screening Level (ESL) modeling analysis for ammonia ($NH_3$ – CAS 7664-41-7) and

[1] Per EPA's Green Book. Available online: https://www.epa.gov/green-book. Accessed January 24, 2020.

formaldehyde (CAS 50-00-0) in accordance with TCEQ's Modeling and Effects Review Applicability (MERA) guidance for non-criteria (ESL-based) pollutants.[2] Furthermore, the AQA includes a discussion of the additional impacts analysis (for growth, soils and vegetation, and visibility [or Class I Area Impacts]) as well as an ozone and secondary $PM_{2.5}$ formation.

Since the project site is located in a non-attainment area for $PM_{10}$, and the project emissions trigger a non-attainment review for $PM_{10}$, there is no need to address PSD requirements for $PM_{10}$ since a non-attainment new source review will be performed for $PM_{10}$.

As presented in this AQA Report, the analysis supports the following conclusions:

- The Significance Analysis for CO (1-hour and 8-hour), $SO_2$ (1-hour, 3-hour, 24-hour and annual), $PM_{2.5}$ (24-hour and annual), and $NO_2$ (1-hour and annual) demonstrated that all receptors were below the applicable significant impact levels (SIL); therefore, a PSD NAAQS/Increment Analysis was not required.

- The required State Property Line analysis demonstrated that impacts from $SO_2$ (1-hour) and $H_2SO_4$ (1-hour and 24-hour) were below the State Property Line standards;

- The required Air Toxics Effects Screening Level (ESL) analysis demonstrated that impacts from $NH_3$ and formaldehyde were below the short- and long-term screening levels; and

- The additional PSD analysis (for growth, soils and vegetation, and visibility [or Class I Area Impacts]) as well as ozone and secondary $PM_{2.5}$ formation analyses demonstrated that adverse impacts from the EPE Project are not expected in the region.

Therefore, the predicted air quality impacts from the EPE Project will not cause or contribute to a violation of any applicable NAAQS, PSD Increment Standard, or State Property Line standard, ESL, or cause or contribute to adverse impacts on human health or the environment.

[2] TCEQ (2019). *Modeling and Effects Review Applicability (MERA).* APDG 5874. Air Permits Division Texas Commission on Environmental Quality. March 2018.

# 1 ORGANIZATION OF THE AIR QUALITY ANALYSIS

This AQA describes the methodology that was followed in conducting the Class II air dispersion modeling analyses for the proposed EPE Project demonstrating compliance with the applicable standards. This AQA has been prepared in accordance with the current EPA and TCEQ Air Quality Modeling guidelines.[3,4] The following list provides the individual section summary of the AQA.

- Section 2 of this AQA provides a summary of project identification information for the EPE Project.
- Section 3 of this AQA provides a project overview, which includes a brief site description, and an overview of the proposed emission units and air pollutant emitting activities.
- Section 4 provides an overview of the process description.
- Section 5 includes a detailed discussion of the models used including the model version numbers.
- Section 6 provides a discussion on the general air quality dispersion modeling approach to demonstrate compliance with the applicable NAAQS, PSD Increment, State Property Line standards and State Health Effects guidelines.
- Section 7 includes plot plans and an area map of the proposed project. The plot plans include the layout of the property line, fence line, emission points, and building and structures, which could contribute to downwash.
- Section 8 provides a summary of the specialized modeling techniques used in this modeling demonstration including: a summary of the rural/urban classification and selection of dispersion options, building downwash analysis, receptor grid, meteorological data, and terrain considerations.
- Section 9 of this AQA provides a summary listing of all constituents that were evaluated.
- Section 10 of the AQA includes a discussion on how the representative ambient background concentrations were obtained.
- Section 11 includes details on the model emission inventory including the on-property sources in the air permit application and other off-property sources (as applicable) included in this impact demonstration.
- Section 12 includes a discussion of the modeling results.
- Section 13 provides a discussion on the other additional Prevention of Significant Deterioration (PSD) impact analyses including growth, visibility, soils and vegetation, and Class I areas.
- Section 14 of the AQA provides the conclusions.

[3] Code of Federal Regulations, Title 40 – Protection of the Environment, Part 51, Appendix W.
[4] TCEQ's "Air Quality Modeling Guidelines" (TCEQ, APDG 6232v4, November 2019).

- Section 15 includes a summary listing of the modeling files provided with this AQA.

# 2 PROJECT IDENTIFICATION INFORMATION

In accordance with TCEQ modeling guidance, following provides a summary listing of the project identification information to clearly identify the analysis:

- Applicant: El Paso Electric
- Facility: Newman Power Station
- Permit Application Number: PSD Permit No. PSDTX1090 and TCEQ NSR Permit No. 1467
- Costumer Number: CN600352819
- Regulated Entity: RN100211309
- Nearest City and County: El Paso, El Paso County, TX.
- Applicant's Modeler: SWCA Environmental Consultants.

# 3 PROJECT OVERVIEW

EPE plans to construct new equipment at the existing Newman Generating Station in El Paso County, Texas. EPE proposes to install a new Mitsubishi Model M501GAC Simple Cycle gas turbine which will be fired by pipeline quality natural gas. The turbine will be used to provide new power generation capacity, especially during EPE's summer peak hours. The unit will be equipped with dry low-$NO_x$ burners, and a Hot SCR and oxidation catalyst to reduce emission rates.

Additional emission sources associated with the project includes a natural gas fired line heater which will be used to ensure that natural gas fueling the turbine is at an acceptable temperature for combustion. An emergency use firewater pump will also be installed as part of this project for safety purposes. The new facilities associated with the project are:

- One (1) Mitsubishi Model M501GAC Simple Cycle gas turbine;
- One (1) 3.92 MMBtu/hr Natural gas-fired line heater;
- One (1) 99 hp Clarke JU4H-UFADJ2 firewater pump engine; and
- Fugitive ammonia and natural gas emissions from piping components

Existing equipment located at the Newman Station is currently authorized under PSD Permit PSDTX1090 and Texas Commission on Environmental Quality (TCEQ) Construction NSR Permit 1467, TCEQ standard Permit Number 114528, and TCEQ Voluntary Emission Reduction Permit Number 45606. Additionally, the site is authorized under Federal Operating Permit and Acid Rain Permit O80. EPE is seeking to authorize the emissions associated with the Project by applying for a major modification to PSDTX1090 and NSR Permit 1467. EPE does not propose to modify any of the currently authorized emission sources as part of the Project.

# 4 PROCESS DESCRIPTION

The process description specific to the proposed new equipment is described in this section. The natural gas fuel enters the facility from the natural gas supplier's pipeline and is routed through the line heater (FIN LH-1), equipped with a low-$NO_x$ burner, to increase the fuel temperature before being routed to the turbine. Natural gas is also used by the line heater as fuel during this process.

The simple cycle turbine (FIN SC-7) operates by drawing air into the unit which is compressed and fed into the combustion chamber at high pressure. In the combustion chamber, natural gas fuel is introduced into the stream and the mixture is combusted. The high temperature, high-pressure gas stream leaves the combustion chamber and expands through the turbine, rotating the turbines blades in order to continue drawing air into the combustion chamber as well as to spin a generator and produce power. The exhaust gas stream is then vented through the turbine's exhaust stack. The turbine will be equipped with a dry low-$NO_x$ burner to reduce thermal nitrogen oxides formation. An SCR system will be used to reduce NOx emissions in the exhaust gas stream via vaporization and injection of a 19% solution of aqueous ammonia to the exhaust stream prior to the catalyst bed. The turbine will be also equipped with an oxidation catalyst to reduce emissions of other products of incomplete combustion such as carbon monoxide and volatile organic compounds.

During times of startup and shut down of the unit, the exhaust gas stream may not be within the temperature range necessary for effective catalytic control or at too low a temperature for ammonia injection. During start up, the electric motor spins the main shaft until enough air is blowing through the combustion chamber, at which point, natural gas fuel starts flowing and ignition occurs. After ignition, the gas turbine will accelerate to synchronization speed, and upon synchronization, the turbine will begin increasing the load until it reaches the selected load. The M501GAC model turbine operating in simple cycle mode is able to go from ignition to base load within thirty-five minutes and is able to shut down completely from base load to flame out within twenty minutes. Emission rates for these startup and shutdown periods have been provided by Mitsubishi to allow quantification of these emissions.

The emergency-use fire water pump (FIN FIRE-2) will be operated for necessary maintenance and testing activities which will occur no more than one hundred (100) hours per year. The natural gas piping and instrumentation equipment leaks (FIN FUG-7) will result in small levels of VOC emissions. Similarly, leaks from a pressurized ammonia tank and the SCR system piping will result in small levels of emissions of ammonia from piping.  Lubricating oil components, reservoirs, and lube oil vents associated with the Project are expected to have negligible emissions due to low vapor pressure. Leaks from the circuit breakers release Sulfur Hexafluoride (SF6) – a compound with a very high global warming potential (FIN: FUG-7) compared to other GHGs.

# 5 MODELS PROPOSED

For all PSD permitting activities, the EPA and TECQ require the use of the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) dispersion model. AERMOD is a state-of-the-science plume model that incorporates plume dispersion based on planetary boundary layer turbulence structure and scaling concepts. AERMOD can simulate dispersion of point, area, volume, and open pit sources. AERMOD incorporates the sophisticated Plume Rise with Model Enhancements (PRIME) building wake effects algorithm, and AERMOD has superior terrain-handling capabilities.

The EPA formally adopted AERMOD as its preferred plume model in November 2005. The AERMOD system also includes the AERMAP terrain processor, the AERSURFACE surface characteristics processor, and the Building Profile Input Program for PRIME (BPIP-PRIME).

For the EPE Project modeling study, Lakes Environmental AERMOD View modeling software suite (Version 9.8.3) was used to populate model inputs, run the model, and review the output. AERMOD View uses the following versions of the EPA core AERMOD system programs for this project:

- AERMOD: Version 19191
- AERMAP: Version 18081
- AERMET: Version 16216
- AERSURFACE: Version 19039
- BPIP-PRIME: Version 04274

The AERMOD model used the regulatory default options, including use of stack-tip downwash, elevated terrain algorithms requiring input of terrain height data, use of calms processing, and use of missing-data processing routines. As recommended by the TCEQ, these regulatory default options should generally be used in the modeling analysis.

# 6 GENERAL AIR QUALITY DISPERSION MODELING APPROACH

This section of the AQA discusses the general air quality dispersion modeling approach used for the Class II analyses to demonstrate compliance with the applicable NAAQS, PSD Increments, State Property Line standards, and the State Health Effects guidelines (or Effects Screening Level [ESL] analysis).

## 6.1 PSD Analyses

Under PSD regulations, permit applications for major sources must include an air quality analysis demonstrating the proposed facility's emissions of the NSR-regulated air pollutants will not cause or contribute to a violation of the applicable NAAQS or applicable PSD Class II increments. PSD air quality dispersion modeling analyses are organized into two major components based upon EPA modeling guidance: 1) the Significance Analysis; and 2) the Full Impact Analysis.

### *6.1.1 Significance Analysis*

The first step in the PSD analysis, known as the preliminary impact analysis or Significance Analysis, is to determine whether emissions of criteria pollutants from a new major source will cause or contribute to an exceedance of a NAAQS or PSD Increment. In the Significance Analysis, modeled ground-level concentrations, from the proposed emission sources only, and on an individual criteria pollutant and averaging period basis, are compared to the corresponding Significance Impact Level (SIL) to determine whether they will have a significant impact on the surrounding area.

In accordance with EPA and TCEQ guidance, impacts under the Significance Analysis are reported as follows:

- for 1-hour $NO_2$: the highest of multi-year averages of the maximum modeled daily 1-hour concentrations predicted each year at each receptor;
- for 24-hour $PM_{2.5}$: the highest of multi-year averages of the maximum modeled 24-hour concentrations predicted at each receptor;
- for annual $PM_{2.5}$ and $NO_2$: the highest of multi-year averages of the maximum modeled annual concentration predicted at each receptor, and
- for 1-hour and 8-hour CO: the highest-first-high 1-hour and 8-hour average concentrations predicted at each receptor.

For the significance analysis, EPE considered the CO, $NO_2$, and $PM_{2.5}$ emissions associated with the Project sources. All impacts from the Significance Analysis compared the highest, first high (H1H) concentration modeled at any given receptor in the modeling grid based on five years of meteorological data to the SILs listed in Table 1.

**Table 1**. Significant Impact Levels (μg/m$^3$)

| Pollutant | 1-Hour | 3-Hour | 8-Hour | 24-Hour | Annual |
|---|---|---|---|---|---|
| CO | 2,000 | - | 500 | - | - |
| $NO_2$ | 7.5[a] | - | - | - | 1 |
| $PM_{2.5}$ | - | - | - | 1.2[b] | 0.2[b] |
| $SO_2$ | 7.8[a] | 25 | - | 5 | 1 |

[a] Interim SIL (www.tceq.texas.gov/assets/public/permitting/air/memos/guidance_1hr_no2naaqs.pdf for 1-hour $NO_s$ and www.tceq.texas.gov/assets/public/permitting/air/memos/appwso2.pdf for 1-hour $SO_s$)
[b] Recommended SIL

The Significance Analysis determines whether EPE is required to conduct further analyses for CO, $NO_2$, and $PM_{2.5}$ and defines the radius of impact (ROI) for the Full Impact Analysis. According to TCEQ guidance, the ROI defines the farthest distance from the center of the proposed project site to the receptor where modeled ground-level concentrations are greater than or equal to the applicable SIL for each averaging period. However, the largest radius, regardless of the averaging period, is used to establish the ROI.

### *6.1.2 Full Impact Analysis*

In the Significance Analysis, if it is determined that a criteria pollutant for a given averaging period has a significant impact (i.e., modeled concentrations greater than the applicable SIL), then a Full Impact Analysis is conducted to address NAAQS and PSD increment requirements. The NAAQS analyses includes the on-property sources, the nearby off-property sources and a representative background concentration, whereas the PSD Increment analyses includes only the on-property sources and the off-property increment consuming sources for a given pollutant.

#### 6.1.2.1 PSD NAAQS AND INCREMENT ANALYSIS

For pollutants with modeled concentrations greater than the SIL, PSD regulations require a NAAQS analysis. The NAAQS analysis demonstrates the post-project, ambient concentration (i.e., the sum of the modeled concentration [on-property sources and the off-property sources] plus the appropriate background concentration) will not cause or contribute to an exceedance of the applicable NAAQS.

The PSD Increment analysis demonstrates a project will neither cause nor contribute to an exceedance of federal standard on industrial expansion. The federal government has three PSD Increment zoning classifications: A Class I area for restricted industrial growth (federally protected lands, etc.); a Class II area for controlled industrial growth; and a Class III area for expanded industrial growth. Most facilities, including the Project, in Texas are located within Class II areas; therefore, PSD Class II Increment standards was used. For a given pollutant, a PSD increment is the maximum increase in concentration allowed above an established baseline concentration.

The modeling threshold concentrations for the NAAQS vary depending on the pollutant and the averaging period. Each Full Impact NAAQS and PSD Increment modeled result is expressed as a concentration (μg/m$^3$) and by a specific averaging period. For reference, Table 2 below lists the standard and form of the modeled result for each criteria pollutant averaging time for both full impact NAAQS and PSD increment demonstrations.

The modeling results for the PSD Significance Analysis summarized in Section 12.1 of this AQA demonstrate the emissions from the EPE Project for all averaging periods and pollutants are below the corresponding SIL. Therefore, a Full Impact Analysis for is not required.

**Table 2.** Criteria Pollutant Concentration Standards

| Pollutant | Averaging Time | Primary NAAQS ($\mu g/m^3$) | Secondary NAAQS ($\mu g/m^3$) | Class II Increment ($\mu g/m^3$) | Class I Increment ($\mu g/m^3$) |
|---|---|---|---|---|---|
| Carbon Monoxide | 1-Hour | 40,000 | - | - | - |
| | 8-Hour | 10,000 | - | - | - |
| Nitrogen Dioxide | 1-Hour | 188 | - | - | - |
| | Annual | 100 | 100 | 25 | 2.5 |
| Particulate Matter ($PM_{2.5}$) | 24-Hour | 35 | 35 | 9 | 2 |
| | Annual | 12 | 15 | 4 | 1 |
| Sulfur Dioxide | 1-Hour | 196 | - | - | - |
| | 3-Hour | - | 1,300 | 512 | 25 |

**Source:** TCEQ Air Quality Modeling Guidelines- Table B-1. Criteria Pollutants

## 6.2 Minor NSR NAAQS Analysis

In accordance with TCEQ guidance, because the Project does not trigger PSD permitting requirements for $SO_2$ (i.e., < 40 tpy), a minor NSR NAAQS analysis was conducted for this criteria pollutant. Similar to PSD air quality dispersion modeling analyses, the minor NSR NAAQS analyses were organized into a Significance Analysis and a Full Impact Analysis. However, the Full Impact Analysis only includes a NAAQS analysis for minor NSR (i.e., no PSD Increment Analysis).

### *6.2.1 Significance Analysis*

In the minor NSR Significant Analysis, the emissions of $SO_2$ from the EPE Project sources only are evaluated to determine whether they have the potential for significant impact on the surrounding area. Modeled impacts under the minor NSR $SO_2$ analysis are reported as follows:

- The modeled impacts for all averaging periods (1-hour, 3-hour, 24-hour, and annual) are reported as the H1H modeled concentration predicted at each discreet receptor based on 1 year of National meteorological data (i.e., calendar year 2012).

- All impacts from the Significance Analysis compared the highest, first high (H1H) concentration modeled at any given receptor in the modeling grid based on one year of meteorological data to the SILs listed in Table 1.

### *6.2.2 Full Impact Analysis*

The modeling results for the minor NSR Significance Analysis summarized in Section 12.1 of this AQA demonstrate the emissions of $SO_2$ from the EPE Project for all averaging periods are below the corresponding SIL. Therefore, a Full Impact Analysis for $SO_2$ is not required.

## 6.3 State Property Line Analysis

The scope of the dispersion modeling required for this NSR/PSD permit included not just modeling to address compliance with the applicable NAAQS and PSD increments, but also compliance with TCEQ 30 TAC Chapter 112 State Property Line standards for $SO_2$ and $H_2SO_4$. The 30-minute (1-hour) $SO_2$ property line standard is 1,021 $\mu g/m^3$, while the 1-hour $H_2SO_4$ standard is 50 $\mu g/m^3$ and the 24-hour $H_2SO_4$ standard is 15 $\mu g/m^3$.[5]

The State Property Line analysis includes all the on-property sources for the EPE Project that emit $SO_2$ and/or $H_2SO_4$ and compares the H1H modeled concentration predicted at each receptor based on one year of meteorological data to the applicable State Property Line standard. The results of the State Property Line Analysis are presented in Section 12.4.

## 6.4 Air Toxics Effects Screening Level Analysis

In addition, a modeling analysis of ammonia ($NH_3$ – CAS 7664-41-7) is required in accordance is required in accordance with TCEQ's Modeling and Effects Review Applicability (MERA) guidance for non-criteria (Effects Screening Level-based) pollutants. Analysis of formaldehyde (CAS 50-00-0) is conducted to demonstrate that there will be no adverse health effects since it is the highest emitted HAP from the combustion turbine. However, Appendix B of the MERA guidelines state that emissions from combustion units fueled by pipeline quality natural gas have been evaluated and are not expected to cause adverse health effects and do not required additional review. The 1-hour $NH_3$ ESL is 180 $\mu g/m^3$ and the annual $NH_3$ ESL is 92 $\mu g/m^3$. The 1-hour formaldehyde ESL is 15 $\mu g/m^3$ and the annual formaldehyde ESL is 3.3 $\mu g/m^3$.

The ESL analysis includes all the on-property sources for the EPE Project that emit $NH_3$ and formaldehyde. The ESL analysis compares the H1H modeled concentration predicted at each receptor based on one year of meteorological data to the applicable ESL. The results of the ESL Analysis are presented in Section 12.5.

[5] Per Table B-3 of TCEQ's "Air Quality Modeling Guidelines" (TCEQ, APDG 6232v4, November 2019).

# 7 AREA MAP AND PLOT PLAN

EPE plans to construct new equipment at the Newman Power Station in El Paso County, Texas. The site address is 4900 Stan Roberts Sr. Avenue, El Paso, Texas 79934. Table 3 provides the location and elevation of the Newman Power Station.

**Table 3.** Site Location

| County | Nearest City | Latitude | Longitude | Elevation |
|---|---|---|---|---|
| El Paso | El Paso | 31.98342 | -106.42824 | 4,056 feet |

Figure 1 shows a current area map with a 3,000-foot radius from the property boundary which shows that there are no receptors within 3,000 feet of the project. The area map also includes a zoomed-out view to show the closest non-industrial receptors.

Figure 2 shows a plot plan including the proposed location of the Project equipment along with the currently authorized emission sources. EPE does not propose to modify these existing sources as part of the Project.

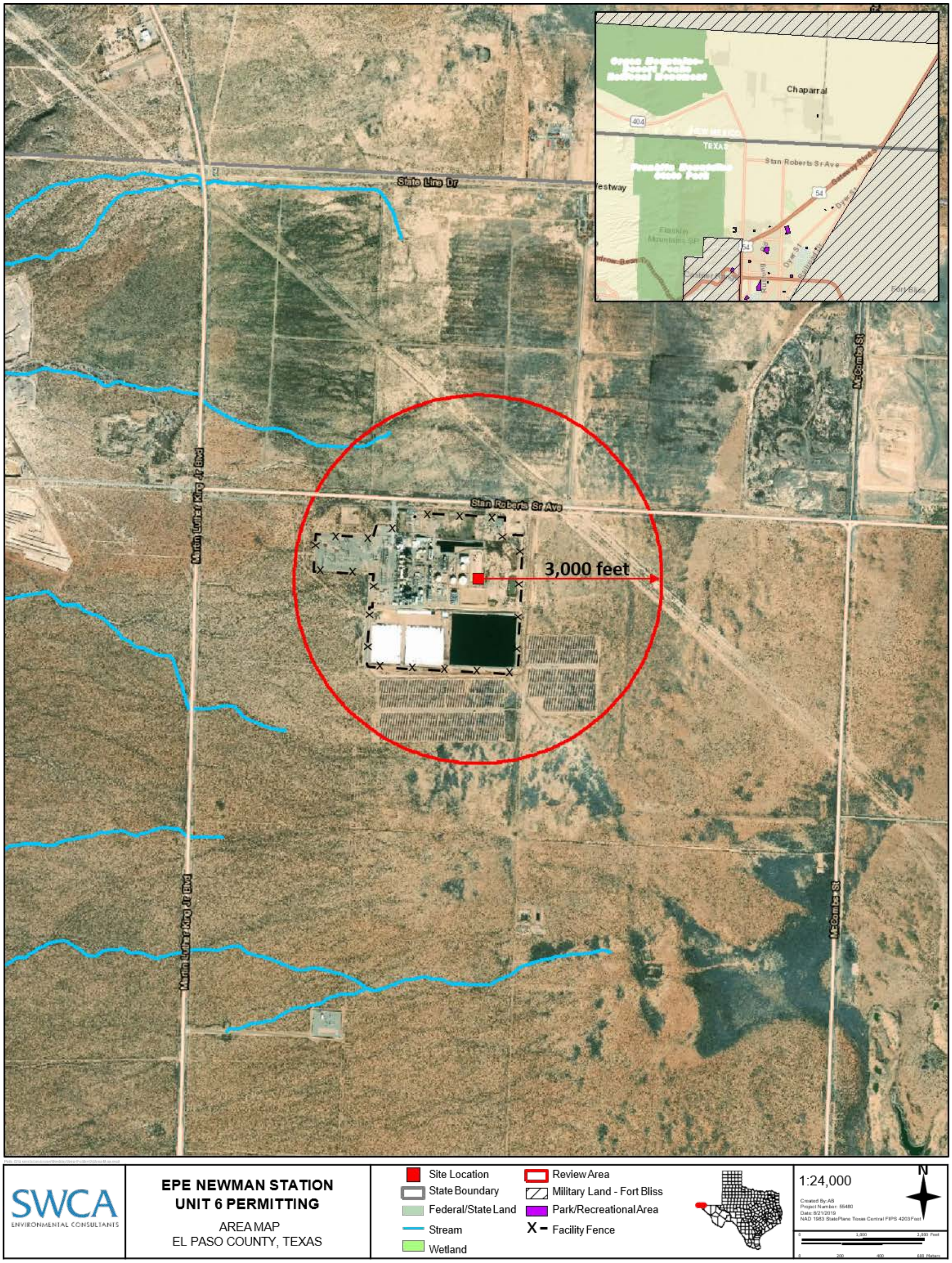


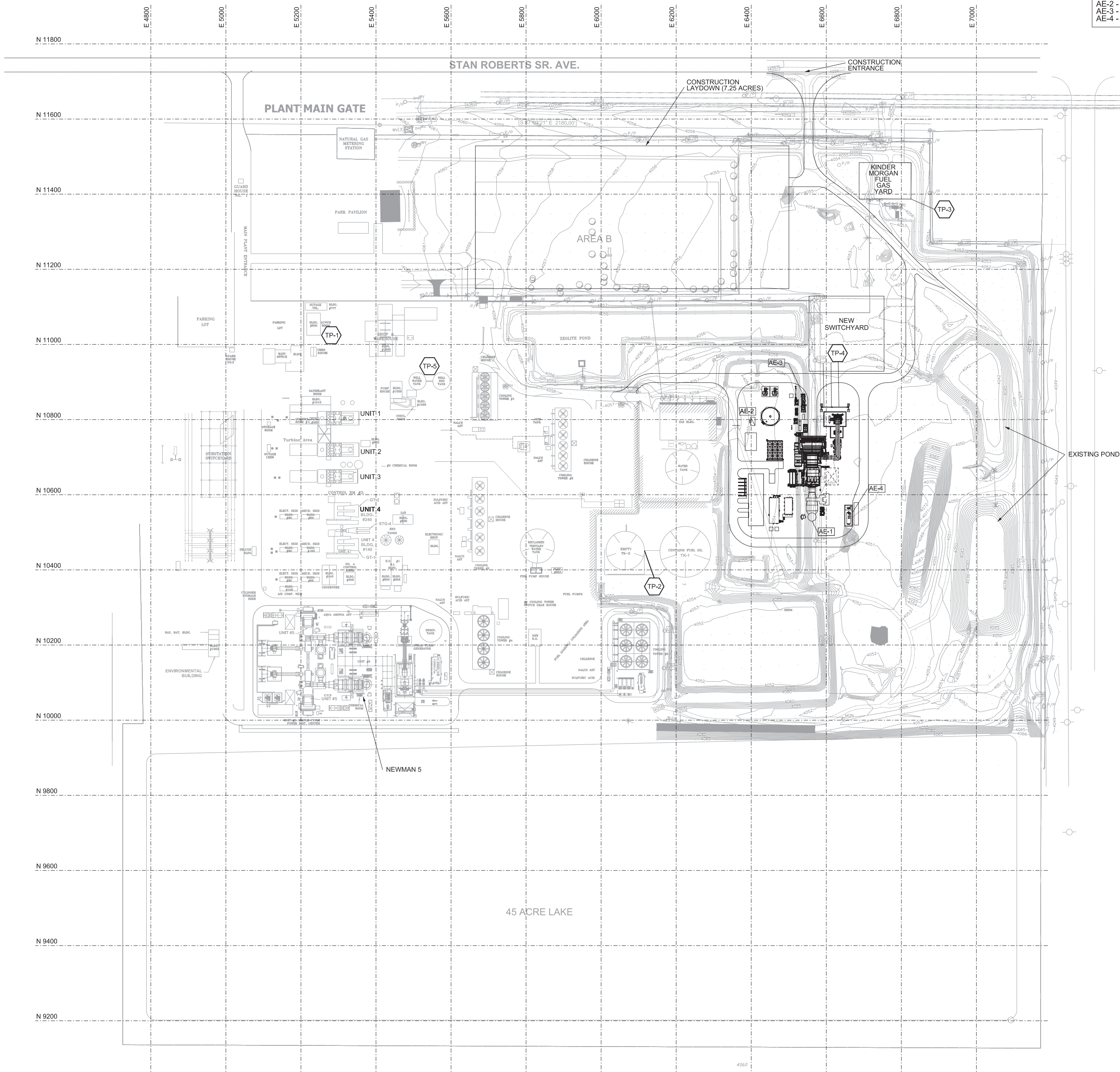

**Figure 1.** Area Map

# LEGEND

| AIR EMISSION SOURCES | COORDINATES | |
|---|---|---|
| | EASTING | NORTHING |
| AE-1 - EXHAUST STACK UNIT 6 | 6562.02 | 10540.77 |
| AE-2 - DIESEL FIRE PUMP | 6404.31 | 10795.27 |
| AE-3 - WATER BATH HEATER | 6538.93 | 10844.00 |
| AE-4 - AMMONIA TANK | 6659.56 | 10537.34 |

INTERFACE TERMINAL POINT LIST

TP-1 - POTABLE WATER
TP-2 - DEMINERALIZED WATER
TP-3 - NATURAL GAS SUPPLY
TP-4 - TRANSMISSION LINE
TP-5 - WELL WATER/SERVICE WATER




PRELIMINARY
NOT FOR CONSTRUCTION

100' 0' 100' 200' 300'
GRAPHIC SCALE
DRAWING SCALE
1" = 100'-0"
NORTH

HOLD INFORMATION

| NO. | DESCRIPTION |
|---|---|
| | |

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL (OR THAT OF ITS SUB-CONTRACTOR(S)) PERFORMING THE WORK.

RELEASE INFORMATION

| REV. | DATE | DESCRIPTION |
|---|---|---|
| A | 04-02-2019 | ISSUED FOR CLIENT COMMENTS |
| B | 07-16-2019 | ISSUED FOR INFORMATION |
| C | 08-07-2019 | ISSUED FOR INFORMATION |
| D | 09-16-2019 | ISSUED FOR INFORMATION |

ISSUE PURPOSE: FOR INFORMATION
SPECIFICATION: ---
PROJECT NO.: 13856.010

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DRAWING TITLE

GENERAL ARRANGEMENT
SITE DEVELOPMENT PLAN

| DRAWING NUMBER | REVISION |
|---|---|
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Revision 10, Revision Date: 10-16-2009

# 8 MODELING TECHNIQUES

The following describes the basic inputs used for developing the modeling simulation. These include rural/urban classification, building downwash analysis, receptor grid, meteorological data, and terrain considerations.

## 8.1 Rural/Urban Classification and Selection of Dispersion Option

For modeling purposes, 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. A land use classification procedure was used to determine the appropriate model setting. The procedure requires a land use evaluation of the area surrounding the proposed facility within a three-kilometer (km) radius.

The land-use within 3 kilometers of the site is predominantly rural in nature as shown in Figure 3. Given the facility's predominantly rural setting, no further refinement is required, and the model will be run with the appropriate land-use designation.

## 8.2 Building Downwash Analysis

Building downwash effects were evaluated by incorporating the appropriate building/structure dimensions into the AERMOD input files using Lakes Environmental commercial version of EPA's BPIP-PRIME software. The BPIP-PRIME program is EPA approved and includes the latest EPA building downwash algorithms.

By inputting building dimensions, BPIP-PRIME assesses the potential for downwash effects from nearby structures by producing direction-specific downwash parameters. Output from BPIP-PRIME is incorporated into the AERMOD modeling input files. The plume rise model enhancements in BPIPPRIME include features that consider source to building distance, add cavity calculations (near wake), fractional plume in cavity, smooth discontinuities, and downwash effects on plume rise. Table 4 lists on-property structures, tanks and their heights; Figure 4 depicts the general arrangement of the EPE Project structures graphically.

**Table 4.** Downwash Structures

| Building/Structure Name | Number of Tiers | Source Parameters | |
|---|---|---|---|
| | | Base Elevation | Tier Height |
| | | m | m |
| BLDG:A | 1 | 1238.86 | 3.1 |
| BLDG:B | 1 | 1239.23 | 3.91 |
| BLDG:C | 1 | 1238.47 | 5.36 |
| BLDG:D | 1 | 1239.31 | 4.47 |
| BLDG:E | 1 | 1239.17 | 3.79 |
| BLDG:F | 1 | 1239.52 | 4.37 |

| Building/Structure Name | Number of Tiers | Source Parameters | |
|---|---|---|---|
| | | Base Elevation | Tier Height |
| | | m | m |
| CT1 | 1 | 1237.38 | 17.68 |
| CT2 | 1 | 1236.9 | 13.28 |
| CT3 | 1 | 1237.34 | 14.86 |
| CT4 | 1 | 1237.24 | 17.98 |
| BLDG:Q | 1 | 1238.44 | 4.65 |
| BLDG:R | 1 | 1239.11 | 5.31 |
| BLDG:S | 1 | 1239.52 | 12.45 |
| BLDG:T | 1 | 1239.14 | 27.97 |
| BLDG:U | 1 | 1239.42 | 12.45 |
| BLDG:V | 1 | 1239.25 | 27.97 |
| BLDG:W | 1 | 1239.4 | 12.45 |
| BLDG:X | 1 | 1239.33 | 30.56 |
| BLDG:Y | 1 | 1239.42 | 20.95 |
| BLDG:Z | 1 | 1239.18 | 17.07 |
| BLDG:AA | 1 | 1239.13 | 17.07 |
| BLDG:BB | 1 | 1238.66 | 4.29 |
| BLDG:EE | 1 | 1238.05 | 5.05 |
| BLDG:GG | 1 | 1238.34 | 7.7 |
| BLDG:HH | 1 | 1238.32 | 5.05 |
| CT4SWTCH | 1 | 1236.98 | 4.8 |
| BLDG:JJ | 1 | 1238.95 | 4.55 |
| BLDG:KK | 1 | 1238.96 | 4.37 |
| BLDG:LL | 1 | 1239.09 | 6.55 |
| BLDG:MM | 1 | 1239.16 | 2.46 |
| BLDG:NN | 1 | 1239.16 | 6.4 |
| BLDG:OO | 1 | 1239.17 | 3.51 |
| BLDG:PP | 1 | 1239.22 | 3.51 |
| BLDG:RR | 1 | 1240.44 | 4.4 |
| BLDG:SS | 1 | 1240.08 | 4.62 |
| SCS6B | 1 | 1238.87 | 6.71 |
| SCS6A | 1 | 1238.85 | 6.71 |
| HRSGS6B | 1 | 1238.75 | 28.04 |
| HRSGS6A | 1 | 1238.82 | 28.04 |
| STTURBN | 1 | 1238.78 | 9.14 |
| GT6B | 1 | 1238.88 | 9.14 |
| GT6A | 1 | 1238.87 | 9.14 |

| Building/Structure Name | Number of Tiers | Source Parameters | |
|---|---|---|---|
| | | Base Elevation | Tier Height |
| | | m | m |
| CT6 | 1 | 1236.87 | 13.72 |
| COOLER1 | 1 | 1238.87 | 4.57 |
| COOLER2 | 1 | 1238.79 | 4.57 |
| CTRBLDG | 1 | 1238.07 | 4.09 |
| DSLTKS | 1 | 1240.48 | 3.57 |
| FIREPUMP | 1 | 1236.93 | 3.96 |
| DSLGEN | 1 | 1238.34 | 4.57 |
| NH3TK | 1 | 1238.66 | 3.66 |
| TANK:G | 1 | 1238.33 | 11.43 |
| TANK:H | 1 | 1238.07 | 8.97 |
| TANK:M | 1 | 1236.02 | 12.93 |
| NEWTK1 | 1 | 1236.08 | 14.68 |
| OLDTK1 | 1 | 1236.07 | 12.17 |
| H2OTNK | 1 | 1236.89 | 16.41 |
| TANK:CC | 1 | 1238.69 | 6.65 |
| TANK:DD | 1 | 1238.77 | 10.97 |
| TANK:FF | 1 | 1238.64 | 6.02 |
| TANK:VV | 1 | 1238.42 | 15.06 |
| BLD_65 | 1 | 1237.43 | 5.36 |
| BLD_62 | 1 | 1235.67 | 13.72 |
| BLD_63 | 1 | 1235.46 | 30.18 |
| BLD_64 | 1 | 1235.54 | 22.25 |
| BLD_66 | 1 | 1235.12 | 9.14 |
| BLD_67 | 1 | 1235.25 | 32.61 |
| BLD_68 | 1 | 1235.86 | 3.66 |

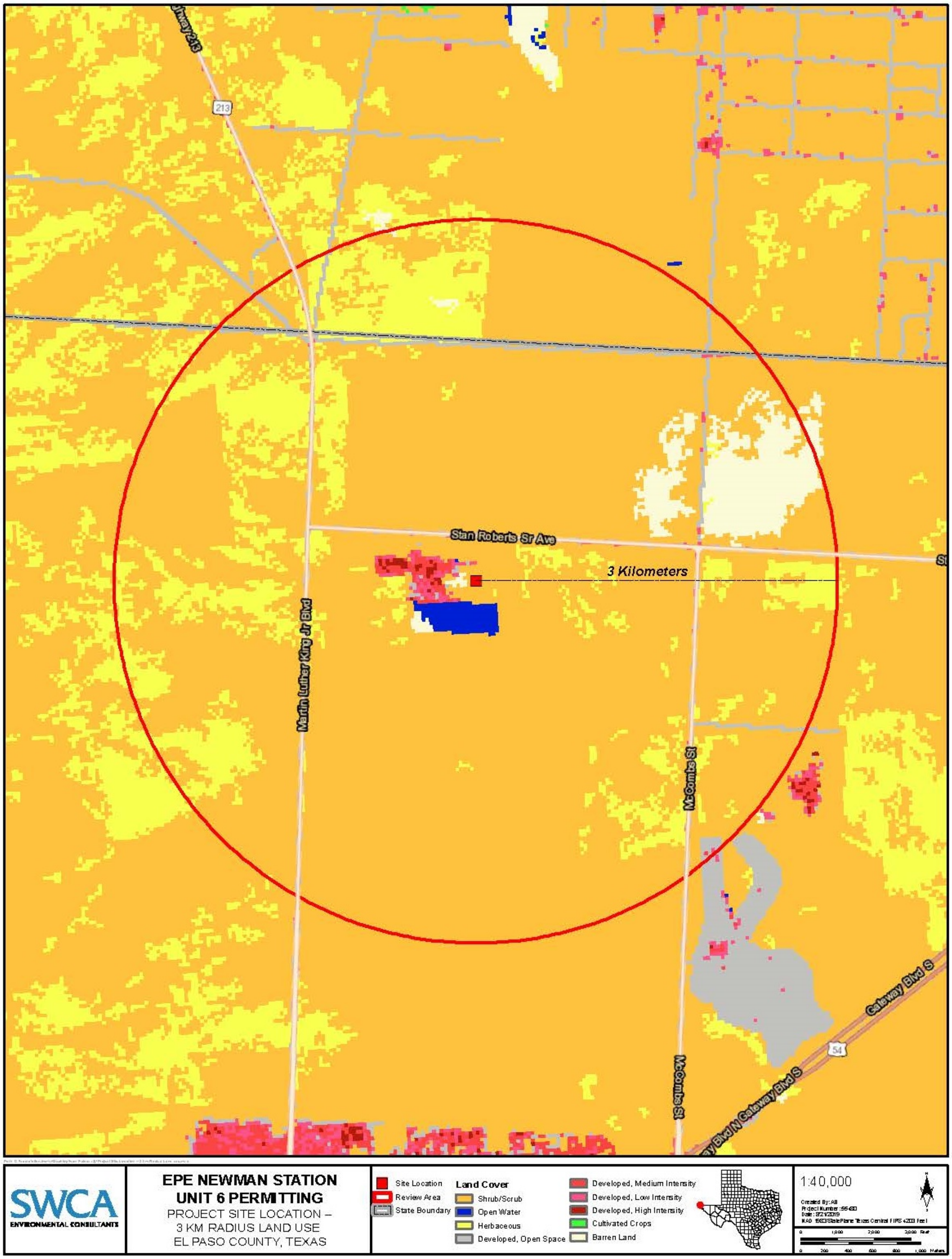


**Figure 3.** Land Use

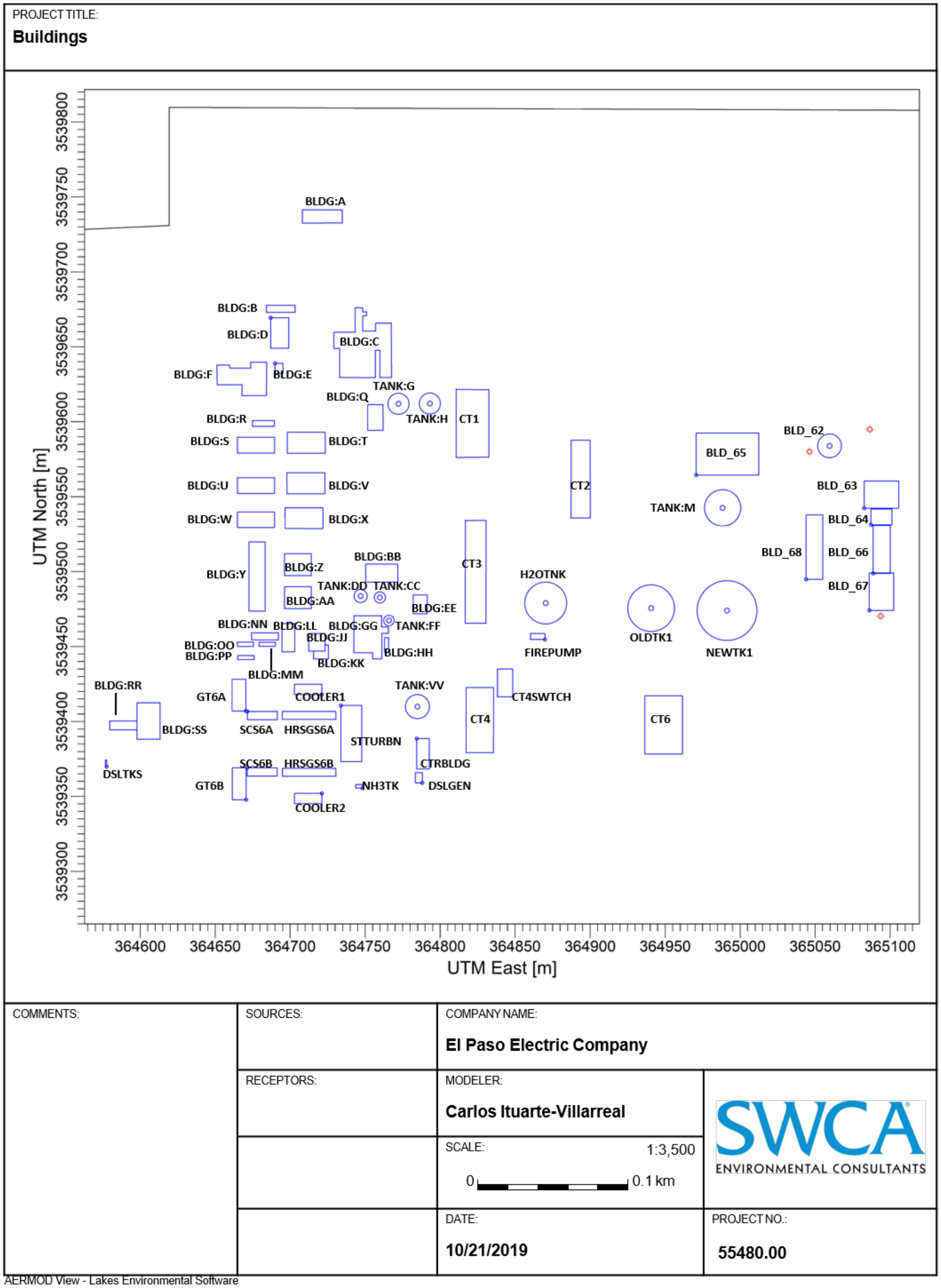


**Figure 4. Downwash Structures**

## 8.3 Receptor Grid

In accordance with standard TCEQ receptor network spacing guidance, a tiered receptor spacing network was used. That is, a tight, 25-meter spaced grid was placed starting at the EPE Project property line and extending out 300 m (for the EPE Project the property line and fence line are one and the same.) From that 300 m distance, a fine, 100-meter spaced grid extending out 1 km from the property line was placed, followed by a medium, 500-meter spaced grid extending to 5 km from the property line, and finally, a 1,000-meter spaced grid extending to 50 km. This grid was designed to capture both the maximum predicted concentrations from the EPE Project, as well as to fully define any area of significant impact.

## 8.4 Meteorological Data

The AERMOD modeling was conducted using 5 years of the "most recent, readily available" meteorological data made available through and approved by the TCEQ. The most recent available meteorological files were used. The 5-year data files used in the modeling are for years 2011–2015. EPE used individual years of meteorology for the SIL modeling to define the radius of impact and the significant receptors, but a concatenated 5-year data set was used for certain pollutant averaging periods. For the TCEQ property line standards (§112), and air toxics (ESLs)-based modeling, a single year of meteorology (2012) was used.

El Paso International Airport (Station ID: 23044) surface and EPZ- Santa Teresa station (Station ID: 3020) upper air station observations are recommended for modeling in El Paso County.

Three (3) sets of meteorological data files were pre-processed by TCEQ using the AERMET meteorological pre-processor for each county in Texas, based on one set of values for albedo and Bowen ratio and three different surface roughness values. TCEQ also used the AERMINUTE preprocessor to develop hourly wind speeds and directions from the 1-minute Automated Surface Observation System (ASOS) winds. Therefore, EPE believes these data are representative of meteorological conditions at the Project site.

Surface roughness is related to the height of obstacles to wind flow. TCEQ developed three meteorological data sets for each county, representing three categories of surface roughness: low, medium, and high. According to TCEQ, the low surface roughness category represents surface roughness length values ranging from 0.001 to 0.1 m. Staff input a roughness length value of 0.05 m into AERMET to develop the low roughness meteorological data set. The medium surface roughness category represents surface roughness length values ranging from 0.1 to 0.7 m. Staff input a roughness length value of 0.5 m into AERMET to develop the medium roughness meteorological data set. The high surface roughness category represents surface roughness length values ranging from 0.7 to 1.5 m.

AERMOD users are instructed to select one of three values: 0.05 m (low roughness), 0.5 m (medium roughness), or 1 m (high roughness), depending on the topography and land use within the modeling domain. To determine which data set is appropriate for this AQA, EPA's AERSURFACE software was initially used to evaluate the surface roughness for the proposed site. Per TCEQ guidance, AERSURFACE was centered on the Project site and not the surface meteorological site.

The Project site was evaluated to determine which set of meteorological data (low, mid or high surface roughness) will be used for the AQA. Using AERSURFACE, a tool that processes land cover and land use (LULC) to determine the surface characteristics for use in AERMET, surface roughness, albedo, and daytime Bowen ratio for the area surrounding the Project location were extracted.

AERSURFACE uses LULC data in the U.S. Geological Survey's 1992 National Land Cover Dataset to extract the necessary micrometeorological data. AERSURFACE was used to develop surface roughness in a 1-km radius surrounding the project site. These micrometeorological data were processed for seasonal and annual periods using 30-degree sectors. Seasonal moisture conditions were considered average with no months with continuous snow cover.

The results of the AERSURFACE test indicate an average annual surface roughness of 0.102 m, allowing EPE to use the medium surface roughness meteorological data set.

## 8.5 Terrain Consideration

Elevations of the Project emission sources, structures, and receptors examined in the modeling, were determined from National Elevation Dataset (NED) data files (each with a 30-m resolution) and were based on North American Datum of 1983 (NAD83).

The NED data were processed with AERMAP. AERMAP is a preprocessor program which was developed to process terrain data in conjunction with a layout of receptors and sources to be used in AERMOD. For complex terrain situations, AERMOD captures the essential physics of dispersion in complex terrain and therefore, needs elevation data that convey the features of the surrounding terrain. In response to this need, AERMAP first determines the base elevation at each receptor. AERMAP then searches for the terrain height and location that has the greatest influence on dispersion for each individual receptor.

Using these topographical data, AERMAP was implemented through the Lakes Environmental graphical user interface to calculate elevations for each source and structure, and to calculate the elevation and hill height scale for each receptor. The NED files used in this analysis, as well as the AERMAP output reports, have been provided on the CD/DVD included in Appendix C of the AQA.

# 9 CONSTITUENTS EVALUATED

The County of El Paso is currently classified as being in attainment or unclassified with respect to the NAAQS for CO, nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), particulate matter 2.5 microns or less ($PM_{2.5}$), lead (Pb), and the 8-hour ozone standard. The city of El Paso is a moderate nonattainment area for particulate matter 10 microns or less ($PM_{10}$).

Since the project site is located in a non-attainment area for $PM_{10}$, and the project emissions trigger a non-attainment review for $PM_{10}$, there is no need to address PSD requirements for $PM_{10}$ since a non-attainment new source review will be performed for $PM_{10}$.

To support the permit application, the following analyses were performed:

- NAAQS Significance Impact Level (SIL) and Area of Impact (AOI) analyses for $NO_2$, CO and $PM_{2.5}$emissions, to predict whether the proposed sources could make a significant impact on existing air quality;

- PSD preconstruction monitoring analysis for $NO_2$, CO, $O_3$, and $PM_{2.5}$ emissions, to determine whether preconstruction monitoring may be required to evaluate existing air quality;

- State NAAQS analysis for $SO_2$ emissions, as applicable based on the SIL and AOI analyses, to demonstrate that the Project will not cause nor contribute to an exceedance of the State NAAQS;

- State Property Line analysis, to demonstrate that the emissions from the proposed project comply with State standards for net ground-level concentrations of $SO_2$ and $H_2SO_4$; and

- State Health Effects analysis, to demonstrate that $NH_3$ and formaldehyde (HCHO) emissions from the proposed project will not exceed the TCEQ Effects Screening Levels (ESLs).

The modeling results for the Significance Analysis summarized in Section 12.1 of this AQA demonstrate the emissions of $NO_2$, CO, $PM_{2.5}$, and $SO_2$ from the EPE Project for all averaging periods are below the corresponding SIL. Therefore, the following analyses were not required:

- PSD NAAQS analysis for $NO_2$, CO and $PM_{2.5}$ emissions, as applicable based on the SIL and AOI analyses, to demonstrate that the Project will not cause nor contribute to an exceedance of the NAAQS;

- Minor NSR NAAQS analysis for $SO_2$ emissions, as applicable based on the SIL and AOI analyses, to demonstrate that the Project will not cause nor contribute to an exceedance of the NAAQS; and

- PSD Increment analysis for $NO_2$ and $PM_{2.5}$ emissions, to demonstrate that the Project will not cause nor contribute to an exceedance of an increment.

# 10 AIR QUALITY MONITORING DATA

The dispersion modeling analysis must consider the existing background concentrations of pollutants in the area where impacts are being evaluated to assess the potential impacts of emissions on the NAAQS.

While the modeling results for the Significance Analysis summarized in Section 12.1 of this AQA demonstrate the emissions of $NO_2$, CO, $PM_{2.5}$, and $SO_2$ from the EPE Project for all averaging periods are below the corresponding SIL, EPE is including this section for completeness purposes.

For NAAQS modeling, the modeled result is added to the monitored background concentration presented in Table 5 to generate a total air quality impact.

**Table 5.** Form of Monitored Background Design Values

| Pollutant | 1-Hour | 3-Hour | 8-Hour | 24-Hour | Annual |
|---|---|---|---|---|---|
| **$NO_2$** | 3 yr avg of 98th percentile of annual distribution of max daily 1-hour value | NA | NA | NA | Annual from the most recent complete year |
| **$SO_2$** | 3 yr avg of 99th percentile of annual distribution of max daily 1-hour value | H2H from the most recent complete year. | NA | H2H from the most recent complete year. | Annual from the most recent complete year |
| **$PM_{2.5}$** | NA | NA | NA | 3 yr avg of 98th percentile of annual distribution of 24-hour values | Annual max over 3 years |
| **CO** | H2H from the most recent complete year. | NA | H2H from the most recent complete year. | NA | NA |

## 10.1 Significant Monitoring Concentrations

The EPA's monitoring de minimis concentrations or Significant Monitoring Concentrations (SMC), establish levels at which a facility needs to conduct pre-construction ambient air quality monitoring. This pre-construction monitoring is required in order to evaluate the existing air quality for pollutants subject to PSD review. However, if the air quality dispersion modeling analyses demonstrate that maximum modeled concentrations from the affected emission sources in the Significance Analysis do not exceed the SMC, pre-construction ambient air quality monitoring may be avoided. To address the SMC, the proposed emissions from the facility were modeled and compared to these SMCs listed in Table 6.

**Table 6.** Significant Monitoring Concentrations

| Pollutant | SMC 8-Hour ($\mu g/m^3$) | SMC 24-Hour ($\mu g/m^3$) | SMC Annual ($\mu g/m^3$) |
|---|---|---|---|
| **$SO_2$** | -- | 13 | -- |
| **$NO_2$** | -- | -- | 14 |
| **CO** | 575 | -- | -- |

**Source:** TCEQ Air Quality Modeling Guidelines- Table B-1. Criteria Pollutants

Although EPA had promulgated an SMC for $PM_{2.5}$, it was vacated by a January 22, 2013 DC Court of Appeals opinion. however, EPA has responded to the vacatur by indicating that existing background monitors should be sufficient to fulfill the ambient monitoring requirements.

TCEQ maintains an extensive ambient monitoring system in Texas and publishes available background data for $PM_{2.5}$ on its website. The El Chamizal monitor (EPA site: 481410044) is the selected ambient $PM_{2.5}$ monitor representative of ambient background concentrations of $PM_{2.5}$ near the Project site. The El Chamizal monitor is located in El Paso County, Texas and is owned and operated by TCEQ. It is the closest ambient $PM_{2.5}$ monitor in Project site, and it is geographically located in a similar and representative area as the Project. Therefore, sufficient ambient background monitoring data is available for the region for $PM_{2.5}$.

Similarly, a SMC has not been established for $O_3$. However, projects with net increases of 100 tpy or more of VOCs or NOx subject to PSD would be required to perform an ambient impact analysis, including an analysis of the existing ambient air quality in the area that the proposed project would affect.

Based on readily available monitoring data for the Ascarate Park SE monitoring station (AQS ID: 481410055), the 2016-2018 concentration values for $O_3$ were used to represent existing background conditions. The Ascarate Park Se monitoring station is located in El Paso County, Texas. This monitoring site was select as is the closest $O_3$ monitor with a 2016-2018 design value (Annual fourth-highest daily maximum 8 hour average concentration, averaged over 3 years) not exceeding the 8-hour ozone NAAQS standard that is located on the same side of the Franklin Mountains.

As discussed in further detail in Section 12.1 of this report, the EPE SIL impacts are less than the SMCs listed in Table 6. Consistent with these modeling results, the Project is requesting from TCEQ a waiver from preconstruction monitoring requirements.

## 10.2 NAAQS Background Levels

When considering the selection of a background monitor, ideally, a background monitor should be located within approximately 10 km of the site being modeled to adequately represent local ambient conditions. For cases where a somewhat distant monitor may be used, it is important to compare local characteristics of the monitor relative to the location of the proposed project (e.g., topographic differences; comparability of background emission sources). Generally, monitors are placed to gauge either local/urban population exposure, to assess urban ozone photochemistry, or to assess the impact from a particular source or sources.

The closest candidate monitors are not always ideal background monitors. Therefore, the best technical approach should be based on identifying the best candidate monitor, realizing that a level of conservatism will be built into the monitored values.

The selected background concentration for each pollutant was chosen to best represent existing background pollutant concentrations at the site, since no on-site data exist for pollutants to be evaluated. The following subsections provide a discussion on how the representative ambient background concentrations were obtained for the Project.

### *10.2.1 Carbon Monoxide (CO)*

To obtain a representative background concentration for CO in the vicinity of the Project, a number of monitoring sites were evaluated to determine which site most closely reflected the conditions near the site. The closest CO ambient monitors are presented in Table 7 below.

**Table 7.** CO Ambient Air Monitors Summary

| Monitor Name | AQS Monitor ID | Proximity to Project | Latitude | Longitude | Location Setting | Data Completeness | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | km | | | | 2014 | 2015 | 2016 | 2017 | 2018 |
| Ojo de Agua | 481411021 | 17 | 31.86247 | -106.5473 | Suburban | C | C | C | C | C |
| El Paso Chamizal | 481410044 | 24 | 31.76569 | -106.4552 | Urban | C | C | I | I | I |
| El Paso UTEP | 481410037 | 25 | 31.76829 | -106.5013 | Urban | N | N | N | N | C |
| Ascarate Park SE | 481410055 | 26 | 31.74678 | -106.4028 | Suburban | C | C | C | C | N |

Source: Air Data Monitor Values Report. Available at: https://www.epa.gov/outdoor-air-quality-data/monitor-values-report. Accessed September 2019.
C = Complete – Calendar year with a minimum data completeness of 75%.
I = Incomplete – Calendar year with less than 75% data completeness.
N = Not Available – Pollutant not monitored during calendar year.

The closest of these sites is Ojo de Agua (AQS ID: 481411021), which is 10.6 miles (17 km) southwest of the Project site. El Paso Chamizal (AQS ID: 481410044), El Paso UTEP (AQS ID: 481410037) and Ascarate Park SE (AQS ID: 481410055) are slightly further away, 14.9 miles (24 km), 15.5 miles (25 km) and 16.2 miles (26 km), respectively. The Project site climatology is very similar to the four monitoring sites; desert climate. The climate in this area is characterized by hot summers, with little humidity, and cool to mild dry winters. Topographically, all stations are in flat to gently rolling terrain, like the proposed project. The Franklin Mountains extend into El Paso from the north and nearly divide the city into two sections; the west side forms the beginnings of the Mesilla Valley, and the east side expands into the desert and lower valley. The project site is located east of the Franklin Mountains. El Paso Chamizal and Ascarate Park SE sites are located southeast of the Franklin mountains. Ojo de Agua is located west of the Franklin Mountains and El Paso UTEP monitor is southwest of the Franklin mountains; making the meteorological conditions not representative of the project site.

The El Paso Chamizal monitoring station was selected to represent existing background CO concentrations at the site. Based on readily available monitoring data for the El Paso Chamizal monitoring station, the 2018 concentration values for CO were used to represent existing background concentrations. The CO background concentrations are the highest-second-high (H2H) 1-hour and 8-hour CO ground level concentrations observed at the proposed monitoring site for the 2018 calendar year (i.e., most recent complete year). Table 8 summarizes the proposed CO background concentrations.

**Table 8.** 1-Hour and 8-Hour CO Background Concentrations

| Monitor ID | Monitor Name | Year | Averaging Period | Monitored Concentration (ppm) | Monitored Concentration (μg/m$^3$) |
|---|---|---|---|---|---|
| 481410044 | El Paso Chamizal | 2018 | 1-hour | 4.9 | 5,630 |
| | | | 8-hour | 2.3 | 2,630 |

### 10.2.2 Nitrogen Dioxide ($NO_2$)

A review of the closest $NO_2$ monitors to the Project identified five candidate sites as presented in Table 9.

**Table 9.** $NO_2$ Ambient Air Monitors Summary

| Monitor Name | AQS Monitor ID | Proximity to Project | Latitude | Longitude | Location Setting | Data Completeness | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | km | | | | 2014 | 2015 | 2016 | 2017 | 2018 |
| El Paso Chamizal | 481410044 | 24 | 31.76569 | -106.45523 | Urban | C | C | C | I | I |
| Sunland Park | 350130021 | 25 | 31.796334 | -106.57971 | Suburban | C | C | C | C | C |
| El Paso UTEP | 481410037 | 25 | 31.76829 | -106.50126 | Urban | C | C | C | C | C |
| Ascarate Park SE | 481410055 | 26 | 31.74678 | -106.40281 | Suburban | C | C | C | I | I |
| Santa Teresa | 350130022 | 33 | 31.7878 | -106.6828 | Rural | N | C | C | C | C |

Source: Air Data Monitor Values Report. Available at: https://www.epa.gov/outdoor-air-quality-data/monitor-values-report. Accessed September 2019.
C = Complete – Calendar year with a minimum data completeness of 75%.
I = Incomplete – Calendar year with less than 75% data completeness.
N = Not Available – Pollutant not monitored during calendar year.

The closest of these sites is El Paso Chamizal (AQS ID: 481410044), which is 14.9 miles (24 km) south of the Project site. Sunland Park (AQS ID: 350130021), El Paso UTEP (AQS ID: 481410037) and Ascarate Park SE (AQS ID: 481410055) are slightly further away, 15.5 miles (25 km), 15.5 miles (25 km) and 16.2 miles (26 km), respectively.

As described in previous sections, the Project is located east of the Franklin Mountains. Sunland Park, El Paso UTEP and Santa Teresa monitoring sites are located west of the Franklin Mountains. The closest monitor (i.e. El Paso Chamizal) only provides monitored concentrations for calendar years 2014 to 2016. Therefore, consideration of the UTEP monitor may be reasonable; despite the fact the monitor is sited near the southern portion of the Franklin Mountains, it is near an urban area with more $NO_x$ emissions than near the project site, and provides more recent monitoring data (i.e., calendar years 2016 to 2018).

The 1-hour background concentration is the 3-year average of the 98$^{th}$ percentile of the daily maximum 1-hour $NO_2$ values for 2014 through 2016. The annual background concentration is the arithmetic average of all the 1- hour $NO_2$ values observed at the monitoring site during the 2016 calendar year. Table 10 presents the 1-hour $NO_2$ background concentration and Table 11 presents the annual $NO_2$ background concentration.

**Table 10.** 1-hour $NO_2$ Background Concentrations

| Monitor ID | Monitor Name | Averaging Period | Year | Monitored Concentration (ppb) | Monitored Concentration (µg/m$^3$) |
|---|---|---|---|---|---|
| 481410037 | El Paso UTEP | 1-hour | 2016 | 60 | 112.9 |
| | | | 2017 | 58 | 109.1 |
| | | | 2018 | 61 | 114.8 |
| | | | 3-Year Average | 59.7 | 112.3 |

**Table 11.** Annual $NO_2$ Background Concentrations

| Monitor ID | Monitor Name | Averaging Period | Year | Monitored Concentration (ppb) | Monitored Concentration (µg/m³) |
|---|---|---|---|---|---|
| 481410037 | El Paso UTEP | Annual | 2018 | 10.94 | 20.58 |

### *10.2.3 Particulate Matter 2.5 Microns or Less ($PM_{2.5}$)*

The area surrounding the location of the proposed facility is somewhat lacking in ambient $PM_{2.5}$ air quality data. The closest $PM_{2.5}$ ambient air monitors to Project site are listed in Table 14.

Monitored concentration values from the pollutant monitors closest to the project area (i.e., El Paso Chamizal monitoring site data (AQS ID: 481410044 – Monitor 1) were used to represent the ambient conditions at the Project's site.

**Table 12.** $PM_{2.5}$ Ambient Air Monitors Summary

| Monitor Name | AQS Monitor ID | Proximity to Project | Latitude | Longitude | Location Setting | Data Completeness | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | km | | | | 2014 | 2015 | 2016 | 2017 | 2018 |
| El Paso Chamizal | 481410044 | 24 | 31.76569 | -106.45523 | Urban | C | C | C | C | C |
| El Paso UTEP | 481410037 | 25 | 31.76829 | -106.50126 | Urban | C | C | C | C | I |

Source: Air Data Monitor Values Report. Available at: https://www.epa.gov/outdoor-air-quality-data/monitor-values-report. Accessed September 2019.
C = Complete – Calendar year with a minimum data completeness of 75%.
I = Incomplete – Calendar year with less than 75% data completeness.
N = Not Available – Pollutant not monitored during calendar year.

The $PM_{2.5}$ background concentrations proposed are measured at the El Paso Chamizal monitor (AQS ID: 481410044). The $PM_{2.5}$ ground level concentration for the annual averaging period is based on the 3-year average of the annual average $PM_{2.5}$ concentrations; for the 24-hour averaging period, the ground level concentration is based on the 3-year average of the 98$^{th}$ percentile 24-hour average $PM_{2.5}$ concentrations for the daily standard. Proposed values are summarized in Table 15.

**Table 13.** Annual and 24-Hour $PM_{2.5}$ Background Concentrations

| Monitor ID | Monitor Name | Year | 98$^{th}$ Percentile 24-hour Average (µg/m³) | Annual Average (µg/m³) |
|---|---|---|---|---|
| 481410044 | El Paso Chamizal | 2016 | 24 | 8.7 |
| | | 2017 | 28 | 9.3 |
| | | 2018 | 27 | 8.6 |
| | | 3-Year Average | 26.3 | 8.9 |

#### 10.2.3.1 JUSTIFICATION FOR USING THE $PM_{2.5}$ AND OZONE SILS

On January 22, 2013, the U.S. Court of Appeals vacated and remanded 40 CFR 51.166(k)(2) and 52.21(k)(2) based upon EPA's lack of authority to exempt sources from the requirements of the Federal Clean Air Act when it established the SIL for $PM_{2.5}$, and vacated 40 CFR 51.166(i)(5)(i)(c) and 52.21(i)(5)(i)(c) based on EPA's lack of authority to exempt the preconstruction monitoring requirements through the SMC established for $PM_{2.5}$.

On April 17, 2018, EPA issued a guidance memorandum, which establishes EPA's current approach to significant impact levels used in the PSD modeling program.[6] In issuing this guidance, EPA changed the technical basis for how it sets SILs. The new approach, referred to as the air quality variability approach, looks to a statistical analysis of variability to determine when changes are within the inherent variability of observed design values.

Changes of less than the value are indistinguishable from the inherent variability in the measured atmosphere and may be observed even in the absence of the increased emissions from the new or modified source. Therefore, EPA finds that such changes are "not meaningful" and do not cause or contribute to violations of the relevant NAAQS or PSD increments.

The recommended SIL values are:

- 24-hour $PM_{2.5}$: 1.2 $\mu g/m^3$;
- Annual $PM_{2.5}$: 0.2 $\mu g/m^3$; and
- 8-Hour $O_3$: 1 ppb (1.96 $\mu g/m^3$)

A copy of the EPA "Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program," dated April 17, 2018) is included in Appendix B.

### *10.2.4 Sulfur Dioxide ($SO_2$)*

The Skyline Park monitor (AQS ID: 481410058) in El Paso, Texas, is the nearest monitor recording ambient concentration levels of $SO_2$. The Skyline Park monitor is located 9.9 km south of the Project site. EPE proposes to use 2015-2017 $SO_2$ data from this monitor to represent the existing background concentrations in the vicinity of the project site. Proposed values are summarized in Table 16.

[6] U.S. EPA, 2018. *"Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program,"*. April 17, 2018

**Table 14.** $SO_2$ Background Concentration

| Monitor ID | Monitor Name | Year | 99th percentile 1-hour Average (µg/m³) | H2H 1-hour (µg/m³) |
|---|---|---|---|---|
| 481410693 | Skyline Park | 2015 | 2.0 | - |
| | | 2016 | 3.0 | - |
| | | 2017 | 2.0 | 1.2 |
| | | 3-Year Average | 2.3 | - |

## *10.2.5 Ozone ($O_3$)*

A review of the closest $O_3$ monitors to the Project identified eight candidate sites as presented in Table 12. The Ascarate Park SE monitoring station (AQS ID: 481410055) was used to represent existing background $O_3$ concentrations at the Project site as this is the closest $O_3$ monitor with a 2016-2018 design value (Annual fourth-highest daily maximum 8 hour average concentration, averaged over 3 years) not exceeding the 8-hour ozone NAAQS standard that is located on the same side of the Franklin Mountains. Based on readily available monitoring data for the Ascarate Park SE monitoring station, the 2016-2018 concentration values for $O_3$ were used to represent existing background conditions.

**Table 15.** $O_3$ Ambient Air Monitors Summary

| Monitor Name | AQS Monitor ID | Proximity to Project | Latitude | Longitude | Location Setting | 2016-2018 Design Value |
|---|---|---|---|---|---|---|
| | | km | | | | ppm |
| Chaparral | 350130020 | 6.4 | 32.041212 | -106.40971 | Rural | 0.071 |
| Skyline Park | 481410058 | 9.9 | 31.89417 | -106.42535 | Suburban | 0.072 |
| MacNutt | 350130008 | 19.7 | 31.930659 | -106.6311 | Rural | 0.068 |
| El Paso Chamizal | 481410044 | 24 | 31.76569 | -106.45523 | Urban | 0.071 |
| Sunland Park | 350130021 | 25 | 31.796334 | -106.57971 | Suburban | 0.074 |
| El Paso UTEP | 481410037 | 25 | 31.76829 | -106.50126 | Urban | 0.073 |
| Ascarate Park SE | 481410055 | 26 | 31.74678 | -106.40281 | Suburban | 0.069 |
| Santa Teresa | 350130022 | 33 | 31.7878 | -106.6828 | Rural | 0.074 |

Source: Air Data Monitor Values Report. Available at: https://www.epa.gov/outdoor-air-quality-data/monitor-values-report. Accessed September 2019.
C = Complete – Calendar year with a minimum data completeness of 75%.
I = Incomplete – Calendar year with less than 75% data completeness.
N = Not Available – Pollutant not monitored during calendar year.

The 8-hour background concentration is the three-year arithmetic average of the annual highest-fourth-high daily maximum 8-hour ozone concentrations for 2016 through 2018. Table 13 summarizes the ozone background concentration.

**Table 16.** 8-Hour $O_3$ Background Concentrations

| Monitor ID | Monitor Name | Averaging Period | Year | Monitored Concentration (ppm) | Monitored Concentration (μg/m$^3$) |
|---|---|---|---|---|---|
| 481410055 | Ascarate Park SE | 8-hour | 2016 | 0.066 | 129.57 |
| | | | 2017 | 0.067 | 131.53 |
| | | | 2018 | 0.075 | 147.24 |
| | | | 3-Year Average | 0.069 | 135.46 |

# 11 MODELING EMISSION INVENTORY

## 11.1 On-Property Sources in the Permit Application

As noted in Section 3, A comprehensive emissions inventory for the Project has been developed. EPE plans to construct new equipment at the existing Newman Generating Station. EPE proposes to install a new Mitsubishi Model M501GAC Simple Cycle gas turbine, a natural gas fired line heater, an emergency firewater pump, and fugitive sources. The modeled emission sources in AERMOD include area sources and point sources. Area sources include fugitive piping emissions. Point sources include stationary combustion sources.

The following sections provide additional details by source type with regards to the assumptions and methods used to determine release characteristics and emission rates modeled in this AQA.

### *11.1.1 Point Sources*

The point sources associated with the Project include the combustion turbine stack, emergency firewater pump stack, and the line heater stack.

#### 11.1.1.1 COMBUSTION TURBINE

For the combustion turbine (Unit 7 Simple Cycle Turbine [EPN: SC-7]), exit temperature and exit velocity will vary during startup and shutdown, with varying load, and with varying ambient temperature. To select which operating scenarios to use in the evaluation of the maximum concentrations, a screening level analysis was performed using the AERSCREEN model to determine the worst-case operating conditions for the proposed combustion turbine.

This screening level set of modeling runs encompassed fifteen (15) scenarios with varied normal operating load cases and four (4) startup and shutdown scenarios provided by the combustion turbine vendor (Mitsubishi). Two (2) additional cases were evaluated assuming 24 minutes of startup and 35 minutes of startup time respectively.

The twenty-one (21) operating scenarios included a wide range of operating conditions, with varying stack temperatures ranging from 703.0 to 825.0 degrees Fahrenheit (°F) and various stack linear flow velocities ranging from 50 to 95.0 feet per second (fps). An emission rate of 1.0 lb/hr was used to determine the stack discharge characteristics during the worst-case operation. As a result, Case SU_MIN (hot startup at minimum ambient temp (°F)) with a stack velocity of 50 fps and stack temperature of 703 °F, the overall worst-case scenario for all of the different load groups. This operating scenario exhibited the overall maximum impacts; therefore, this operating representation was selected to conservatively characterize the full range of operating parameters for the operation of the gas turbine. Appendix A includes a list of the 21 operating scenarios.

Potential emissions of criteria pollutants were based on a maximum operating schedule of 8,760 hr/yr. For all the evaluated pollutants and averaging periods, with exception of the 1-hour $NO_2$, the exhaust parameters modeled represented a “worst-case” profile of possible parameters (e.g., stack discharge temperature and velocity); that is, the worst-case dispersion parameters were paired with worst-case emissions to return maximum modeled concentrations.

EPA released a Memorandum on March 1, 2011 entitled *"Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour $NO_2$ National Ambient Air Quality Standard"* (EPA Memorandum).[7] The EPA Memorandum clarifies that the 1-hour $NO_2$ National Ambient Air Quality Standards (NAAQS) AQS compliance demonstration should address emission scenarios that can logically be assumed to be relatively continuous or which occur frequently enough to contribute significantly to the annual distribution of daily maximum 1-hour concentrations based on existing modeling guidelines. The EPA Memorandum clarifies that reviewing authorities have discretion to allow exclusion of "intermittent emission scenarios, such as startup/shutdown operations" or otherwise adjust the maximum hourly emission rate modeled from intermittent sources with respect to the 1-hour $NO_2$ standard.

The EPA Memorandum recognizes that intermittent emissions scenarios, if modeled at maximum hourly emission rates, would result in modeled emissions based on the implicit assumption that the intermittent scenario is occurring continuously, and, thus, the worst-case emissions scenario would coincide with worst case meteorological conditions each day throughout the year. However, intermittently occurring emission scenarios or source operations are unlikely to consistently coincide with worst-case meteorological conditions, so the modeled impacts using maximum hourly emission rates from these sources will result in 1-hour impacts being significantly higher than actual impacts would realistically be expected for a startup emission scenario.

The EPA Memorandum indicates that assuming continuous operation of intermittent emissions scenarios would effectively impose an additional level of stringency beyond the level intended by the 1-hour $NO_2$ NAAQS. Impacts are assessed for the 1-hour standard based on the daily maximum 1-hour concentration at each receptor averaged over a year. If a source is unlikely to significantly contribute to the distribution of daily maximum 1-hour concentrations, then it would be justifiable to use the intermittent source guidelines to consider impacts from the source.

The proposed combustion turbine will operate as a mid-merit unit, serving load and following demand in a manner that is on a spectrum from baseload to peaking units. Therefore, the startup of the unit will not be periodic nor predictable. Additionally, the worst-case stack parameters modeled will occur during startup of the unit, which lasts less than one full hour. Since the one-hour standard is based on the annual average one-hour maximum concentrations, intermittent scenario parameters modeled as though they were continuous would result in an overly conservative estimation of impacts because the startup scenario would be intermittent (potentially not contributing to the one-hour maximum daily concentrations each day) and the duration of each event would be less than one hour. Thus, it is appropriate to use the EPA's intermittent source guidelines applied to the startup emissions.

For the evaluation of the 1-hr $NO_2$, EPE assessed impacts from the simple cycle turbine startup events based on intermittent source guidelines. For this evaluation, the worst-case dispersion parameters were paired with worst-case steady state emissions with scaled startup emissions based on intermittent source guidelines which represents the maximum annual average emission rate for evaluating 1-hour $NO_2$ impacts from the source.

The maximum steady state $NO_x$ emissions for the turbine are 25.2 pounds per hour. The annual average emission rates during startup events is 8.76 tons per year of $NO_x$ based on a maximum emission rate of 48.0 lb/event and 365 events per year; therefore, the maximum hourly emission rate used for modeling the source was determined as:

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[7] EPA Memorandum from Tyler Fox, Leader Air Quality Modeling Group C439-01 to Regional Air Division Directors, "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour $NO_2$ National Ambient Air Quality Standard" dated March 1, 2011.
(http://www.epa.gov/region7/air/nsr/nsrmemos/appwno2_2.pdf)

The maximum steady state $NO_x$ emissions for the turbine are 25.2 pounds per hour. To account for the contribution to one-hour $NO_2$ impacts from this source due to startup events, the annual average emission rates during startup events were determined and added to the maximum steady state emission rate. The annual average emission rates during startup events is 8.76 tons per year of $NO_x$ based on a maximum emission rate of 48.0 lb/event and 365 events per year; therefore, the maximum hourly emission rate used for modeling the source was determined as:

[Maximum Steady State Emission Rate] 25.2 lb/hr + [Annual Average Intermittent Emission Scenario (startup) emission rate] 8.76 tons per year / 8,760 hours per year * 2,000 lb/ton = 27.2 lb/hr.

This modeling method accounts for the impacts due to startup events over the averaging period without overestimating impacts by assuming continuous operation of an intermittent scenario.

The emission rate discussed above is conservatively modeled using the worst-case one-hour stack parameters associated with a startup event which have been determined via a sensitivity analysis evaluating multiple scenarios using AERSCREEN as described above.

#### 11.1.1.2 FIREWATER PUMP

This AQA included the emission rates for the firewater pump engine (EPN: FIRE-2) in combination with the other modeled sources (e.g., combustion turbine and line heater). Except for emergency situations, these unit will not operate in excess of 100 hours per consecutive 12-month period. Per EPA's guidance, because the frequency of these intermittent emissions is uncertain, the 1-hour $NO_2$ analyses were based on the annualized hourly emission rate.

#### 11.1.1.3 LINE HEATER

The line heater (EPN: LH-1) was modeled as point source, and no scaling factor was applied to 1-hour $NO_2$ emissions. Table 17 provides a summary of the Project point sources, a brief description of the operating mode, the emission rates and stack parameters used in the SIL modeling analysis.

**Table 17.** Project Point Source Emission Parameters Summary

| Emission Source | Description | UTM Coordinates of Emission Point East | UTM Coordinates of Emission Point North | Stack Exit Height | Stack Diameter | Stack Exit Temperature | Stack Exit Velocity | Modeled Emission Rate Pollutant | Modeled Emission Rate lb/hr |
|---|---|---|---|---|---|---|---|---|---|
| | | (m) | (m) | (feet) | (feet) | (°F) | (fps) | Pollutant | lb/hr |
| SC7 | Mitsubishi M501 GAC | 365093.7 | 3539470 | 155.0 | 31.0 | 703.0 | 50.0 | CO | 555.67 |
| | | | | | | | | 1-hr $NO_2$ | 27.2 |
| | | | | | | | | Annual $NO_2$ | 58.5 |
| | | | | | | | | $PM_{2.5}$ | 7.0 |
| | | | | | | | | $SO_2$ | 1.54 |
| | | | | | | | | $H_2SO_4$ | 1.41 |
| | | | | | | | | $NH_3$ | 18.7 |
| | | | | | | | | Formaldehyde | 1.29 |
| FIRE2 | Emergency Diesel Firewater Pump Engine | 365046.2 | 3539580 | 12.992 | 0.666 | 880.07 | 69.259 | CO | 0.13 |
| | | | | | | | | 1-hr $NO_2$ | 0.006393 |
| | | | | | | | | Annual $NO_2$ | 0.55 |
| | | | | | | | | $PM_{2.5}$ | 0.03 |
| | | | | | | | | $SO_2$ | 0.004 |
| | | | | | | | | Formaldehyde | 0.000818 |
| LH1 | Forced Draft Line Heater | 365086.4 | 3539595 | 24.016 | 6.0 | 180.0 | 15.83 | CO | 0.145 |
| | | | | | | | | 1-hr $NO_2$ | 0.118 |
| | | | | | | | | Annual $NO_2$ | 0.118 |
| | | | | | | | | $PM_{2.5}$ | 0.019 |
| | | | | | | | | $SO_2$ | 0.004 |
| | | | | | | | | Formaldehyde | 0.000288 |

### 11.1.2 Area Sources

Fugitive emissions of ammonia from handling/storage of aqueous ammonia in a pressurized tank and within the piping and components. These fugitive ammonia sources were located around the aqueous ammonia storage area. It was conservatively assumed that all fugitive emissions including those from the entire piping system (aqueous ammonia tank to SCR) would be released in this relatively limited area. This limited area effectively concentrates the fugitive ammonia emissions modeled for the Project. Therefore, the modeled ammonia emission rates presented within this AQA report represent a conservative approach and demonstrate that impacts from ammonia were below the short- and long-term air toxic screening levels. The source parameters used to model the fugitive emissions of ammonia are provided in Table 18.

**Table 18.** Project Area Source Emission Parameters Summary

| Emission Source | Description | UTM Coordinates of Emission Point | | Release Height | Length | Width | Modeled Emission Rate | |
|---|---|---|---|---|---|---|---|---|
| | | East | North | | | | | |
| | | (m) | (m) | (feet) | (feet) | (feet) | Pollutant | lb/hr |
| FUG7 | Unit 7 Piping Fugitives | 365117.6 | 3539493 | 6.562 | 17.57 | 26.87 | $NH_3$ | 0.36 |

## 11.2 Other On-Property and Off-Property Sources

When the preliminary impact modeling of the project-only emissions exceeds any of the applicable SIL, a retrieval of nearby sources (other on-property and off-property) is required to complete the full impact modeling (PSD increment consumption and/or NAAQS). Because the modeling results for the Significance Analysis summarized in Section 12.1 of this AQA demonstrate the emissions from the EPE Project for all pollutants and averaging periods are below the corresponding SIL, no other on-property and off-property sources were included in the analysis.

# 12 MODELING RESULTS

Using the emission source inputs, meteorological data, receptor network, and following the EPA and TCEQ modeling guidance, emissions from the Project were modeled using AERMOD to address the applicable air quality standards. The results below are organized by criteria pollutant SIL, full impact NAAQS, PSD Increment, state property line standard, and non-criteria pollutant analyses. Overall, the AERMOD modeling conducted as part of this AQA demonstrates that, the Project will meet the air quality standards and guidelines of the EPA/TCEQ and will not cause or contribute to a violation of any applicable standard.

## 12.1 Significance Analysis Results

For the NAAQS Preliminary Impact Determination, the emissions from the Project were modeled for each pollutant and averaging time combination to determine whether the proposed sources could make a significant impact on existing air quality. The Project would be considered to have a potentially significant impact on existing air quality if the model predicts concentrations at one or more receptors in the modeling grid greater than or equal to the SIL. Table 19 lists the results for both the Minor and PSD NAAQS analysis for the relevant pollutant and averaging times.

**Table 19.** SIL Maximum Predicted Impacts

| Pollutant | Averaging Time | Rank/Form | SIL | Modeled GLC | SIL percentage | GLC<SIL |
|---|---|---|---|---|---|---|
| | | | μg/m$^3$ | μg/m$^3$ | % | |
| Carbon Monoxide | 1-hr 2011 | H1H | 2000 | 122.25 | 6% | YES |
| | 1-hr 2012 | H1H | 2000 | 132.23 | 7% | YES |
| | 1-hr 2013 | H1H | 2000 | 112.41 | 6% | YES |
| | 1-hr 2014 | H1H | 2000 | 140.24 | 7% | YES |
| | 1-hr 2015 | H1H | 2000 | 107.35 | 5% | YES |
| | 1-hr 2011-2015 | H1H | 2000 | 140.24 | 7% | YES |
| | 8-hr 2011 | H1H | 500 | 59.94 | 12% | YES |
| | 8-hr 2012 | H1H | 500 | 47.67 | 10% | YES |
| | 8-hr 2013 | H1H | 500 | 43.83 | 9% | YES |
| | 8-hr 2014 | H1H | 500 | 36.76 | 7% | YES |
| | 8-hr 2015 | H1H | 500 | 45.08 | 9% | YES |
| | 8-hr 2011-2015 | H1H | 500 | 59.94 | 12% | YES |
| Nitrogen Dioxide | 1-hr 2011-2015 | H1H | 7.5 | 5.63 | 75% | YES |
| | Annual - 2011 | H1H | 1 | 0.76 | 76% | YES |
| | Annual - 2012 | H1H | 1 | 0.80 | 80% | YES |
| | Annual - 2013 | H1H | 1 | 0.75 | 75% | YES |
| | Annual - 2014 | H1H | 1 | 0.73 | 73% | YES |
| | Annual - 2015 | H1H | 1 | 0.71 | 71% | YES |
| | Annual - 2011-2015 | H1H | 1 | 0.75 | 75% | YES |

| Pollutant | Averaging Time | Rank/Form | SIL | Modeled GLC | SIL percentage | GLC<SIL |
|---|---|---|---|---|---|---|
| | | | μg/m³ | μg/m³ | % | |
| **Particulate Matter ($PM_{2.5}$)** | 24-hr -2011 | H1H | 1.2 | 0.343 | 29% | YES |
| | 24-hr -2012 | H1H | 1.2 | 0.304 | 25% | YES |
| | 24-hr -2013 | H1H | 1.2 | 0.310 | 26% | YES |
| | 24-hr -2014 | H1H | 1.2 | 0.321 | 27% | YES |
| | 24-hr -2015 | H1H | 1.2 | 0.284 | 24% | YES |
| | 24-hr 2011-2015 | H1H | 1.2 | 0.248 | 21% | YES |
| | Annual - 2011 | H1H | 0.2 | 0.050 | 25% | YES |
| | Annual - 2012 | H1H | 0.2 | 0.052 | 26% | YES |
| | Annual - 2013 | H1H | 0.2 | 0.049 | 24% | YES |
| | Annual - 2014 | H1H | 0.2 | 0.048 | 24% | YES |
| | Annual - 2015 | H1H | 0.2 | 0.048 | 24% | YES |
| | Annual - 2011-2015 | H1H | 0.2 | 0.049 | 25% | YES |
| **Sulfur Dioxide** | 1-hr 2012 | H1H | 7.8 | 0.49 | 6% | YES |
| | 3-hr 2012 | H1H | 25 | 0.20 | 1% | YES |
| | 24-hr 2012 | H1H | 5 | 0.05 | 1% | YES |
| | Annual 2012 | H1H | 1 | 0.01 | 1% | YES |

In accordance with TCEQ's Air Quality Modeling Guidance, since the results of the Significance Analysis showed that there were no pollutant/averaging time combinations where the SIL was exceeded, both the Minor NSR and PSD NAAQS demonstration are considered complete.

## 12.2 PSD Pre-Application Analysis

Pollutants subject to PSD Air Quality Analysis are required to conduct a PSD Pre-Application Analysis. In accordance with TCEQ's Air Quality Modeling Guidelines, Step 1 of this Analysis is to compare results of the Preliminary Impact Determination from the PSD NAAQS Analysis for each pollutant/averaging time combination against the significant monitoring concentration (SMC). Table 20 lists the results below:

**Table 20.** Modeling Results for PSD Pre-Application Analysis

| Pollutant Evaluated | Averaging Time | Model Results (μg/m³) | SMC (μg/m³) |
|---|---|---|---|
| $SO_2$ | 24-hr | 0.05 | 13 |
| $NO_2$ | Annual | 0.75 | 14 |
| CO | 8-hr | 59.94 | 575 |

Because the results of the PSD NAAQS Preliminary Impacts Determination are below the SMC for all relevant pollutants and averaging times, and sufficient ambient background monitoring data is available for the region for O3 and $PM_{2.5}$, the demonstration is complete.

## 12.3 PSD Increment Analysis

PSD Air Quality Analysis requires a PSD Increment Analysis if the results of the Preliminary Impact Determination exceed de minimis concentrations. Since de minimis thresholds were not exceeded, the demonstration is considered complete.

## 12.4 State Property Line Evaluation

The state property line analysis is required for $SO_2$ and $H_2SO_4$. In accordance with TCEQ Guidelines, the $SO_2$ 30-minute averaging time demonstration will be compared with the 1-hour averaging time results from the model. A preliminary impact determination for 1-hour $SO_2$ and 1-hour and 24-hour $H_2SO_4$ was conducted and compared against 2 percent of the state property line standard in order to determine whether side-wide modeling would be needed. Table 21 lists these results.

**Table 21.** State Property Line Analysis

| Pollutant Evaluated | Averaging Time | Model Results (µg/m$^3$) | 2% of Standard (µg/m$^3$) |
|---|---|---|---|
| $SO_2$ | 30-min | 0.49 | 20.4 |
| $H_2SO_4$ | 1-hr | 0.34 | 1 |
| $H_2SO_4$ | 24-hr | 0.05 | 0.3 |

Based on the preliminary impact determination for the State Property Line Analysis, the impacts are below 2 percent of the applicable standard. Because the total project emission increases are low, requiring only minor NSR review, and previous site-wide modeling projects did not exceed the de minimis thresholds for these pollutants. Additionally, based on monitoring data from the Skyline Park monitoring station (Meter ID 481410058) 10 km south of the site, the $SO_2$ background concentration averaged over the previous 3 full years of finalized data is only 2.3 µg/m$^3$, so it is unlikely that the sources at Newman Station combined with this background level will exceed the state property line standards.

## 12.5 State Health Effects Analysis

The State Health Effects Analysis was conducted for the $NH_3$ (CAS 7664-41-7) and formaldehyde (CAS 50-00-0) emissions from the Project. This analysis was not completed for other HAP emissions from the project because other HAP emissions from this project result from the combustion of pipeline quality natural gas or diesel in an emergency diesel engine. These emissions are exempt from Health Effects Analysis because emissions of this character have already been reviewed for health effects and are not expected to cause adverse health effects. Therefore, in accordance with Appendix B of the TCEQ's Modeling and Effects Review Analysis (MERA) Guidelines, these emissions do not require additional review through the MERA process.

Using the MERA Guidelines step by step process, the $NH_3$ and formaldehyde emissions from the project were determined to be below their ESLs, which is protective of public health and welfare and are not expected to cause adverse health or welfare effects.

An Air Toxics ESL modeling analysis for ammonia and formaldehyde was conducted in accordance with TCEQ's MERA guidance for non-criteria (ESL-based) pollutants. The results of the air toxic ESL modeling of formaldehyde and ammonia are listed in Table 22.

**Table 22.** Air Toxics Impacts (µg/m$^3$)

| Pollutant | 1-Hour Maximum Modeled Concentration | 10% of 1-Hour ESL | Annual Maximum Modeled Concentration | 10 % of Annual ESL |
|---|---|---|---|---|
| Formaldehyde | 0.307 | 1.5 | 0.003 | 0.33 |
| Ammonia | 65.387 | 18 | 0.605 | 9.2 |

Because the maximum modeled concentrations listed in Table 22 for formaldehyde are less than the 10% ESLs, no further analysis is required for this pollutant.

As modeled concentrations for ammonia are higher than 10% the short-term and long-term ESLs, but lower than the respective ESLs, a ratio test was performed. The ammonia total project increase was evaluated against the currently authorized emissions from all emission points on the site, along with the new and increased emissions.

The following inequality from Step 6 of the MERA guidance is was employed to determine if the MERA evaluation was complete:

$$\frac{GLC_{max}}{ESL} \leq \frac{ER_P}{ER_S}$$

Where:

$GLC_{max}$= The maximum ground level concentration for the appropriate averaging time, in µg/m$^3$
ESL= The effects screening level for the appropriate averaging time, in µg/m$^3$.
$ER_p$= The project increase, in lb/hr or tpy
$ER_S$= The proposed site-wide emissions, in lb/hr or tpy.

The project increase in tpy was estimated to be 83.49 tpy and the proposed $NH_3$ site-wide emissions were estimated as 186.1 tpy. Therefore, the inequality is true (0.3633<0.4468) and no further analysis is required for this pollutant.

## 12.6 Ozone Ambient Impact Analysis

As outlined in Table Q-1 of TCEQ's "Air Quality Modeling Guidelines", the worst-case derived MERPs for the hypothetical Texas sources (in tons per year) are 250 tpy $NO_X$ and 2,604 tpy VOC for 8-hr ozone.

Per the guidance, the SIL analysis demonstration for the proposed Project is as follows:

(121.12 tpy $NO_X$ project emissions increase / 250 tpy $NO_X$ 8-hr $O_3$ MERP) + (114.26 tpy VOC project emissions increase / 2,604 tpy VOC 8-hr $O_3$ MERP) *100 = 52.84% <100%

As the predicted ozone value is less than 100%, the source impact is less than the SIL and a cumulative analysis would not be needed. Therefore, there are no adverse impacts associated with precursor emissions for ozone as part of these projects, and a cumulative ozone analysis is not required.

## 12.7 Secondary Formation of $PM_{2.5}$

Impacts from secondary formation of $PM_{2.5}$ were evaluated using TCEQ Air Quality Modeling Guidelines Appendix R, Tier 1 demonstration. Essentially the Tier 1 demonstration uses the emission rates and modeled concentrations of precursors to secondary $PM_{2.5}$ formation to calculate whether or not secondary $PM_{2.5}$ formation in addition to direct $PM_{2.5}$ emissions would have the potential to cause significant impact to existing air quality.

The demonstration is based on the following calculation:

[$PM_{2.5}$ Modeled value (µg/m$^3$) /$PM_{2.5}$ SIL(µg/m$^3$) + $NO_x$ Project Emissions (tpy)/$NO_x$ MERP (tpy) + $SO_2$ Project Emissions (tpy)/$SO_2$ MERP (tpy)] * 100<100%

This calculation is conducted for both the 24 hour and the annual averaging times. The results of this calculation represent the Project indirect and direct $PM_{2.5}$ results as a percentage of the SIL. Therefore, if the results are less than 100% of the SIL, the secondary formation of $PM_{2.5}$ is demonstrated not to cause significant impact to existing air quality.

As outlined in Table R-1 of TCEQ's "Air Quality Modeling Guidelines", the worst-case derived MERPs for the hypothetical Texas sources (in tons per year) are 2,649 tpy $NO_X$ and 359 tpy $SO_2$ for 24-hr $PM_{2.5}$ and 10,397 tpy $NO_X$ and 1,820 tpy $SO_2$ for Annual $PM_{2.5}$. The proposed $NO_x$ and $SO_2$ emissions are 121.12 tpy and 6.76 tpy respectively.

Based on this analysis, the secondary formation of $PM_{2.5}$ would be 35.04% of the SIL for the 24-hour averaging period and 27.58% of the SIL for the annual averaging period. The estimated total 24-hr and Annual concentrations including secondary impacts was determined as 0.421 µg/m$^3$ and 0.055 µg/m$^3$ respectively. Therefore, after accounting for secondary formation of $PM_{2.5}$ it has been demonstrated that the impacts from the Project are still below the SIL and a cumulative analysis would not be needed.

# 13 ADDITIONAL IMPACTS ANALYSIS

The Project is a major modification of an existing major source and as such, an analysis of the project's impacts to growth (with respect to residential, industrial, commercial, and/or other growth) in the area, visibility, and soils and vegetation.

## 13.1 Growth Analysis

The Project is occurring at an existing source and will not lead to a significant shift in population and activity in the area. Thus, the Project is not expected to have significant impacts that would result in additional air quality impacts for the area.

## 13.2 Visibility Impairment Analysis

The new emission sources being installed as part of the Project will comply with the visibility and opacity requirements of 30 TAC Chapter 111. Therefore, it is not expected there will be visual impairment within the Project area.

## 13.3 Soils and Vegetation Analysis

There is no vegetation with significant commercial or recreational value within the area. Additionally, the Project emissions were found not to cause significant impact to existing air quality in each analysis conducted (were less than the SIL). Since the concentrations of pollutants for which a secondary NAAQS has been established are in attainment with the primary NAAQS in the Project area, and the secondary NAAQS is greater than or equal to the primary NAAQS for all pollutants except for 3-hour $SO_2$ where primary NAAQS has not been established, then it can be deduced that the Project will not cause an exceedance of the secondary NAAQS and thus will not have a significant adverse impact to vegetation and soils.

# 14 CONCLUSIONS

In conclusion, this AQA has been prepared in accordance with the current EPA and TCEQ Air Quality Modeling guidelines. As described in this AQA, the methodology that was followed in conducting this Class II air dispersion modeling analyses for the proposed EPE Project demonstrates the following:

- The Significance Analysis for CO (1-hour and 8-hour), $SO_2$ (1-hour, 3-hour, 24-hour and annual), $PM_{2.5}$ (24-hour and annual), and $NO_2$ (1-hour and annual) demonstrated that all receptors were below the applicable significant impact levels (SIL); therefore, a PSD NAAQS/Increment Analysis was not required.

- The required State Property Line analysis demonstrated that impacts from $SO_2$ (1-hour) and $H_2SO_4$ (1-hour and 24-hour) were below the State Property Line standards;

- The required Air Toxics Effects Screening Level (ESL) analysis demonstrated that impacts from $NH_3$ and formaldehyde were below the short- and long-term screening levels; and

- The additional PSD analysis (for growth, soils and vegetation, and visibility [or Class I Area Impacts]) as well as ozone and secondary $PM_{2.5}$ formation analyses demonstrated that adverse impacts from the EPE Project are not expected to adversely impact air quality in the region.

Therefore, the predicted air quality impacts for the EPE Project will not cause or contribute to a violation of any applicable NAAQS, PSD Increment standard, 30 TAC §112 State Property Line standard, ESL or cause or contribute to adverse impacts on human health or the environment.

# 15 ELECTRONIC MODELING FILES SUMMARY

All electronic files used in the modeling have been written to CD/DVD which accompanies this report (Appendix C). This includes:

- Downwash program (BPIP-Prime) input and output files
- Meteorological Data Files
- Land Use and Land Cover files
- AERSURFACE input and output files
- Terrain Data files
- Plot plan
- AERMOD input and output files

# Appendix A. Operating Scenarios.

**El Paso Electric Newman Station Unit 6**
**Air Quality Permitting Information Needs**
**Version 1.3 May 3, 2019**

| Item Number | Information Needed | Responsible Party | delivered to | table to | Data Point (-10F) | Comments |
|---|---|---|---|---|---|---|
| **Project Scope and Definition -** | | | | | | |
| 1 | Objectives of the Project (i.e., power generation goals, peaking or base load, reliability, etc.); | **EPE ENV** | | | Through its ongoing planning processes, EPE forecasts its energy and demand needs on an annual and multi-year basis. EPE determined its need for new generation capacity for 2022 and 2023 as part of its annual planning process. This resource will provide capacity during EPE's summer peak hours and will satisfy EPE's reserve margin target in years 2022 and 2023. The selection of this project reflects the results of an all source competitive bidding process that began in June 2017 with a request by EPE for proposals for new electric power supply and load management resources (2017 RFP). Through this process, EPE selected a self-build generation unit option as one of the winning bids to fulfill the need for new resources and advance EPE's strategy of having reliable and diverse power sources. This unit will improve system reliability and efficiency and allow EPE to meet its reserve margin criteria by providing peaking to intermediate capacity and generation, especially during peak summer hours. | |
| 2 | Narrative and technical detail as to why simple-cycle was chosen? | **EPE ENV** | | | When combined with the other RFP awarded resources, EPE's selection of the MHPSA GAC Simple Cycle self-build option, resulted in the optimal resource portfolio available through the competitive bidding process and analysis. This simple cycle unit will meet summer peaking requirements and overall system reliability beginning in year 2023. The Mitsubishi M501 GAC unit provides proven technology with a simple-cycle thermal efficiency of approximately 40% percent. The unit offers great value and benefits such as efficiency, cycling capability without impacting maintenance intervals, ramping capability to follow load, sufficient turndown and low mass emissions. | |
| 3 | Narrative and technical detail as to why Mitsubishi turbine technology was chosen? | **EPE ENV** | | | see above | |
| 4 | Mitsubishi to provide language or narrative regarding fast start capability. | **EPE ENV** | | | | |
| 5 | Projected start of construction | **EPE ENV** | | | 3rd Qtr of 2021 | |
| 6 | Projected start of operation | **EPE ENV** | | | May 1, 2023 | |
| **Cad Files (geo-reference and in dxf format)** | | | | | | |
| 7 | Entire facility layout or plot plan that identifies the following: a clearly marked scale, the property boundary, property fence line, emission source stack locations (turbines, emergency generator engine(s), emergency firewater pump engine(s), cooling towers, storage tanks, a true north arrow, UTM coordinated along the vertical and horizontal borders, datum of coordinates, reference UTM coordinates, buildings and structures on-property with length width height | **EPE/S&L** | | | | |
| 8 | Power block layout | **S&L** | | | | |
| 9 | Is there a property fence that is adequate to keep the public off of the facility property | **EPE ENV** | | | Yes | |
| 10 | Property legal description | **EPE ENV** | | | | |
| **Turbines Normal Operations** | | | | | | |
| **Manufacturer's simple cycle combustion turbine maximum design parameters including the following:** | | | | | | |
| 11 | Manufacturer Rated Output per GT, ISO in MW (net and gross) | **Mitsubishi/EPE** | | | 241.9MW gross, 237.9MW net (59F, 60%RH, 12.693psia, inlet cond. off) | |
| 12 | Manufacturer's design heat rate at Base load, ISO in Btu/kW-hr | **Mitsubishi/EPE** | | | 9,799 BTU/kWh-gross HHV (59F, 60%RH, 12.693psia, inlet cond. off) | |
| 13 | Proposed Site Operating Range in MW (i.e., minimum base load to maximum output) | **Mitsubishi/EPE** | | | 65.7MW | Based on -9.2F, 60%RH output minus 105F, 13%RH, inlet cond. Off output |

| | | | | |
|---|---|---|---|---|
| 14 | Fuel flow rate on a design maximum basis (per turbine) [klb/hr. and MMBtu/hr., HHV] | **Mitsubishi/EPE** | 114.1 klb/hr<br>2,593 MMBTU/hr-HHV | Based on -9.2F, 60%RH |
| 15 | Manufacturer's simple cycle combustion turbine air pollution controls including the following: | | | |
| 16 | Will the units be equipped with a SCR system. | **Mitsubishi/EPE** | Hot SCR | |
| 17 | What is the required minimum temperature of the SCR catalyst to ensure emission guarantees (°F); | **Mitsubishi/EPE** | 482F | |
| 18 | Will the units be equipped with a CO catalyst system? | **Mitsubishi/EPE** | Yes (dual function catalyst) | |
| 19 | What is the required minimum temperature of the CO catalyst to ensure emission guarantees (°F); | **Mitsubishi/EPE** | 482F | |
| 20 | Natural Gas Fuel Composition used by Mitsubishi for calculating stack gas parameters and pollutant emissions. | **Mitsubishi/EPE** | Fuel gas composition normalized to (mol%), 92.053% $CH_4$, 4.925% $C_2H_6$, 0.475% $C_3H_8$, 0.036% n-$C_4H_{10}$, 0.02% i-$C_4H_{10}$, 0.044% n-$C_5H_{12}$, 0.006% i-$C_5H_{12}$, 0.003% $C_6H_{14}$, 2.242% $N_2$, 0.195% $CO_2$ | |
| **Manufacturer's simple cycle combustion turbine performance data and/or technical specification sheets for the electric-generating units (EGU) at the Newman facility, for the minimum and maximum ambient conditions and under the various operating scenarios ( % load) on a high heating value (HHV) basis including the following information for each case:** | | | | |
| 21 | Ambient temperature (°F); | **Mitsubishi/EPE** | -10 (MHPS Case 19) | |
| 22 | Relative Humidity (%); | **Mitsubishi/EPE** | 60 (MHPS Case 19) | |
| 23 | Load (%); | **Mitsubishi/EPE** | Base (MHPS Case 19) | |
| 24 | Gross Output at Combustion Turbine Generator, low heating value (LHV) basis (kW); | **Mitsubishi/EPE** | 257,600 | |
| 25 | Total Heat Input, LHV (MMBtu/hr.); | **Mitsubishi/EPE** | 2,282 | |
| 26 | Total Heat Input, HHV (MMBtu/hr.); | **Mitsubishi/EPE** | 2,530 | |
| 27 | Fuel flow to Gas Turbine (klb/hr.); | **Mitsubishi/EPE** | 111.3 | |
| 28 | Stack Exhaust flow (klb/hr.); | **Mitsubishi/EPE** | 6,462 (case 19) | |
| 29 | Stack Exhaust flow (fps); | **Mitsubishi/EPE** | 91 (case 19) | |
| 30 | Stack Exhaust gas temperature (° F); | **Mitsubishi/EPE** | 825F (maximum) | |
| 31 | Speciated Stack Exhaust Flue Gas Composition (Vol %) | **Mitsubishi/EPE** | See attached | |
| 32 | Exhaust Gas Molar Mass (kg/kmol); | **Mitsubishi/EPE** | See attached | |
| 33 | Emission rates of the following: | **Mitsubishi/EPE** | | |
| 34 | NOX (ppmvd @ 15% O2); | **Mitsubishi/EPE** | 2.5 | |
| 35 | NOX (as NO2) [lb/hr.]; | **Mitsubishi/EPE** | 25.2 | |
| 36 | CO (ppmvd @ 15% O2); | **Mitsubishi/EPE** | 3 | |
| 37 | CO (lb/hr.); | **Mitsubishi/EPE** | 18.4 | |
| 38 | VOC (ppmvd @ 15% O2); | **Mitsubishi/EPE** | 2 | |
| 39 | VOC (lb/hr.); | **Mitsubishi/EPE** | 7 | |
| 40 | PM10 (ppmvd @ 15% O2); | **Mitsubishi/EPE** | | |
| 41 | PM10 (lb/hr.); | **Mitsubishi/EPE** | 7 | |
| 42 | NH3 Slip (ppmvd @ 15% O2), if applicable; | **Mitsubishi/EPE** | 5 | |
| 43 | NH3 Slip (lb/hr.), if applicable; | **Mitsubishi/EPE** | 18.7 | Spec sheet says that it is 0.19% ammonia by |
| 44 | SO2 (ppmvd @ 15% O2); | **Mitsubishi/EPE** | 0.2 | |
| 45 | SO2 (lb/hr.); | **Mitsubishi/EPE** | 1.54 | |
| 46 | H2SO4 (ppmvd @ 15% O2); worst case value | **Mitsubishi/EPE** | 0.1 | |
| 47 | H2SO4 (lb/hr.); worst case value | **Mitsubishi/EPE** | 1.41 | |
| 48 | Formaldehyde (ppbvd @ 15% O2); worst case value | **Mitsubishi/EPE** | 91 | |
| 49 | Formaldehyde (lb/hr.); worst case value | **Mitsubishi/EPE** | 0.6 | |
| 50 | CO2 (ppmvd @ 15% O2); | **Mitsubishi/EPE** | | |
| 51 | CO2 (lb/hr.); | **Mitsubishi/EPE** | 300,700 | |
| 52 | CH4 (ppmvd @ 15% O2); worst case value | **Mitsubishi/EPE** | 5 | |
| 53 | CH4 (lb/hr.); worst case value | **Mitsubishi/EPE** | 17.6 | |
| 54 | N2O (ppmvd @ 15% O2); worst case value | **Mitsubishi/EPE** | Later | |
| 55 | N2O (lb/hr.); worst case value | **Mitsubishi/EPE** | Later | |
| 56 | Stack Diameter (ft.); | **S&L** | 31 | |
| 57 | Stack Height (ft.); | **S&L** | 155 | SWCA - the Permit application asks for build |
| 58 | Stack location (UTM coordinates); | **S&L** | | |
| **Turbines Startup and Shutdown** | | | | |
| 59 | Describe the startup. | **Mitsubishi/EPE** | Prior to startup, the GT must be in turning gear and all necessary BOP systems must be ready to support the GT startup. Upon push button, the GT accelerates to the ignition speed. At this point, purge can take place, if no purge credit is applied. After purge, if any, the GT combustors will undergo ignition process. After ignition, the GT will accelerate to synchronization speed. Upon synchronization, the GT will increase to approx. 5% load and then load-up to the selected load. | |

| | | | | |
|---|---|---|---|---|
| **Hot Start** | | | | |
| 60 | Define hot start in hours since standstill | **Mitsubishi/EPE** | NA | |
| 61 | Duration of Hot start in minutes from ignition to 50% load and to base load. | **Mitsubishi/EPE** | 24min and 35min respectively | |
| 62 | Annual number of hot start events from turbine. | **Mitsubishi/EPE** | | |
| 63 | Max Daily number of hot starts from turbine. | **Mitsubishi/EPE** | | |
| 64 | Average Stack Temp during hot start at min ambient temp (°F) | **Mitsubishi/EPE** | 703degF | |
| 65 | Average Stack Temp during hot start at max ambient temp (°F) | **Mitsubishi/EPE** | 761degF | |
| 66 | Average Stack Velocity during hot start at min ambient temp (fps) | **Mitsubishi/EPE** | 50ft/s | |
| 67 | Average Stack Velocity during hot start at max ambient temp (fps) | **Mitsubishi/EPE** | 53ft/s | |
| 68 | Total emissions of CO,NOx,VOC, CH4, and CO2 per hot start event at min ambient temp in lbs. | **Mitsubishi/EPE** | Ignition to 50% load: 25lbs of Nox, 547lbs of CO, 310lbs of VOC, 1655lbs of CH4, and 27,700lbs of CO2.<br><br>Ignition to base load: 48lbs of Nox, 548lbs of CO, 310lbs of VOC, 1657lbs of CH4, and 75,600lbs of CO2. | VOC excludes methane and ethane. VOC molecular weight is that of methane. CH4 estimated as UHC - VOC.<br><br>Is there a way to estimate formaldehyde emissions during start up? |
| 69 | Total emissions of CO,NOx,VOC, CH4, and CO2 per hot start event at max ambient temp in lbs. | **Mitsubishi/EPE** | Ignition to 50% load: 21lbs of NOx, 339lbs of CO, 187lbs of VOC, 1335lbs of CH4, and 25,900lbs of CO2.<br><br>Ignition to base load: 33lbs of NOx, 340lbs of CO, 187lbs of VOC, 1337lbs of CH4, and 65,000lbs of CO2. | VOC excludes methane and ethane. VOC molecular weight is that of methane. CH4 estimated as UHC - VOC. |
| **Warm Start** | | | | |
| 70 | Define warm start in hours since standstill | **Mitsubishi/EPE** | No difference between Cold, Warm and Hot starts for this simple cycle unit | |
| 71 | Duration of warm start in minutes from first fire. | **Mitsubishi/EPE** | | |
| 72 | Annual number of warm start events. | **Mitsubishi/EPE** | | |
| 73 | Max daily number of warm start events. | **Mitsubishi/EPE** | | |
| 74 | Average Stack Temp during warm start at min ambient temp (°F) | **Mitsubishi/EPE** | | |
| 75 | Average Stack Temp during warm start at max ambient temp (°F) | **Mitsubishi/EPE** | | |
| 76 | Average Stack Velocity during warm start at min ambient temp (fps) | **Mitsubishi/EPE** | | |
| 77 | Average Stack Velocity during warm start at max ambient temp (fps) | **Mitsubishi/EPE** | | |
| 78 | Total emissions of CO,NOx,VOC, CH4, and CO2 per warm start event at min ambient temp in lbs. | **Mitsubishi/EPE** | | |
| 79 | Total emissions of CO,NOx,VOC, CH4, and CO2 per warm start event at max ambient temp in lbs. | **Mitsubishi/EPE** | | |
| **Cold Start** | | | | |
| 80 | Define cold start in hours since standstill | **Mitsubishi/EPE** | No difference between Cold, Warm and Hot starts for this simple cycle unit | |
| 81 | Duration of cold start in minutes from first fire. | **Mitsubishi/EPE** | | |
| 82 | Annual number of cold start events. | **Mitsubishi/EPE** | | |
| 83 | Max daily number of cold start event. | **Mitsubishi/EPE** | | |
| 84 | Average Stack Temp during cold start at min ambient temp (°F) | **Mitsubishi/EPE** | | |
| 85 | Average Stack Temp during cold start at max ambient temp (°F) | **Mitsubishi/EPE** | | |
| 86 | Average Stack Velocity during cold start at min ambient temp (fps) | **Mitsubishi/EPE** | | |
| 87 | Average Stack Velocity during cold start at max ambient temp (fps) | **Mitsubishi/EPE** | | |
| 88 | Total emissions of CO,NOx,VOC, CH4, and CO2 per cold start event at min ambient temp in lbs. | **Mitsubishi/EPE** | | |
| 89 | Total emissions of CO,NOx,VOC, CH4, and CO2 per cold start event at max ambient temp in lbs. | **Mitsubishi/EPE** | | |
| **Shutdown** | | | | |
| 90 | Duration of shutdown event from normal operations (at base load) to flame out in minutes | **Mitsubishi/EPE** | 20min | |
| 91 | Annual number of shutdown events. | **Mitsubishi/EPE** | By EPE | |
| 92 | Max Daily number of shutdown events. | **Mitsubishi/EPE** | By EPE | |
| 93 | Average Stack Temp during shutdown at min ambient temp (°F) | **Mitsubishi/EPE** | 779degF | |
| 94 | Average Stack Temp during shutdown at max ambient temp (°F) | **Mitsubishi/EPE** | 816degF | |

| | | | | |
|---|---|---|---|---|
| 95 | Average Stack Velocity during shutdown at min ambient temp (fps) | **Mitsubishi/EPE** | 61ft/s | |
| 96 | Average Stack Velocity during shutdown at max ambient temp (fps) | **Mitsubishi/EPE** | 65ft/s | |
| 97 | Total emissions of CO,NOx,VOC, CH4, CO2 per shutdown event at min ambient temp in lbs. | **Mitsubishi/EPE** | 31lbs of NOx, 326lbs of CO, 153lbs of VOC, 1365lbs of CH4, and 51,700lbs of CO2. | VOC excludes methane and ethane. VOC molecular weight is that of methane. CH4 estimated as UHC - VOC. |
| 98 | Total emissions of CO,NOx,VOC, CH4, and CO2 per shutdown event at max ambient temp in lbs. | **Mitsubishi/EPE** | 25lbs of NOx, 246lbs of CO, 103lbs of VOC, 900lbs of CH4, and 43,500lbs of CO2. | VOC excludes methane and ethane. VOC molecular weight is that of methane. CH4 estimated as UHC - VOC. |
| **Tanks** | | | | |
| **Lube Oil** | | | | |
| 99 | Will combustion turbine have its own lube oil reservoir? | **EPE** | | |
| 100 | What are the dimensions (LxWxD [ft.]) and capacity (gal) of each reservoir? | **EPE** | | |
| 101 | What type of oil are these anticipated to use? Please provide MSDS. | **EPE** | | |
| 102 | Are they closed systems? | **EPE** | | |
| **Ammonia Storage tank (if applicable)** | | | | |
| 103 | Capacity of tank (gallons) | **Mitsubishi/EPE** | Not provided by MHPS. 20,000 gallon tanks are typical | Tank is closed system. |
| 104 | Annual consumption of ammonia (gallons) | **Mitsubishi/EPE** | 600 lb/hr max (gal/yr to be determined based on operating hours) | |
| **Circuit Breakers Containing SF6** | | | | |
| 105 | Number of SF6 circuit breakers | **EPE T&D** | | |
| 106 | Breaker type (kilovolt) | **EPE T&D** | | |
| 107 | Pounds SF6 per circuit breaker | **EPE T&D** | | |
| **Margins** | | | | |
| 108 | What is the anticipated performance degradation during the first 36,000 hours for heat rate (%)? | **Mitsubishi** | approx. 1.8% (increase) | |
| 109 | What is the anticipated performance degradation during the first 36,000 hours for [owner output (%)? | **Mitsubishi** | approx. 2.8% (decrease) | |
| 110 | What is the anticipated degradation during year 20 and 25 (%)? | **Mitsubishi** | Depends on EPE's expected operating profile. A degredation curve will be provided with SUSD emissions. | Comment from Mitsubishi indicates EPE will need to be involved. |
| **Internal Combustion engines (Firewater pump(s))** | | | | |
| 111 | How many pumps will be used? | **EPE/S&L** | | |
| 112 | Are control devices installed? What control technology? | **EPE/S&L** | No - EPA certified diesel engine | |
| 113 | What fuel will be used in the engine? | **EPE/S&L** | Diesel | |
| 114 | Which Emissions Tier (4?) | **EPE/S&L** | Vendor Data Provided | |
| 115 | Manufacture's emission specs for: | **EPE/S&L** | | |
| 116 | CO (g/bhp-hr) | **EPE/S&L** | 0.6 | |
| 117 | NOx (g/bhp-hr) | **EPE/S&L** | 2.53 | |
| 118 | VOC (g/bhp-hr) | **EPE/S&L** | 0.24 (Total HC) | |
| 119 | PM (g/bhp-hr) | **EPE/S&L** | 0.16 | |
| 120 | Fuel Consumption Rate (per engine) | **EPE/S&L** | SWCA will use 7,000 Btu/hp-hr AP-42 default unless otherwise specified. | |
| 121 | Stack Height (ft.) | **EPE/S&L** | | |
| 122 | Stack Temperature (°F) | **EPE/S&L** | | |
| 123 | Stack Exit Velocity (fps) | **EPE/S&L** | | |
| 124 | Stack Diameter (ft.) | **EPE/S&L** | | |
| 125 | Engine rating HP (each) | **EPE/S&L** | 99 | |
| 126 | How many hours per year for maintenance/testing (per unit) | **EPE/S&L** | | |
| 127 | Maximum hours that one non emergency use event may last (for each unit) | **EPE/S&L** | | |
| 128 | Can engines be tested separately, do they ever need to run at the same time in non emergency situations, if applicable? | **EPE/S&L** | | |
| **Natural Gas-Fired gas heater** | | | | |
| 129 | Heater Rating (MMBTU/hr) | **EPE/S&L** | Provided by EPE | |
| 130 | Manufacture's emission specs (if available) for: | **EPE/S&L** | | |
| 131 | CO (g/bhp-hr) | **EPE/S&L** | Provided by EPE | |
| 132 | NOx (g/bhp-hr) | **EPE/S&L** | Provided by EPE | |
| 133 | VOC (g/bhp-hr) | **EPE/S&L** | Provided by EPE | |
| 134 | PM (g/bhp-hr) | **EPE/S&L** | Provided by EPE | |
| 135 | Stack Height (ft.) | **EPE/S&L** | Provided by EPE | |
| 136 | Stack Temperature (°F) | **EPE/S&L** | | |
| 137 | Stack Exit Velocity (fps) | **EPE/S&L** | Provided by EPE | |
| 138 | Stack Diameter (ft.) | **EPE/S&L** | | |
| 140 | How many hours per year of operation? | **EPE/S&L** | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | COMMERCIAL DATA | | | | | | | | | | | | | | |
| Customer | | **El Paso Electric** | | | | | | | | | | | | | | |
| Project Name | | **El Paso, TX** | | | | | | | | | | | | | | |
| Manufacturer | | **Mitsubishi Hitachi Power Systems Americas Inc.** | | | | | | | | | | | | | | |
| INPUT INFORMATION | | | | | | | | | | | | | | | | |
| Gas Turbine Type | | **M501GAC** | | | | | | | | | | | | | | |
| Configuration & Arrangement | | **GT Only 1x0 with Hot SCR** | | | | | | | | | | | | | | |
| Scope | | **GT Only** | | | | | | | | | | | | | | |
| Fuel Type | | **Natural Gas** | | | | | | | | | | | | | | |
| Fuel Heat Input HHV | Btu/lb | 22,732 | | | | | | | | | | | | | | |
| Fuel Heat Input LHV | Btu/lb | 20,501 | | | | | | | | | | | | | | |
| CASE # | | 1 | 2 | 5 | 6 | 7 | 10 | 11 | 14 | 15 | 18 | 19 | 22 | 29 | 30 | 31 |
| Performance Guarantee Point | (Y/N) | Y | | | | | | | | | | | | | | |
| Ambient Dry Bulb Temperature | °F | 105.0 | 105.0 | 105.0 | 70.0 | 70.0 | 70.0 | 35.0 | 35.0 | 26.0 | 26.0 | -10.0 | -10.0 | -9.2 | 113.0 | 113.0 |
| Barometric Pressure | psia | 12.693 | 12.693 | 12.693 | 12.693 | 12.693 | 12.693 | 12.693 | 12.693 | 12.693 | 12.693 | 12.693 | 12.693 | 12.693 | 12.693 | 12.693 |
| Relative Humidity | % | 13.0 | 13.0 | 13.0 | 50.0 | 50.0 | 50.0 | 67.0 | 67.0 | 23.2 | 23.2 | 60.0 | 60.0 | 60.0 | 13.0 | 13.0 |
| Inlet Conditioning | On/Off | ON | OFF | OFF | ON | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | ON |
| GT PERFORMANCE (per GT) | | | | | | | | | | | | | | | | |
| GT Load | % | Base | Base | 55% | Base | Base | 50% | Base | 50% | Base | 50% | Base | 50% | Base | Base | Base |
| GT Heat Input | MMBtu/h - HHV | 2,307 | 2,068 | 1,371 | 2,382 | 2,312 | 1,398 | 2,517 | 1,493 | 2,545 | 1,515 | 2,529 | 1,616 | 2,593 | 2,008 | 2,276 |
| GT EXHAUST CONDITIONS @ GT FLANGE (per GT) | | | | | | | | | | | | | | | | |
| GT Exhaust Flow | kpph | 4,240 | 3,963 | 2,693 | 4,361 | 4,274 | 2,666 | 4,575 | 2,760 | 4,607 | 2,793 | 4,505 | 2,925 | 4,568 | 3,885 | 4,188 |
| GT Exhaust Temperature | °F | 1,163 | 1,166 | 1,247 | 1,157 | 1,159 | 1,247 | 1,146 | 1,241 | 1,144 | 1,234 | 1,143 | 1,217 | 1,141 | 1,166 | 1,166 |
| Max. Allowable Pressure Loss (Total) | inH2O | 14.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Max. Allowable Pressure Loss (Static) | inH2O | 10.9 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| GT Exhaust Gas Composition | vol% | | | | | | | | | | | | | | | |
| O2 | | 11.66 | 12.22 | 12.44 | 11.71 | 11.86 | 12.13 | 11.87 | 12.02 | 11.89 | 12.06 | 11.76 | 11.93 | 11.66 | 12.25 | 11.60 |
| CO2 | | 4.07 | 3.93 | 3.82 | 4.10 | 4.07 | 3.94 | 4.15 | 4.08 | 4.17 | 4.09 | 4.24 | 4.16 | 4.28 | 3.89 | 4.07 |
| H2O | | 10.11 | 8.69 | 8.49 | 9.67 | 9.24 | 9.01 | 8.53 | 8.39 | 8.20 | 8.04 | 8.26 | 8.12 | 8.35 | 8.89 | 10.47 |
| N2 | | 73.24 | 74.23 | 74.32 | 73.60 | 73.90 | 73.98 | 74.52 | 74.58 | 74.80 | 74.87 | 74.80 | 74.84 | 74.76 | 74.04 | 72.95 |
| Ar | | 0.92 | 0.93 | 0.93 | 0.92 | 0.93 | 0.93 | 0.93 | 0.93 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.93 | 0.92 |
| GT Exhaust Gas Molecular Weight | | 28.23 | 28.37 | 28.38 | 28.28 | 28.32 | 28.34 | 28.41 | 28.42 | 28.45 | 28.46 | 28.45 | 28.46 | 28.44 | 28.35 | 28.19 |
| STACK EMISSIONS (per Stack) | | | | | | | | | | | | | | | | |
| NOx (abated) | ppmvd@15% O2 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| NOx (abated) | lb/h | 23.0 | 20.6 | 13.6 | 23.8 | 23.1 | 13.9 | 25.1 | 14.9 | 25.4 | 15.1 | 25.2 | 16.1 | 25.9 | 20.0 | 22.7 |
| NOx (abated) | lb/MMBtu - HHV | 0.00998 | 0.00997 | 0.00995 | 0.00997 | 0.00997 | 0.00997 | 0.00997 | 0.00997 | 0.00998 | 0.00997 | 0.00998 | 0.00996 | 0.00997 | 0.00996 | 0.00998 |
| CO (abated) | ppmvd@15% O2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO (abated) | lb/h | 16.8 | 15.1 | 10.0 | 17.4 | 16.8 | 10.2 | 18.3 | 10.9 | 18.6 | 11.0 | 18.4 | 11.8 | 18.9 | 14.6 | 16.6 |
| CO (abated) | lb/MMBtu - HHV | 0.00729 | 0.00728 | 0.00727 | 0.00728 | 0.00728 | 0.00728 | 0.00728 | 0.00728 | 0.00729 | 0.00728 | 0.00729 | 0.00728 | 0.00729 | 0.00728 | 0.00729 |
| VOC (abated) | ppmvd@15% O2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| VOC (abated) | lb/h | 6.4 | 5.7 | 3.8 | 6.6 | 6.4 | 3.9 | 7.0 | 4.2 | 7.1 | 4.2 | 7.0 | 4.5 | 7.2 | 5.6 | 6.3 |
| VOC (abated) | lb/MMBtu - HHV | 0.00278 | 0.00278 | 0.00278 | 0.00278 | 0.00278 | 0.00278 | 0.00278 | 0.00278 | 0.00278 | 0.00278 | 0.00278 | 0.00278 | 0.00278 | 0.00278 | 0.00278 |
| Formaldehyde (abated) | ppbvd@15% O2 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| Formaldehyde (abated) | lb/h | 0.48 | 0.43 | 0.28 | 0.50 | 0.48 | 0.29 | 0.52 | 0.31 | 0.53 | 0.32 | 0.53 | 0.34 | 0.54 | 0.42 | 0.47 |
| Formaldehyde (abated) | lb/MMBtu - HHV | 0.00021 | 0.00021 | 0.00021 | 0.00021 | 0.00021 | 0.00021 | 0.00021 | 0.00021 | 0.00021 | 0.00021 | 0.00021 | 0.00021 | 0.00021 | 0.00021 | 0.00021 |
| Particulates (PM10 Total) | lb/h | 6.4 | 6.0 | 4.0 | 6.6 | 6.5 | 4.0 | 7.0 | 4.2 | 7.1 | 4.3 | 7.0 | 4.5 | 7.1 | 5.8 | 6.3 |
| Particulates (PM10 Total) | lb/MMBtu - HHV | 0.00279 | 0.00289 | 0.00295 | 0.00279 | 0.00281 | 0.00288 | 0.00279 | 0.00283 | 0.00279 | 0.00282 | 0.00275 | 0.00279 | 0.00273 | 0.00291 | 0.00279 |
| H2SO4 | lb/h | 1.3 | 1.1 | 0.8 | 1.3 | 1.3 | 0.8 | 1.4 | 0.8 | 1.4 | 0.8 | 1.4 | 0.9 | 1.4 | 1.1 | 1.3 |
| H2SO4 | lb/MMBtu - HHV | 0.00055 | 0.00055 | 0.00055 | 0.00055 | 0.00055 | 0.00055 | 0.00055 | 0.00055 | 0.00055 | 0.00055 | 0.00055 | 0.00055 | 0.00055 | 0.00055 | 0.00055 |
| Ammonia Consumption | lb/h | 489 | 438 | 290 | 505 | 490 | 296 | 533 | 316 | 540 | 321 | 536 | 341 | 550 | 425 | 482 |
| Ammonia Slip (NH3) | ppmvd@15% O2 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Ammonia Slip (NH3) | lb/h | 17.0 | 15.3 | 10.1 | 17.6 | 17.1 | 10.3 | 18.6 | 11.0 | 18.8 | 11.2 | 18.7 | 11.9 | 19.1 | 14.8 | 16.8 |
| Ammonia Slip (NH3) | lb/MMBtu - HHV | 0.00739 | 0.00738 | 0.00737 | 0.00738 | 0.00738 | 0.00738 | 0.00738 | 0.00738 | 0.00739 | 0.00738 | 0.00739 | 0.00737 | 0.00738 | 0.00737 | 0.00739 |
| Hot SCR EXHAUST CONDITIONS @ Stack (per Stack) | | | | | | | | | | | | | | | | |
| Hot SCR Stack Exhaust Flow | kpph | 6,523 | 6,095 | 4,492 | 6,550 | 6,428 | 4,369 | 6,694 | 4,421 | 6,700 | 4,431 | 6,462 | 4,496 | 6,542 | 5,996 | 6,486 |
| Hot SCR Stack Exhaust Volumetric Flow | acfm | 4,029,414 | 3,752,178 | 2,760,176 | 4,040,786 | 3,960,881 | 2,688,871 | 4,113,454 | 2,713,560 | 4,111,283 | 2,715,984 | 3,965,694 | 2,756,772 | 4,015,933 | 3,684,835 | 4,007,954 |
| Hot SCR Stack Exhaust Velocity | ft/s | 93 | 87 | 64 | 93 | 91 | 62 | 95 | 63 | 95 | 63 | 91 | 64 | 93 | 85 | 92 |
| Attemperated Fluegas (Hot SCR Inlet/Outlet) Temperature | °F | 825 | 825 | 825 | 825 | 825 | 825 | 825 | 825 | 825 | 825 | 825 | 825 | 825 | 825 | 825 |
| Hot SCR Stack Exhaust Gas Composition | vol% | | | | | | | | | | | | | | | |
| O2 | | 14.78 | 15.16 | 15.72 | 14.66 | 14.77 | 15.42 | 14.68 | 15.30 | 14.68 | 15.30 | 14.50 | 15.04 | 14.42 | 15.18 | 14.76 |
| CO2 | | 2.68 | 2.58 | 2.32 | 2.76 | 2.73 | 2.43 | 2.86 | 2.57 | 2.89 | 2.61 | 2.98 | 2.73 | 3.01 | 2.55 | 2.66 |
| H2O | | 7.02 | 6.08 | 5.58 | 6.96 | 6.66 | 6.09 | 6.03 | 5.47 | 5.71 | 5.14 | 5.80 | 5.33 | 5.88 | 6.30 | 7.32 |
| N2 | | 74.60 | 75.26 | 75.46 | 74.71 | 74.91 | 75.13 | 75.51 | 75.73 | 75.78 | 76.01 | 75.77 | 75.95 | 75.74 | 75.06 | 74.35 |
| Ar | | 0.92 | 0.93 | 0.93 | 0.92 | 0.93 | 0.93 | 0.93 | 0.93 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.93 | 0.92 |
| Hot SCR Stack Exhaust Gas Molecular Weight | | 28.44 | 28.53 | 28.56 | 28.45 | 28.48 | 28.52 | 28.56 | 28.60 | 28.60 | 28.64 | 28.60 | 28.63 | 28.59 | 28.51 | 28.41 |

NOTES (Performance notes apply to all cases unless otherwise specified.):

1 Seller shall provide all requested data identified as "By Seller" as a minimum.
2 Emissions shall be tested in accordance with the following EPA methods: NOx: 20, CO: 10, VOC: 25/18, NH3: CTM-027, PM10: Non-condensables using Method 201 or 201A and condensables using Method 202.
**3** VOC's are expressed as non-methane and non-ethane basis assuming equivalent molecular weight of methane.
4 0.2 gr/100scf of sulfur and 0% fuel bound nitrogen (FBN) are considered in the fuel.
5 Fuel gas composition (vol%), 92.088% $CH_4$, 4.895% $C_2H_6$, 0.468% $C_3H_8$, 0.035% n-$C_4H_{10}$, 0.019% i-$C_4H_{10}$, 0.041% n-$C_5H_{12}$, 0.006% i-$C_5H_{12}$, 0.003% $C_6H_{14}$, , 2.247% $N_2$, 0.194% $CO_2$ normalized to 100%
6 Emissions shall be guaranteed for all parameters between MECL and Base Load.
7 Hot SCR exhaust gas duct loss shall be met for all conditions specified.
8 90% continues as SO2, 10% oxidixes at GT flange to SO3.

**El Paso Electric Company**

**AERSCREEN Analysis**

**Modeling Parameters**

| Parameter | Units | Case # | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **1** | **2** | **5** | **6** | **7** | **10** | **11** | **14** | **15** | **18** | **19** | **22** | **29** | **30** | **31** | **SU min** | **SU max** | **SD min** | **SD max** |
| GT Load | | Base | Base | 55% | Base | Base | 1 | Base | 1 | Base | 1 | Base | 1 | Base | Base | Base | hot start at min ambient temp (°F) | hot start at max ambient temp (°F) | shutdown at min ambient temp (°F) | shutdown at max ambient temp (°F) |
| Ambient Dry Bulb Temperature | °F | 105 | 105 | 105% | 70 | 70 | 70 | 35 | 35 | 26 | 26 | -10 | -10 | -9 | 113 | 113 | | | | |
| Relative Humidity | % | 13 | 13 | 13 | 50 | 50 | 50 | 67 | 67 | 23 | 23 | 60 | 60 | 60 | 13 | 13 | | | | |
| Exhaust Volumetric Flow | acfm | 4,029,414 | 3,752,178 | 2,760,176 | 4,040,786 | 3,960,881 | 2,688,871 | 4,113,454 | 2,713,560 | 4,111,283 | 2,715,984 | 3,965,694 | 2,756,772 | 4,015,933 | 3,684,835 | 4,007,954 | 2,264,401 | 2,400,163 | 2,762,452 | 2,943,597 |
| Exhaust Velocity | ft/s | 93 | 87 | 64 | 93 | 91 | 65 | 95 | 63 | 95 | 63 | 91 | 64 | 93 | 85 | 92 | 50 | 53 | 61 | 65 |
| Exhaust Temperature | °F | 825 | 825 | 825 | 825 | 825 | 825 | 825 | 825 | 825 | 825 | 825 | 825 | 825 | 825 | 825 | 703 | 761 | 779 | 816 |
| Stack Diameter | ft | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| Stack Height | ft | 155 | 155 | 155 | 155 | 155 | 155 | 155 | 155 | 155 | 155 | 155 | 155 | 155 | 155 | 155 | 155 | 155 | 155 | 155 |
| Emission Rate | lb/hr | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| $GLC_{max}$ | $\mu g/m^3$ | 0.046 | 0.051 | 0.083 | 0.046 | 0.048 | 0.081 | 0.044 | 0.085 | 0.044 | 0.085 | 0.048 | 0.083 | 0.046 | 0.053 | 0.047 | 0.127 | 0.113 | 0.092 | 0.081 |

# Appendix B. Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**
RESEARCH TRIANGLE PARK, NC 27711

APR 17 2018

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

**MEMORANDUM**

**SUBJECT:** Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program

**FROM:** Peter Tsirigotis
Director

**TO:** Regional Air Division Directors, Regions 1-10

The purpose of the attached document is to provide guidance on compliance demonstration tools for use with ozone and fine particles ($PM_{2.5}$) in the Prevention of Significant Deterioration (PSD) permitting program. The Environmental Protection Agency (EPA) has developed a new analytical approach and has used it to identify a significant impact level (SIL) for each ozone and $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) and for the $PM_{2.5}$ PSD increments. Permitting authorities may use these values to help determine whether a proposed PSD source causes or contributes to a violation of the corresponding NAAQS or PSD increments. Separately, we have developed a technical document that provides a detailed discussion of the technical analysis used in the development of these values and a legal memorandum that provides further detail on the legal basis that permitting authorities may choose to adopt to support using SILs to show that requirements for obtaining a PSD permit are satisfied.[1] This guidance provides a summary of the results of the technical analysis and information on the particular points in the PSD air quality analysis at which permitting authorities may decide to use these values on a case-by-case basis in the review of PSD permit applications. This guidance, and the technical and legal documents, are not final agency actions and do not create any binding requirements on permitting authorities, permit applicants or the public.

Please share this guidance with permitting authorities in your Region. If you have questions regarding the guidance, please contact Raj Rao at *rao.raj@epa.gov* or (919) 541-5344. For questions regarding the technical document, please contact Tyler Fox at *fox.tyler@epa.gov* or (919) 541-5562. For questions regarding the legal document, please contact Brian Doster at *doster.brian@epa.gov* or (202) 564-1932.

Attachment

[1] "Technical Basis for the EPA's Development of Significant Impact Thresholds for $PM_{2.5}$ and Ozone," EPA-454/R-18-001, April 2018; "Legal Memorandum: Application of Significant Impact Levels in the Air Quality Demonstration for Prevention of Significant Deterioration Permitting under the Clean Air Act," April 2018.

**Attachment**

# Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program

## I. INTRODUCTION

When a Prevention of Significant Deterioration (PSD) permit applicant has shown through air quality modeling that the projected air quality impact from a proposed source for a particular pollutant is not significant or meaningful, the EPA believes there is a valid analytical and legal basis in most cases for the permitting authority to conclude that the proposed source will not cause or contribute to a violation of a National Ambient Air Quality Standard (NAAQS) or PSD increment for that pollutant. To show that the proposed source will not have a significant or meaningful impact on air quality, permit applicants and permitting authorities may elect to use these Significant Impact Level (SIL) values (air quality concentration values) as a compliance demonstration tool. In this guidance and accompanying documents, the EPA has provided policy, technical and legal analyses that permitting authorities may choose to adopt in supporting the use of the SILs to make the required demonstration in particular PSD permitting actions. The use of SILs can help satisfy PSD requirements while expediting the permitting process and conserving resources for permit applicants and permitting authorities.

The EPA has previously issued guidance describing particular uses of SILs.[1,2,3,4] The EPA has also recognized that permitting authorities have the discretion to apply SILs on a case-by-case basis in the review of individual permit applications, provided such use is justified in the permitting record.[5] In an effort to reduce the need for case-by-case justification by permitting authorities, the EPA finalized a rule in 2010 to codify, among other things, particular $PM_{2.5}$ SIL values and specific

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[1] Memorandum from Stephen D. Page, EPA OAQPS, to EPA Regional Air Division Directors, "Guidance Concerning the Implementation of the 1-hour $SO_2$ NAAQS for the Prevention of Significant Deterioration Program," August 23, 2010.

[2] Memorandum from Stephen D. Page, EPA OAQPS, to EPA Regional Air Division Directors, "Guidance Concerning the Implementation of the 1-hour $NO_2$ NAAQS for the Prevention of Significant Deterioration Program," June 29, 2010.

[3] Memorandum from Stephen D. Page, EPA OAQPS, to OAQPS Personnel and EPA Regional Modelers, "Modeling Procedures for Demonstrating Compliance with $PM_{2.5}$ NAAQS," March 23, 2010.

[4] Memorandum from Gerald A. Emison, EPA OAQPS, to Thomas J. Maslany, EPA Air Management Division, EPA Region 3, "Air Quality Analysis for Prevention of Significant Deterioration (PSD)," July 5, 1988.

[5] Order Responding to Petitioner's Request that the Administrator Object to Issuance of a State Operating Permit, *In the Matter of CF&I Steel, L.P. dba EVRAZ Rocky Mountain Steel*, Petition Number VIII-2011-01, at 15-17 (May 31, 2012) (*"Rocky Mountain Steel Order"); In re: Mississippi Lime Company*, 15 E.A.D. 349, 375-379 (Environmental Appeals Board (EAB) 2011).

applications of those values ("2010 rulemaking").[6] However, in the course of subsequent litigation over this rule, the EPA conceded the regulation was flawed because it did not preserve the discretion of permitting authorities to require additional analysis in certain circumstances, and the court granted the EPA's request to vacate and remand the rule so that the EPA could address the flaw.[7]

Following the litigation, the EPA began developing a new rule to address the flaw identified in the 2010 rulemaking.[8] However, after further evaluation and the identification of a revised set of SIL values based on the technical and legal analyses described below, the EPA believes it should first obtain experience with the application of these values in the permitting program before establishing a generally applicable rule.[9] Thus, the EPA intends at this point to take a two-step approach.

First, the EPA is providing non-binding guidance so that we may gain valuable experience and information as permitting authorities use their discretion to apply and justify the application of the SIL values identified below on a case-by-case basis in the context of individual permitting decisions. We will be seeking to learn generally about permitting agencies' experiences in applying SILs in particular PSD permitting decisions. We will also be seeking more specific information, including how often and in what types of settings the application of a SIL at the single-source assessment and cumulative assessment stages of the PSD air quality analysis has made a critical difference in whether a conclusion was reached that the proposed source will not cause or contribute to a NAAQS or PSD increment violation. The EPA intends to obtain this information through its own PSD permitting activities in states that do not have SIP-approved PSD programs, regular discussions between our Regional offices and air agencies, regular conference calls with the permitting committees of national organizations of air agencies, and technical conferences of air quality modelers and others interested in permitting activities.

Second, the EPA will use this experience and information to assess, refine and, as appropriate, codify SIL values and specific applications of those values in a future, potentially binding rulemaking. During this second step, to assess whether it is appropriate to codify particular SIL

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[6] 75 FR 64864 (October 20, 2010).

[7] *Sierra Club v. EPA*, 705 F.3d 458, 463-66 (D.C. Cir. 2013). In its litigation brief at n. 10, the EPA stated an intent to issue guidance in the near future concerning $PM_{2.5}$ values remaining in 40 CFR 51.165(b)(2). The EPA issued such guidance in May 2014. Memorandum from Stephen D. Page, EPA OAQPS, to EPA Regional Air Division Directors, "Guidance for $PM_{2.5}$ Permit Modeling," May 20, 2014.

[8] Fall 2015 Regulatory Agenda, USEPA, 80 FR 78024, December 15, 2015. Ozone and Fine Particulate Matter ($PM_{2.5}$) Significant Impact Levels (SILs) for Prevention of Significant Deterioration (PSD), RIN: 2060-AR28. *http://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201510&RIN=2060-AR28.*

[9] *See SEC v. Chenery Corp.*, 332 U.S. 194, 199-203 (1947) (recognizing that some principles may warrant further development before they are ready to be codified in a rule of general applicability).

values for ozone and $PM_{2.5}$, the EPA will consider whether permitting experience has confirmed that the recommended SIL values are suitable in all circumstances to show that an increase in air quality concentration below the value does not cause or contribute to a violation of the NAAQS or PSD increments.

Permitting authorities retain discretion to use or not to use these EPA-derived SILs in particular PSD permitting actions. If a permitting authority chooses to use these SIL values to support a case-by-case permitting decision, it must justify the values and their use in the administrative record for the permitting action.[10] Permitting authorities also have discretion to develop their own SIL values, provided that such values are properly supported in the record for permitting actions or decisions in which the values are used to make the required showing. Detailed technical guidance on the development of alternative SIL values is beyond the scope of this document; however, we provide a limited discussion later in this document (*see*, e.g., page 12). This guidance (including the legal and technical documents) supporting the EPA's recommended SIL values may be viewed as a model for permitting authorities that seek to develop alternative SIL values. Permitting authorities may elect to utilize alternative "confidence intervals" as well as regional or local factors in developing their own SIL values.[11]

Since the 2010 rulemaking, the EPA has examined the legal basis for using SIL values in PSD air quality impact analyses. In addition, the EPA has sought to develop a stronger analytical foundation for the EPA recommended SIL values. This guidance and supporting documents are the products of this effort. They identify specific SIL values for ozone and $PM_{2.5}$ and provide a supporting justification that permitting authorities may choose to apply on a case-by-case basis. The values and supporting justification are designed so that permitting authorities can choose to apply the SIL values to demonstrate that a proposed source does not cause or contribute to a violation of NAAQS or PSD increments. In contrast to the 2010 rulemaking, we have developed separate SIL values for the $PM_{2.5}$ NAAQS and PSD increments, and we have developed SILs for the ozone NAAQS. Since there are no PSD increments for ozone, the EPA has not developed SILs for ozone.

The EPA believes that the application of these SILs in the manner described below would be sufficient in most situations for a permitting authority to conclude that a proposed source will not cause or contribute to a violation of an ozone or $PM_{2.5}$ NAAQS or $PM_{2.5}$ PSD increments. However, this guidance is not a final agency action and does not reflect a final determination by the EPA that any particular proposed source with a projected impact below the recommended SIL value does not cause or contribute to a violation. A determination that a proposed source does not cause or contribute to a violation can only be made by a permitting authority on a permit-specific basis after consideration of the permit record. This guidance is not legally binding and does not affect the rights or obligations of permit applicants, permitting authorities, or others. The SIL

[10] *Rocky Mountain Steel Order* at 16-18, supra footnote 5. Such a justification may incorporate the information compiled by the EPA to support the SILs recommended in this memorandum.
[11] A description of the "confidence interval" is provided at page 12 of this document and in the technical document at section 2.2 (Statistical Methods and Assessing Significance Using Confidence Intervals).

values identified by the EPA have no practical effect unless and until permitting authorities decide to use those values in particular permitting actions. The experience of permitting authorities using these SILs on a case-by-case basis, or in choosing to limit or forego their use in specific situations, will be valuable information for the EPA to consider in a future rulemaking. Permitting authorities retain the discretion to apply and justify different approaches and to require additional information from the permit applicant to make the required air quality impact demonstration, consistent with the relevant PSD permitting requirements.

## II. BACKGROUND

A PSD permit applicant must demonstrate that "emissions from construction or operation of such facility will not cause, or contribute to, air pollution in excess of any" NAAQS or PSD increment.[12] The EPA has reflected this requirement in its PSD regulations.[13] The Clean Air Act (Act) does not specify how a permit applicant or permitting authority is to make this demonstration, but section 165(e) authorizes the EPA to determine how the analysis is to be conducted, including the use of air quality models. In accordance with this authority, the EPA has promulgated regulations that identify such models and the conditions under which they may be used in the PSD program to make the demonstration required under the Act.[14]

Using the models identified in the EPA's regulations, there are two basic ways that a PSD permit applicant can demonstrate that the proposed source's emissions will not cause or contribute to a violation of a NAAQS or PSD increment. One way is to demonstrate that no such violation is occurring or projected to occur in the area affected by the emissions from the proposed source.[15] A second way is to demonstrate that the emissions from the proposed source do not cause or contribute to any identified violation of the NAAQS or PSD increments.[16]

The Act does not define "cause" or "contribute." Reading these terms in context, the EPA has historically interpreted this provision in section 165(a)(3) of the Act and associated regulations to mean that a source must have a "significant impact" on ambient air quality in order to cause or contribute to a violation.[17] Thus, the EPA and other permitting authorities have concluded that a

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[12] 42 U.S.C. 7475(a)(3) (section 165(a)(3) of the Act). The EPA interprets the phrase "in excess of" to mean a violation, not the exceedance described in 40 CFR 50.1(l).
[13] 40 CFR 51.166(k); 40 CFR 52.21(k).
[14] The PSD regulations at 40 CFR 51.166(l) and 52.21(l) require the use of "applicable models, data bases, and other requirements" specified in 40 CFR part 51, Appendix W, also known as the *Guideline on Air Quality Models (Guideline*).
[15] 1990 Draft New Source Review (NSR) Workshop Manual at C.51.
[16] 40 CFR part 51, App. W, § 9.2.3; 1990 Draft NSR Workshop Manual at C.52.
[17] *In re: Prairie State Generating Co*., 13 E.A.D. 1, 105 (EAB 2006). This EAB opinion includes a long discussion of the EPA's prior guidance with other examples.

proposed source may meet the requirements in section 165(a)(3) and the EPA's PSD regulations by showing that its projected impact on air quality at the site of a modeled violation is below a level of air quality impact considered to be significant.[18]

Historic Use of SILs

In the context of section 165(a)(3), the EPA has historically used pollutant-specific concentration levels known as "significant impact levels" to identify the degree of air quality impact that "causes, or contributes to" a violation of a NAAQS or PSD increment.[19] Consistent with the EPA guidance, proposed sources have met the requirement to demonstrate that they do not cause or contribute to a violation by showing that the ambient air quality impacts resulting from the proposed source's emissions would be below these concentration levels.[20] The SIL values have served as a compliance demonstration tool to make the required demonstration in the PSD program. They have helped to reduce the burden on permitting authorities and permit applicants to conduct often time-consuming and resource-intensive air dispersion modeling where such modeling was unnecessary to demonstrate that a permit applicant meets the requirements of section 165(a)(3), consistent with the procedures set forth originally in 1977 in the "Guidelines for Air Quality Maintenance Planning and Analysis, Volume 10 (Revised) and Procedures for Evaluating Air Quality Impact of New Stationary Sources."[21]

Recent Status of SILs for Ozone and $PM_{2.5}$

Since the inception of the PSD program, the EPA has faced technical challenges with providing compliance demonstration tools for those pollutants that are not directly emitted by sources (ozone and secondarily-formed $PM_{2.5}$) and which form through chemical reactions of precursor pollutants. In July 2010, the Sierra Club petitioned the EPA to initiate rulemaking regarding the establishment of air quality models for ozone and $PM_{2.5}$ for use by PSD permit applicants. In January 2012, the EPA granted the petition and committed to engage in rulemaking to evaluate whether updates to the *Guideline* are warranted and, as appropriate, incorporate new analytical techniques or models for ozone and secondarily-formed $PM_{2.5}$. In granting the petition, the EPA explained that the "complex chemistry of ozone and secondary formation of $PM_{2.5}$ are well-documented and have historically presented significant challenges to the designation of particular models for assessing

[18] 1990 Draft NSR Workshop Manual at C.52.
[19] 61 FR 38250, 38293 (July 23, 1996); 72 FR 54112, 54139 (September 21, 2007).
[20] 1990 Draft NSR Workshop Manual at C.51-C.52.
[21] October 1977, U.S. EPA, Office of Air Quality Planning and Standards, Research Triangle Park, NC 27711. The 1977 document did not discuss SILs, but did identify procedures for air quality analyses pursuant to the PSD program.

the impacts of individual stationary sources on the formation of these air pollutants"[22] Because of these considerations, the EPA's past judgment had been that it was not technically sound to designate with particularity specific models that must be used to assess the impacts of a single source on ozone and secondarily-formed $PM_{2.5}$ concentrations. Instead, the EPA established a consultation process with permitting authorities for determining (on a permit-specific basis) the analytical techniques that should be used for single-source analyses for both ozone and secondarily-formed $PM_{2.5}$.

The EPA has responded to the Sierra Club petition by finalizing revisions to the EPA's *Guideline*.[23] As discussed in the preamble to the *Guideline*, recent technical advances have made it reasonable for the EPA to provide more specific guidelines that identify appropriate analytical techniques or models that may be used in compliance demonstrations for the ozone and $PM_{2.5}$ NAAQS and $PM_{2.5}$ PSD increments. The revisions to the *Guideline* include criteria and process steps for choosing single-source analytical techniques or models to estimate ozone impacts from precursor nitrogen oxide (NOx) and volatile organic compound (VOC) emissions and to assess concentrations of direct and secondarily-formed $PM_{2.5}$. The ozone and $PM_{2.5}$ SIL values recommended in this guidance are intended to complement the *Guideline* updates by providing thresholds that may be used to determine whether an increase in air pollutant concentration (impact) predicted by the chosen technique or model causes or contributes to a violation.

In the 2010 rulemaking, the EPA established SIL values for $PM_{2.5}$ in paragraph (k)(2) of the PSD regulations at 40 CFR 51.166 and 52.21. In January 2013, the U.S. Court of Appeals for the District of Columbia Circuit granted the EPA's request to vacate and remand the paragraph (k)(2) provision in both PSD regulations so the EPA could correct them.[24] Paragraph (k)(2) as promulgated in 2010 included numerical values of $PM_{2.5}$ SILs and statements about their role in completing an air quality impact analysis with regard to the $PM_{2.5}$ NAAQS and PSD increments. Specifically, the 52.21(k)(2) rule text stated that if the impact of a proposed source seeking a federal PSD permit was below the relevant SIL value(s), then the proposed source would be deemed to not cause or contribute to a violation. The 51.166(k)(2) rule text stated that a state's PSD rules could contain a similar provision. The EPA asked the court to vacate and remand the (k)(2) paragraphs of both PSD regulations so that the EPA could correct an inconsistency between (1) that rule text, which left no discretion for the permitting authority, and (2) our statements in the preamble to the 2010 rulemaking, which identified certain circumstances where it may not be

[22] Letter from Gina McCarthy, Assistant Administrator, EPA Office of Air and Radiation, to Robert Ukeiley, Sierra Club, January 4, 2012.
[23] 82 FR 5182 (January 17, 2017).
[24] *Sierra Club v. EPA*, 705 F.3d 458, 466 (D.C. Cir. 2013).

appropriate for a permitting authority to rely solely on the $PM_{2.5}$ SILs as a basis for concluding that a proposed source does not cause or contribute to a violation.[25]

The court left intact the $PM_{2.5}$ NAAQS significance levels separately promulgated at 40 CFR 51.165(b)(2), because the regulatory text in that section did not say that a proposed source that has an impact less than the significance level is always deemed to not cause or contribute to a violation. The regulatory text at 40 CFR 51.165(b)(2) says that a major source or major modification with a projected impact greater than the listed significance level at any location that does not or would not meet the applicable NAAQS will be considered to cause or contribute to a violation, but this provision does not compel the opposite conclusion for projected impacts equal to or below that level.[26]

## III. RECOMMENDED SIL VALUES FOR USE IN AIR QUALITY IMPACT DEMONSTRATION REQUIRED TO OBTAIN A PSD PERMIT

As discussed above, the EPA has interpreted the phrase "cause, or contribute to" in section 165(a)(3) of the Act to mean that a proposed source will have a "significant impact" on air pollutant concentrations that violate the standards. In this context, the EPA believes permitting authorities may read the phrase "cause, or contribute to" in section 165(a)(3) to be inapplicable to an air quality impact that is insignificant. This interpretation is more fully explained in the legal memorandum. In the context of this section of the Act, the EPA believes an insignificant impact is an impact on air quality concentrations that is small and not meaningful (e.g., the EPA has often described such an impact as "trivial" or "*de minimis*").

As discussed in more detail in the legal memorandum, a permitting authority may conclude that a PSD permit applicant will "cause" a modeled violation of a NAAQS when the increased emissions from construction or modification of the proposed source are the reason for, responsible for, or the "but for" cause of the violation. However, a permitting authority must also consider whether emissions "contribute" to a violation in circumstances where a violation of the NAAQS is present before considering the proposed increase in emissions from a PSD construction project, or when

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[25] These preamble statements were the following: "[N]otwithstanding the existence of a SIL, permitting authorities should determine when it may be appropriate to conclude that even a *de minimis* impact will 'cause or contribute to' an air quality problem and to seek remedial action from the proposed new source or modification." *See* 75 FR 64864, 64892. "[T]he use of a SIL may not be appropriate when a substantial portion of any NAAQS or increment is known to be consumed." *See* 75 FR 64864, 64894. "[W]e earlier provided an example of when it might be appropriate to require a modified source to mitigate its contribution to a violation of a NAAQS or increment even when the predicted ambient impact of the proposed emissions increase would result in what is normally considered to be *de minimis*." *See* 75 FR 64864, 64894.

[26] 40 CFR 51.165(b)(2) is phrased such that an impact equal to the listed value is treated the same as impacts below the listed value. This contrasts to the approach in former 40 CFR 51.166(k)(2) and 52.21(k)(2), and, in this guidance, that an impact equal to the SIL is treated the same as impacts above the SIL.

emissions from multiple sources may impact a particular area. In the absence of specific language in section 165(a)(3) regarding the degree of contribution that is required (such as the term "significantly"), a permitting authority has the discretion under this provision to exercise its judgment to determine the degree of impact that contributes to adverse air quality conditions based on the particular context in which the term contribute is used. A permitting authority may also identify criteria or factors that may be used to determine whether something contributes, including qualitative or quantitative criteria that are appropriate to the particular context.[27]

For purposes of implementing section 165(a)(3) of the Act, the EPA has found it more expedient and practical to use a quantitative threshold (expressed as a level of change in air quality concentration) to determine whether increased emissions from proposed construction or modification of a source will cause or contribute to air quality concentrations in violation of applicable standards. One of the goals of the development of SILs as a compliance demonstration tool is to ensure an appropriate balance between maintenance of air quality and PSD permit process streamlining. The EPA believes that the permitting process can be streamlined without compromising air quality if the EPA and permitting authorities are able to identify a quantitative threshold or dividing line between an insignificant and a significant impact on air pollutant concentrations. Using a quantitative threshold for this purpose is permissible as long as the EPA or the appropriate permitting authority provides a reasoned explanation for why impacts below that value do not cause or contribute to a violation in a particular context.

Historical Approach for Developing SILs

To determine what is (and is not) a significant impact in the context of section 165(a)(3) of the Act, the EPA has previously supported using the levels in 40 CFR 51.165(b)(2).[28] The EPA has

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[27] *See Catawba County, N.C. v. EPA*, 571 F.3d 20, 39 (D.C. Cir. 2009). In this case interpreting the term "contributes" in section 107(d) of the Act, the court held that the EPA is not required to establish a quantitative or objective, bright-line test to define a contribution by sources to adverse air quality conditions in a nearby area in the context of designations with respect to attainment of a NAAQS. The court recognized that the EPA has the discretion to use a totality-of-the-circumstances test if the Agency defines and explains the criteria that it is applying. While this opinion said that a quantified threshold is not required to define "contribution" in the context of section 107(d), the court's reasoning does not preclude PSD permitting authorities from choosing to use a quantitative level of impact to represent a contribution to a violation of the NAAQS or PSD increment when implementing section 165(a)(3) of the Act.

[28] The Emison Memo, *supra* footnote 5, references 40 CFR 51.165(b)(2) for the purpose of defining "significant" in this context. The NSR Workshop Manual at C.26-C.28 lists values from 40 CFR 51.165(b)(2) for the purpose of defining the area of "significant ambient impact."

described these levels as "significance levels."[29] 40 CFR 51.165(b)(2) was originally promulgated by the EPA in 1987 as part of an offset provision permitting authorities could apply after it was determined that construction at a stationary source was predicted to cause or contribute to a violation of the NAAQS.[30] This regulation provides that a proposed source planning to locate in an attainment area will be considered to "cause or contribute to" a violation of the NAAQS if its impact would exceed specific values identified in the regulation. For example, 40 CFR 51.165(b)(2) states that a proposed source impact that is greater than 5 micrograms per cubic meter ($\mu g/m^3$) for the 24-hour sulfur dioxide ($SO_2$) NAAQS causes or contributes to a violation of that NAAQS. The section refers to these values as "significance levels." Values are not provided for every NAAQS, particularly ozone (and not for $PM_{2.5}$ until the 2010 rulemaking), but for those NAAQS covered in this regulation, the application is the same. Over time, these air quality concentration significance levels in 40 CFR 51.165(b)(2) have become known as "significant *impact* levels"[31] [emphasis added] in order to distinguish them from the significant *emissions rates* reflected in the definition of the term "significant," which serve a different function in the PSD program.[32] The EPA has also issued guidance memoranda that have provided recommended SIL values for the 1-hour nitrogen dioxide ($NO_2$) and $SO_2$ NAAQS, to be used for the purpose of determining what are (and are not) significant impacts for these pollutants in the context of the 1-hour standards.[33]

As referenced above, the EPA's values contained in 40 CFR 51.165(b)(2) originally were related to the level of protection afforded by the PSD increments that Congress established for Class I areas.[34] The EPA generally relied on that approach in 2010 by using the ratio of the $PM_{2.5}$ NAAQS

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[29] The EPA initially promulgated these same concentration values in 1978 and described them as the "minimum amount of ambient impact that is significant." 43 FR 26380, 26398 (June 19, 1978). In the 1979 Emissions Offset Interpretative Ruling (Appendix S to 40 CFR part 51), the EPA used these values as the "significance levels" under which a source locating in the "clean" portion of a nonattainment area may be exempt from the preconstruction review requirements. 44 FR 3274, 3283 (January 16, 1979). Under Appendix S, as revised in 1980, the EPA considered a source to "cause or contribute to" a violation if the impact of the source or modification would exceed these significance levels at any locality that does not meet the NAAQS. 45 FR 31307, 31311 (May 13, 1980).

[30] 52 FR 24672, 24713 (July 1, 1987).

[31] The first reference to "significant impact levels" is in the 1980 NSR Workshop Manual, which the EPA subsequently updated in the 1990 draft. It is worth noting that the 1977 comments to the proposed Appendix W rule (45 FR 58543) addressed whether a single-source screening technique should be used to determine if a cumulative modeling analysis would be required in a preconstruction review; industry and state agency comments indicated both groups favored some use of a tool to alleviate resource burden.

[32] 40 CFR 52.21(b)(23) defines the term "significant" and applies discrete values for determining if the emissions increase from a proposed source will be significant. This regulation states that an increase in emissions of each ozone precursor (VOC and NOx) is significant if it equals or exceeds 40 tons per year (tpy) and, for direct emissions of $PM_{2.5}$ the significance level is 10 tpy. For $PM_{2.5}$ precursor emissions, the significance level is 40 tpy for $SO_2$ and 40 tpy for NOx.

[33] Page memoranda, *supra* footnotes 1 and 2 of this attachment.

[34] 43 FR 26380, 26398.

to the particulate matter 10 micrometers or less in diameter ($PM_{10}$) NAAQS as a multiplier to add $PM_{2.5}$ values to 40 CFR 51.165(b)(2) and to establish $PM_{2.5}$ SIL values in 40 CFR 51.166(k)(2) and 52.21(k)(2).[35] However, given limitations in the rationale supporting them, the EPA recognized in the preamble to the 2010 rulemaking that a permitting authority may not be able to apply the SIL values derived through this approach in every situation to show that proposed construction does not cause or contribute to a violation of standards. The EPA acknowledged that "the use of a SIL may not be appropriate when a substantial portion of any NAAQS or increment is known to be consumed." The EPA also said that "notwithstanding the existence of a SIL, permitting authorities should determine when it may be appropriate to conclude that even a *de minimis* impact will 'cause or contribute to' an air quality problem and to seek remedial action from the proposed new source or modification."[36] To guard against the improper use of the 2010 SILs for $PM_{2.5}$ in such circumstances, the EPA later recommended that permitting authorities use those SILs only where they could establish that the difference between background concentrations in a particular area and the NAAQS was greater than those SIL values.[37] This approach was intended to guard against misuse of the SILs in situations where the existing air quality was already close to the NAAQS.

<u>Analytical Foundation for Recommended SILs</u>

Since the May 2014 $PM_{2.5}$ modeling guidance was issued, the EPA has conducted a statistical analysis that provides an improved analytical foundation for the EPA's selection, based on the policy considerations described below, of a degree of change in concentration that permitting authorities may use to represent an insignificant impact on air pollutant concentrations for ozone and $PM_{2.5}$ in the context of PSD permitting. This technical method, referred to as the air quality variability approach, is described in the technical document. Given the improvements reflected in this method, the EPA does not see a need for permitting authorities to show that the difference between background concentrations and the relevant NAAQS is greater than the SIL value before applying one of the recommended $PM_{2.5}$ SIL values. The EPA's intention with this new method was to derive SIL values that are more universally applicable to a range of conditions, including those where a substantial portion of the NAAQS or PSD increment is known to be consumed. However, permitting authorities retain discretion whether to apply SILs as a general matter, or in particular permitting actions, based on information in the permit record.

In order for a specific change in air quality concentrations to be used to show that a proposed source does not cause or contribute to a violation of the NAAQS, the concentration change must

[35] 75 FR 64890.
[36] 75 FR 64864, 64892.
[37] Memorandum from Stephen D. Page, EPA OAQPS, to EPA Regional Air Division Directors, "Guidance for $PM_{2.5}$ Permit Modeling," May 20, 2014.

represent a level of impact on ambient air quality that is not significant or meaningful. The EPA's judgment is that values representing such a level can be selected from a statistical analysis of the variability of air quality, using data from the U.S. ambient monitoring network for ozone and $PM_{2.5}$. Due to fluctuating meteorological conditions and changes in day-to-day operations of all air pollution sources in an area, there is an inherent variability in the air quality in the area surrounding a monitoring site. This variability can be characterized through the application of a well-established statistical framework for quantifying uncertainty.[38,39] The analysis described in the technical document quantifies the inherent variability in pollutant concentrations (as measured by design values) and informs the EPA's choice of a value for a change in concentrations that the EPA does not consider significant or meaningful because changes of this magnitude are well within the inherent variability of observed design values.[40] Once the precautionary choices described below are built into the calculation, this degree of change in concentration is, thus, indistinguishable from the inherent variability in the measured atmosphere and may be observed even in the absence of the increased emissions from a new or modified source. Therefore, a permitting authority can reasonably conclude that emissions of a proposed source that have a projected impact below the SIL values provided in this memorandum are not the reason for, responsible for, or the "but for" cause of a NAAQS violation. Likewise, this indicates that changes in air quality within this range are not meaningful, and, thus, do not contribute to a violation of the NAAQS.

Before delving in detail into the technical and policy considerations that inform the EPA's choice of the SILs recommended in this document, it is important to point out that the discretion of the EPA and other permitting authorities is limited by the 2010 rulemaking. Specifically, since the EPA has established by regulation that a $PM_{2.5}$ impact greater than a certain value will be considered to cause or contribute to a violation of the relevant NAAQS, permitting authorities may not use a value higher than 1.2 $\mu g/m^3$ for the 24-hour $PM_{2.5}$ NAAQS or a value higher than 0.3 $\mu g/m^3$ for the annual $PM_{2.5}$ NAAQS. Because ozone is not addressed in 40 CFR 51.165(b)(2), permitting authorities are not precluded from developing a higher ozone NAAQS SIL value than recommended in this guidance. Likewise, 40 CFR 51.165(b)(2) does not address PSD increments and, thus, does not constrain the discretion of a permitting authority to develop a higher SIL value and use it for PSD increment purposes.

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[38] Efron, B. (1979); "Bootstrap methods: Another look at the jackknife". The Annals of Statistics 7 (1): 1–26. doi:10.1214/aos/1176344552.

[39] Efron, B. (2003); Second Thoughts on the Bootstrap. Stat. Sci., 18, 135-140.

[40] The EPA conducted an external peer review of the technical document containing the statistical analysis used for developing the SILs for ozone and $PM_{2.5}$. The peer review comments were supportive of the air quality variability method as being appropriate for application for SILs. The comments also suggested several considerations for improvements to the technical document and analyses to better support the application of the analysis to determine specific SIL values. Therefore, the EPA made a number of revisions to the technical document, including conducting new analyses to investigate issues raised by the reviewers, edits to a number of sections for clarity and accuracy, and updating the analysis to include the most recent data. A peer review report that outlines the subsequent changes to the technical analysis is available from the U.S. EPA library, library number EPA 454/S-18-001.

Basis for Development of Recommended SILs for Ozone and $PM_{2.5}$

In developing the recommended SILs for ozone and $PM_{2.5}$, we assessed the variability in pollutant concentrations, as determined by the national monitoring network, from the design value at each monitor (i.e., baseline value). The technical analysis uses traditional statistical techniques based on statistical significance testing to characterize the variability in air quality. The conceptual underpinnings of the analysis are an application of the concept of "statistical significance" to inform a policy decision regarding what represents an insignificant impact and, therefore, may serve as the basis for developing a SIL for use in the air quality impact analyses required for PSD permitting. More specifically, traditional statistics is based on the concept of identifying what constitutes a statistically significant change from a baseline value where the "baseline" is the statistic of interest, such as the mean or, in this case, the design value. Rather than focusing on statistically significant changes, the purpose of the analysis was to calculate changes in the design values that, once precautionary choices are applied, may be considered not significant or meaningful. To identify recommended SILs for the desired application in the PSD program, the EPA determined that the findings of the statistical analysis can be used to identify a change in the design value (i.e., an air quality impact) below which a permitting authority may reasonably conclude that the impact does not cause or contribute to a violation of a NAAQS. The principles of statistical significance testing do not by themselves provide a single, unique threshold for determining the statistical significance of a change in the design value. Statistical significance testing provides a range of concentration values that can be considered to represent a statistically significant change in air quality or, in this application, a change in air quality that is not statistically significant. Therefore, it is necessary to consider the function and application of SIL values in the context of the PSD program and to select a change in air quality that is reasonably representative of the showing that a proposed source will not cause or contribute to a NAAQS violation, as required by the Act and PSD regulations.

In making a recommendation for an appropriate SIL value, the EPA balanced two considerations: 1) the usefulness of the SIL as a compliance demonstration tool in the PSD permitting program, and 2) the likelihood of a SIL value representing an impact that is not significant. In balancing these considerations, the EPA made policy decisions concerning the confidence interval (CI) to represent the inherent variability for purposes of the NAAQS compliance demonstration, the approach used to scale local variability to the level of the NAAQS, the geographic extent of each summary value, and the design value year or years from which to use the variability results. As described below, for each of these factors, the EPA chose options that are precautionary, leading to SILs designed to ensure the protection of air quality.

Through the statistical analysis, we calculated CIs, which represent different assessments of the level of change in air quality based on the inherent variability in the air quality of an area. We then selected the recommended SIL values as a function of the CIs, the baseline value, and policy considerations. The selection of a CI in defining a particular SIL value required an exercise of judgment based on the technical and policy considerations (as described below) such that the selected value represents a level of change in air quality concentration that can be considered not significant or meaningful in the context of evaluating the impact of emissions from a proposed source. These policy considerations work in conjunction with the statistical analysis, to provide a rational basis to select values derived from the statistical analysis that can be applied as a tool for making the PSD compliance demonstration required by the Act and PSD regulations. For more information on the design and results of the technical analysis, please refer to the technical document.

The technical analysis relies upon data from the national ambient monitoring network for ozone and $PM_{2.5}$. Because these data generally are the basis for determining NAAQS attainment, they are an appropriate basis to characterize air quality, with the statistical analysis evaluating the variation in the design value at each monitoring site across the nation. This variability in air quality concentrations is described by the different CIs computed from the statistical analysis. The CIs identify a statistically significant deviation from the baseline value. As described in the technical document (Section 3.0), the EPA has calculated CIs at the 25 percent, 50 percent, 68 percent, 75 percent, and 95 percent intervals for consideration in defining SIL values for ozone and $PM_{2.5}$. The smallest CI that might be used to identify a statistically significant change would be a 68 percent CI, which corresponds to one standard deviation from the baseline value. Thus, any change in the design value larger than the variation represented by the 68 percent CI could be considered to be a statistically significant change. However, for purposes of the PSD program, we are seeking to identify a concentration value that constitutes an insignificant impact, meaning a change in the design value that does not reflect a meaningful difference in air quality based on the introduction of a new source. Thus, from a statistical perspective, the EPA believes that the CIs used in determining an appropriate SIL value should be below 68 percent, corresponding to a change of less than one standard deviation.

Very small SIL values would have limited use to permitting authorities (i.e., would lead to "false positives"), while larger values (closer to the air quality change represented by the 68 percent CI) would lead to "false negatives." In weighing these competing considerations to select an appropriate SIL value, the EPA believes that air quality change represented by a 50 percent CI represents a protective approach for a SIL value because it is sufficiently within the 68 percent CI, while still being sufficiently higher than zero such that it can be a useful compliance demonstration tool for the PSD permitting process. Of the available choices, the 50 percent CI has more utility as a screening tool under the permitting program, while providing a value that adequately reflects a change in air quality concentrations that is not significant or meaningful.

The EPA chose to use the relative variability rather than the absolute variability in calculating the SILs because the technical analysis (Section 4.0) showed that the relative variability is fairly consistent across the range of design values, suggesting a commonality in the relative variability across a wide range of geographic regions, chemical regimes, and baseline air quality levels in the development of the SILs.

In order to promote national consistency, the EPA has historically provided national SIL values rather than regional or local values. The EPA considered whether a SIL value should be informed by the statistical analysis at the particular site of the proposed source or the central tendency across all monitored sites in the U.S., regardless of the proposed source's planned location. The EPA continues to recommend using a national SIL value based on the variability aggregated across the nation rather than developing regional or local values. Findings from the statistical analysis indicate that while there are local spatial correlations, there are few instances of large scale (e.g., region-to-region) trends in ambient air variability. Thus, national numbers are supported by the spatial analysis and suitable for use here. Because NAAQS and PSD increments are set on a national basis, the EPA and permitting authorities have historically used national SILs in the PSD program. National SIL values are designed to be used for any location subject to PSD requirements and eliminate the need to determine local or regional approaches for developing a SIL value, including addressing the status of local air quality monitoring (which would be needed if regional or local SILs were to be determined). However, as noted above, local permitting authorities have the discretion to develop alternate SILs.[41] Having a national SIL value promotes consistency in implementation and prevents possible confusion or arbitrary choices that may arise with highly localized SIL values (i.e., determining which monitors to use for computations and other possible deviations from national protocol). Given these considerations, the EPA recommends continuing the practice of using national SIL values. Furthermore, as shown in the technical analysis (Section 4.0), because the median statistic is less influenced by high variability areas, the median statistic is preferred for use in selecting a SIL. Therefore, using the median statistic of the relative variability from the 50 percent CIs from the entire U.S. ambient monitoring network satisfies the policy needs for a SIL and is congruent with the physical and chemical processes that result in this variability.

Next, the EPA chose to use the most recently available years of ambient monitoring data (2012-2016) in the technical analysis to derive the recommended SILs. The SILs should reflect the most recent and representative state of the nation's atmosphere. In assessing the historical trends in ozone and $PM_{2.5}$ air quality levels across the nation, there are observable downward trends in concentrations that indicate more recent data are most appropriate. To have more confidence that the resulting values would not be unduly influenced by temporary circumstances or episodic events, the EPA's recommended SILs are based on an average of the most recent three design value years as a basis for ozone and $PM_{2.5}$ SIL development (i.e., 2012-2014, 2013-2015, 2014-2016).

[41] In the cases where a permitting authority is considering an alternative SIL(s) due to the characteristics of regional variability (e.g., if, based on the analysis presented in the technical document, a specific area appears to have more localized variability than the national average), it is important to understand the factors driving that apparent variability to fully support the application of alternative SIL(s). For example, the results presented in section 4.3 of the technical document show some areas with regional variability for the 24-hour $PM_{2.5}$ standard, though no regional trends were apparent for the annual $PM_{2.5}$ standard and the ozone standard. Furthermore, these regional trends for the 24-hour $PM_{2.5}$ standard were not apparent in the other data years shown in the appendix of the technical document. Additionally, the discussion in the technical document highlights potential causes for some of the variability in these regions (e.g., lower sampling frequency, that can lead to apparently higher variability than would otherwise be shown with higher sampling frequency). Similar issues are discussed in the technical document and can have important consequences for the results and conclusions drawn from more localized analyses of the ambient data and should be thoroughly vetted when considering alternative SILs.

SILs for NAAQS

Using the method described above, the EPA developed SIL values for the 8-hour ozone NAAQS and the annual and 24-hour $PM_{2.5}$ NAAQS. Table 1 lists these SIL values for the NAAQS. Each of these SIL values is based on the level, averaging period and statistical form of its corresponding NAAQS. For the reasons discussed in this guidance and supporting documents, we recommend that PSD permitting authorities use the following values as SILs on a case-by-case basis in the manner described in the next section.

**Table 1. Recommended SIL Values for Ozone and $PM_{2.5}$ NAAQS**

| Criteria Pollutant (NAAQS level) | NAAQS SIL concentration |
|---|---|
| Ozone 8-hour (70 ppb) | 1.0 ppb |
| $PM_{2.5}$ 24-hour (35 μg/m$^3$) | 1.2 μg/m$^3$* |
| $PM_{2.5}$ annual (12 μg/m$^3$ or 15 μg/m$^3$) | 0.2 μg/m$^3$ |

* The table accounts for the significance level for the 24-hour $PM_{2.5}$ NAAQS in 40 CFR 51.165(b)(2). Refer to the guidance discussion for details.

For the 8-hour ozone NAAQS, the SIL value we recommend is 1.0 part per billion (ppb). Consistent with the form of the NAAQS, this value is based on the annual 4$^{th}$ highest daily maximum 8-hour concentration, averaged over 3 years. The recommended SIL value for ozone is the same as the derived value from the air quality variability analysis.

For the 24-hour $PM_{2.5}$ NAAQS, the SIL value we recommend is 1.2 μg/m$^3$. The derived value from the air quality variability analysis is 1.5 μg/m$^3$ and is based on an analysis of the 98$^{th}$ percentile 24-hour concentrations averaged over 3 years. However, 40 CFR 51.165(b)(2) still lists 1.2 μg/m$^3$ as the significance level for the 24-hour $PM_{2.5}$ NAAQS. In the 2010 rulemaking, the EPA determined that an impact above this value will be considered to cause or contribute to a violation of the 24-hour $PM_{2.5}$ NAAQS at any location that does not meet this standard. In the same rule, the EPA also sought to establish that an impact below this value would not cause or contribute to a violation of this NAAQS but acknowledged that there could be circumstances where this conclusion was not always valid. Even though the ambient air quality variability approach indicates that an impact below 1.5 μg/m$^3$ is not significant, significance levels for $PM_{2.5}$ remain in the EPA's regulations at 40 CFR 51.165(b)(2) and the EPA is presently bound by its prior conclusion (that an impact above 1.2 μg/m$^3$ is significant and will cause or contribute to a violation of the 24-hour $PM_{2.5}$ NAAQS). Thus, the EPA cannot conclude at this time that an impact between 1.2 μg/m$^3$ and 1.5 μg/m$^3$ is an insignificant impact or an impact that will not cause or contribute to a violation of the NAAQS. However, based on the ambient air quality variability approach, the EPA can conclude that impacts below 1.2 $\mu g/m^3$ are insignificant at any location and will not cause or contribute to a violation of the NAAQS.[42]

For the annual $PM_{2.5}$ NAAQS, we recommend 0.2 $\mu g/m^3$ as the SIL value, which is the value based on a 3-year average of annual average concentrations. This value is lower than the value of 0.3 $\mu g/m^3$ listed in 40 CFR 51.165(b)(2). Since 40 CFR 51.165(b)(2) does not address whether an impact below 0.3 $\mu g/m^3$ causes or contributes to a violation of the NAAQS, the EPA and other permitting authorities retain the discretion under this provision to determine on a case-by-case basis whether an impact between 0.2 $\mu g/m^3$ and 0.3 $\mu g/m^3$ will cause or contribute to a violation of the annual $PM_{2.5}$ NAAQS. However, based on the ambient air quality variability approach, the EPA's judgment is that an impact below 0.2 $\mu g/m^3$ is not significant and should be considered to not cause or contribute to any violation of the annual $PM_{2.5}$ NAAQS that is identified.

We recommend that these SIL values apply to the NAAQS everywhere, regardless of the class of the airshed.[43] For $PM_{2.5}$, this recommendation is different than what was provided in the vacated (k)(2) paragraphs, where the SIL value that would be used for NAAQS purposes was different for Class I areas than for Class II and III areas. The EPA recognizes that, historically, Congress has provided special protections to Class I areas, as described below in the discussion of SILs for PSD increments. The EPA believes that because each ozone and $PM_{2.5}$ NAAQS is uniform throughout the class areas, no class-specific protection via SILs is necessary when assessing whether a source causes or contributes to a violation of the NAAQS.

<u>SILs for PSD Increments</u>

There are no PSD increments established for ozone and, thus, no ozone SIL values are needed for PSD increment compliance purposes. We used the air quality variability approach to develop PSD increment SILs for the $PM_{2.5}$ PSD increments (*see* Table 2), but in an indirect way. The SIL values

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[42] 40 CFR 51.165(b)(2) provides that a source impact higher than one of the listed significance levels is to be considered significant. A source impact exactly equal to a significance level need not be considered significant. In contrast, in this guidance, consistent with past guidance, we are recommending that a value exactly equal to a recommended SIL be considered significant. Thus, these two approaches treat a value equal to the stated level differently. In practice, we do not expect this to be a practical difference because it will be very unusual for a source's impact to exactly equal one of the recommended SIL values.

[43] When Congress established the PSD program requirements under the 1977 Act Amendments, it included specific numerical PSD increment levels for $SO_2$ and particulate matter (expressed at that time as "total suspended particulate") for Class I, II and III areas. Congress designated Class I areas (including certain national parks and wilderness areas) as areas of special national concern, where the need to prevent deterioration of air quality is the greatest. Consequently, the PSD increments are the smallest in Class I areas. The PSD increments of Class II areas are larger than those of Class I areas and allow for a moderate degree of emissions growth. Class III areas have the largest PSD increments, but to date no Class III areas have been designated. The EPA subsequently defined Class I, II and III PSD increments for $NO_2$ and $PM_{10}$, and $PM_{2.5}$ in multiple rulemakings.

for the $PM_{2.5}$ PSD increments are derived from the recommended NAAQS SIL values and reflect that, under the PSD regulations, the allowable PSD increment values are different for Class I, II and III areas. For Class II areas (which comprise most of the U.S.) and Class III areas (of which there are currently none), we recommend that the values of the NAAQS SILs also be used for PSD increment SILs. For Class I areas, we are recommending annual and 24-hour PSD increment SIL values that are lower than the NAAQS SIL values. This is because the EPA recognizes that Congress intended to establish special protection for Class I areas, as observed by the more stringent statutory Class I PSD increments, as well as provisions for use of air quality related values (including protection against visibility impairment).[44] To help reflect this additional protection, we applied the ratios of the Class I and Class II allowable PSD increments to the NAAQS SIL values derived in our technical analysis.[45] The EPA believes these values for Class I areas will continue to reflect this higher level of protection through the PSD increment SILs.

**Table 2. Recommended SIL Values for $PM_{2.5}$ PSD Increments**

| Criteria Pollutant (averaging period) | PSD increment SIL concentration | | |
|---|---|---|---|
| | Class I | Class II | Class III |
| $PM_{2.5}$ (24-hour) | 0.27 μg/m$^3$ | 1.2 μg/m$^3$ | 1.2 μg/m$^3$ |
| $PM_{2.5}$ (annual) | 0.05 μg/m$^3$ | 0.2 μg/m$^3$ | 0.2 μg/m$^3$ |

## IV. APPLICATION OF SILS

The EPA recommends that permitting authorities consider using these SIL values for ozone and $PM_{2.5}$ on a case-by-case basis at the same points in the PSD air quality analysis as SIL values historically have been used in the PSD program, as described below, with one exception regarding defining the spatial extent for modeling.

First, permitting authorities may elect to use the SIL values reflected in this guidance in a preliminary (single-source) analysis that considers only the impact of the proposed source in the permit application on air quality to determine whether a full (or cumulative) impact analysis is necessary before reaching a conclusion as to whether the proposed source would (or would not) cause or contribute to a violation.[46] A modeled result predicting that a proposed source's maximum impact will be below the corresponding SIL value recommended above generally may be considered to be a sufficient demonstration that the proposed source will not cause or contribute to a violation of the applicable NAAQS or PSD increment. If the single-source analysis shows that a proposed source will not have a significant impact on air quality, permitting authorities may

[44] Section 165(d)(2) of the Act sets forth procedures affording special protection against adverse air quality impacts in Class I areas. Also, section 169A of the Act declares a national goal of preventing future and remedying any existing impairment of visibility in Class I areas. 42 U.S.C. 7475 and 7491.

[45] To derive the Class I PSD increment SIL values, we started with the corresponding NAAQS SIL value as the base number and adjusted it by the ratio of the associated Class I and II PSD increments. For the annual $PM_{2.5}$ increment, we reduced the NAAQS SIL value by the ratio of 1:4, because the Class I PSD increment is 1 μg/m$^3$ and the Class II PSD increment is 4 μg/m$^3$. We used the ratio of 2:9 for the 24-hour $PM_{2.5}$ increment. For the 24-hour increment, we used the 40 CFR 51.165(b)(2) value of 1.2 μg/m$^3$ as our base number.

[46] 1990 Draft NSR Workshop Manual at C.24-C.25, C.51.

generally conclude there is no need to conduct a cumulative impact analysis to assess whether there will be any violations of the NAAQS or PSD increment. However, upon considering the permit record in an individual case, if a permitting authority has a basis for concern that a demonstration that a proposed source's impact is below the relevant SIL value at all locations is not sufficient to demonstrate that the proposed source will not cause or contribute to a violation, then the permitting authority should require additional information from the permit applicant to make the required air quality impact demonstration.

Second, where the preliminary analysis described in the prior paragraph shows a significant impact, permitting authorities may choose to use the recommended SIL values in a cumulative impact analysis for a NAAQS, which, in addition to the proposed new major stationary source or major modification, includes the impact of existing sources (onsite with the proposed major modification, as well as other existing sources), and the appropriate background concentration. The EPA has described this application of a SIL as a "culpability analysis."[47] Where a cumulative impact analysis predicts a NAAQS violation, the permitting authority may further evaluate whether the proposed source will cause or contribute to the violation by comparing the proposed source's modeled contribution to that violation to the corresponding SIL value. If the modeled impact is below the recommended SIL value at the violating receptor during the violation, the EPA believes this will be sufficient in most cases for a permitting authority to conclude that the source does not cause or contribute to (is not culpable for) the predicted violation. This demonstration would, thus, allow the permit to be issued if all other PSD requirements are satisfied. If the proposed source's modeled impact is higher than or equal to the recommended SIL value at the violating receptor during a violation, then a permit should not be issued unless (1) further modifications are made to the proposed source to reduce the proposed source's impact to a not significant level at the affected receptor during the violation, or (2) the proposed source obtains sufficient emissions reductions from other sources to compensate for its contribution to the violation.[48]

Third, permitting authorities may decide to use the SIL values recommended above in a cumulative impact analysis for a PSD increment. According to 40 CFR 51.166(c)(1) and 52.21(c), an allowable PSD increment based on an annual average may not be exceeded, and the allowable PSD increment for any other time period may be exceeded once per year at any one location. In either case, the PSD increment SILs recommended above may be used to determine if the proposed source will cause or contribute to that exceedance. If the cumulative impact analysis shows an annual average $PM_{2.5}$ PSD increment exceedance or a 24-hour PSD increment exceedance at a location, then the comparison of the proposed source's impact at that location during the exceedance to the corresponding SIL value may be used to determine whether the proposed source will cause or contribute to the exceedance(s) at that receptor. If the modeled impact is below the SIL for the relevant pollutant, then the permitting authority may conclude that the source does not cause or contribute to a violation of the PSD increment for that pollutant.

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[47] *Prairie State*, 13 E.A.D. at 100; Mississippi Lime, 15 E.A.D. at 374.

[48] 1990 Draft NSR Workshop Manual at C.52-C.53; this latter alternative is referred to as a PSD offset, and state implementation plans may include an offset program based on federal regulations at 40 CFR 51.165(b).

In the past, SILs have been used in defining the spatial extent of the modeling domain for a cumulative impact analysis. Because an impact from a proposed source below a SIL value is considered not to cause or contribute to a violation, the EPA has previously recognized that there was no informational value in placing modeling receptors farther from the proposed source than the most distant point at which the proposed source's impact is equal to or greater than the applicable SIL value. Streamlining the modeling demonstration to reduce the number of receptors to those of value in determining if the proposed source will cause or contribute to a violation of the applicable NAAQS or PSD increment has enabled permit applicants to complete the required modeling with a reasonable effort. As discussed earlier, the EPA recently updated its *Guideline*. The revisions include providing an appropriate, revised basis for determining the modeling domain for NAAQS and PSD increment assessments. Thus, the revised *Guideline* should be used when considering the extent of the modeling domain.

The SILs identified in this guidance should not influence Air Quality Related Values analyses in Class I areas, which are independent reviews by the Federal Land Managers during the application review process.

Subject to limitations described in this guidance, permitting authorities may use the values in the above tables on a case-by-case basis to support air quality analyses and demonstrations required for issuance of PSD permits. Since this guidance is neither a final determination nor a binding regulation, permitting authorities retain the discretion not to use SILs as described here, either in specific cases or programmatically.

The case-by-case use of SIL values should be justified in the record for each permit. To ensure an adequate record, any PSD permitting decision that is based on this guidance (including the technical and legal documents) should incorporate the information contained in them. The permitting authority should also consider any additional information in the record that is relevant to making the required demonstration.

Permitting authorities also retain the discretion to use other values that may be justified separately from this guidance as levels of insignificant impact, subject to one limitation for the $PM_{2.5}$ NAAQS. Since the EPA has established by regulation that a $PM_{2.5}$ impact greater than certain values will cause or contribute to a violation of the relevant NAAQS, permitting authorities may not use a value higher than 1.2 $\mu g/m^3$ for the 24-hour $PM_{2.5}$ NAAQS or a value higher than 0.3 $\mu g/m^3$ for the annual $PM_{2.5}$ NAAQS. Because the 2010 rulemaking constrains the discretion of state and local permitting authorities, the EPA is committed to reassessing 40 CFR 51.165(b)(2) through a future rulemaking process that will begin within 18 months.

Because ozone is not addressed in 40 CFR 51.165(b)(2), permitting authorities are not precluded from developing a higher ozone NAAQS SIL value than recommended in this guidance. Likewise, 40 CFR 51.165(b)(2) does not address PSD increments and, thus, does not constrain the discretion of a permitting authority to use a higher SIL value that a permitting authority may develop for PSD increment purposes. Permitting authorities are also not precluded from developing and using lower SIL values than recommended in this guidance. Permitting authorities may elect to utilize alternative CIs, based on regional or local factors, in developing their own SIL values. The case-by-case use of a SIL value should be supported by a comparable record in each instance that shows that the value represents a level below which a proposed source does not cause or contribute to a violation of the NAAQS or PSD increment.

**Appendix C. Electronic Modeling Files.**