El Paso
Natural Gas Company
a Kinder Morgan company

February 7, 2020 **FED EX 3902 3071 0060**

Mr. Rupesh Patel
Air Program Manager
Pima County Department of Environmental Quality
33 North Stone Ave, Suite 700
Tucson, AZ 85701

Subject: Title V Significant Permit Revision (Permit #425)
El Paso Natural Gas Company, L.L.C. Vail Compressor Station
Piping Modification Project

Dear Mr. Patel:

Attached is El Paso Natural Gas Company (EPNG)'s application for Significant Permit Revision for the Vail Compressor Station piping modification project. Specifically, the modification includes adding gas cooling facilities and gas recycling to allow for operational flexibility. The proposed project will not involve any physical or operational changes to the turbines. An emergency generator will also be installed as part of this project.

Vail Compressor Station is currently permitted under Title V Permit #425. EPNG believes that the proposed project qualifies as a "Significant Permit Revision" as per Pima County Code of Ordinances §17.12.260. An air dispersion modeling analysis is also included in the application.

If you have questions or comments, please contact me at (303) 914-7616 or email me at weiwen_daly@kindermorgan.com.

Sincerely,

Weiwen Daly
Air Permitting Compliance - West

RECEIVED BY
PIMA COUNTY
FEB 10 2020
DEPARTMENT OF
ENVIRONMENTAL QUALITY

# CLASS I SIGNIFICANT PERMIT REVISION

## El Paso Natural Gas Company, L.L.C. - Vail Compressor Station

El Paso Natural Gas Company, L.L.C.
a Kinder Morgan company

5151 E Broadway Blvd., Suite 1680
Tucson, AZ 85711
(520) 663-4239

Prepared By:

**TRINITY CONSULTANTS**
1661 E Camelback Road, Suite 290
Phoenix, AZ 85016
(602) 274-2900

February 2020

Trinity Consultants

*Environmental solutions delivered uncommonly well*

# TABLE OF CONTENTS


1. EXECUTIVE SUMMARY 1-1
**1.1. PDEQ Permit Application Requirements** 1-3
**1.2. Permit Processing Fee** 1-4

2. PROCESS DESCRIPTION 2-1
**2.1. General Process Overview** 2-1
**2.2. Project Description** 2-2

3. SITE MAP & PLAN 3-1

4. EMISSIONS DATA 4-1
**4.1. Turbine Emissions** 4-1
**4.2. Emergency Generator Emissions** 4-2
**4.3. Fugitive Emissions** 4-2
**4.4. Equipment List** 4-3
**4.5. Site-Wide Emissions Summary** 4-3

5. INSIGNIFICANT ACTIVITIES 5-1

6. REGULATORY APPLICABILITY 6-1
**6.1. Federal New Source Review Applicability** 6-1
*6.1.1. Step 1. Calculate Baseline Actual Emissions (BAE)* 6-2
*6.1.2. Step 2. Calculate Projected Actual Emissions (PAE)* 6-2
*6.1.3. Step 3. Calculate Net Emissions Increase (NEI)* 6-2
*6.1.4. Step 4. Compare PSD Significant Emission Rates* 6-2
**6.2. PDEQ and Federal Applicable Requirements** 6-3
*6.2.1. New Sources Performance Standards* 6-3
*6.2.2. National Emission Standard for Hazardous Air Pollutants* 6-6
*6.2.3. PDEQ Applicable Requirements* 6-7
*6.2.4. Compliance Assurance Monitoring* 6-8
*6.2.5. Chemical Accident Prevention* 6-8
*6.2.6. Stratospheric Ozone Protection Regulations* 6-8

7. BEST AVAILABLE CONTROL TECHNOLOGY 7-1
**7.1. BACT Analysis for Turbines** 7-1
**7.2. BACT Assessment** 7-2
*7.2.1. BACT Definition* 7-2
*7.2.2. BACT Methodology* 7-5
**7.3. BACT Analysis for Natural Gas-Fired Emergency Generator** 7-7
*7.3.1. Background of Pollutant Formation* 7-7
*7.3.2. Identify All Available Control Technologies* 7-7
*7.3.3. Selection of BACT* 7-7

8. AIR DISPERSION MODELING ANALYSIS 8-1
**8.1. Model Overview** 8-1
*8.1.1. Dispersion Model Selection* 8-1
*8.1.2. Meteorological Data* 8-2
*8.1.3. Terrain* 8-2

*8.1.4. Building Wake Effects (Downwash)* ..... *8-2*
*8.1.5. Receptor Grid* ..... *8-3*
*8.1.6. Land Use Classification* ..... *8-3*
*8.1.7. Considerations for 1-hour $NO_2$ Modeling* ..... *8-5*
*8.1.8. Background Concentration* ..... *8-6*
*8.1.9. Impact Analysis for Class I Area* ..... *8-7*
**8.2. Emissions Modeled & Source Characterization ..... 8-9**
*8.2.1. EPNG Sources* ..... *8-9*
*8.2.2. Off-Site Emissions Inventory* ..... *8-12*
**8.3. Modeling Approach & Results ..... 8-12**
*8.3.1. Significant Impact Analysis* ..... *8-12*
*8.3.2. Full Impact Analysis* ..... *8-13*
*8.3.3. Pre-Construction Monitoring Analysis* ..... *8-14*
*8.3.4. Class I Area AQRV Analysis* ..... *8-17*
**8.4. Secondary $PM_{2.5}$ & Ozone Assessment ..... 8-22**
**8.5. Additional Impacts Analysis ..... 8-25**
*8.5.1. Growth Analysis* ..... *8-25*
*8.5.2. Soil and Vegetation Analysis* ..... *8-25*
**8.6. Electronic Files ..... 8-26**

APPENDIX A. PDEQ CLASS I PERMIT APPLICATION FORM, CERTIFICATION & CHECKLIST A

APPENDIX B. DETAILED EMISSION CALCULATIONS B

APPENDIX C. $NO_X$ EMISSION FACTOR MEMORANDUM C

APPENDIX D. HISTORIC CO TEST DATA D

APPENDIX E. ESD AND BLOWDOWN EMISSIONS E

APPENDIX F. APPLICABLE REQUIREMENTS F

APPENDIX G. BACKGROUND DATA DETERMINATION DETAILS G

APPENDIX H. VISCREEN MODEL OUTPUT H

# LIST OF TABLES

Table 1-1. Vail Compressor Station – Post Project Potential Emissions ..... 1-2

Table 1-2. Vail Compressor Station – Project PSD Applicability ..... 1-2

Table 1-3. Vail Compressor Station – Application Components ..... 1-3

Table 4-1. Vail Compressor Station - Equipment List ..... 4-3

Table 4-2. Vail Compressor Station – Post Project Potential Emissions ..... 4-4

Table 6-1. Vail Compressor Station – PSD Applicability Summary ..... 6-3

Table 8-1. Vail Compressor Station – Land Use Types and Corresponding Dispersion Classification * ..... 8-4

Table 8-2. Vail Compressor Station – Land Cover Analysis ..... 8-5

Table 8-3. Vail Compressor Station – Turbines ISR ..... 8-6

Table 8-4. Vail Compressor Station – Representative Background Concentrations ..... 8-7

Table 8-5. Vail Compressor Station – Model Emission Sources & Stack Parameters ..... 8-9

Table 8-6. Vail Compressor Station – Model Emission Rates ..... 8-10

Table 8-7a. Vail Compressor Station – Determination of Worst-Case Combination- 1hr $NO_2$ ..... 8-11

Table 8-7b. Vail Compressor Station – Determination of Worst-Case Combination – 1-hr CO ..... 8-11

Table 8-7c. Vail Compressor Station – Determination of Worst-Case Combination – 8-hr CO ..... 8-11

Table 8-7d. Vail Compressor Station – Determination of Worst-Case Combination – Annual $NO_2$ ..... 8-11

Table 8-8. Vail Compressor Station – Significant Impact Levels & Results ..... 8-13

Table 8-9. Vail Compressor Station – NAAQS and PSD Increment Results ..... 8-14

Table 8-10. Vail Compressor Station – Significant Monitoring Concentrations & Results ..... 8-14

Table 8-11. Vail Compressor Station – NAAQS Off-Site Inventory ..... 8-15

Table 8-12. Vail Compressor Station – VISCREEN Level-1 Inputs ..... 8-19

Table 8-13. Vail Compressor Station – VISCREEN Level 2 Meteorological Conditions Review ..... 8-20

Table 8-14. Vail Compressor Station – Impacts on Vegetation ..... 8-26

# LIST OF FIGURES

Figure 2-1. Vail Compressor Station – Turbines Process Flow Diagram ..... 2-2

Figure 3-1. Vail Compressor Station – Location ..... 3-2

Figure 3-2. Vail Compressor Station – Fenceline ..... 3-3

Figure 3-3. Vail Compressor Station – Plot Plan – Aerial ..... 3-4

Figure 3-4. Vail Compressor Station – Plot Plan – Detailed ..... 3-5

Figure 8-1. Vail Compressor Station - Class I Areas within 300 km ..... 8-8

Figure 8-2. Vail Compressor Station - Location of EPA Arizona MERP Facilities ..... 8-23

# 1. EXECUTIVE SUMMARY

The El Paso Natural Gas Company, L.L.C. (EPNG), a Kinder Morgan Company, provides natural gas transportation services for natural gas suppliers and end users throughout the southwestern United States and owns and operates a large pipeline network. The Vail Compressor Station is one of such stations that provides natural gas compression to the pipeline network. Natural gas compression is needed to maintain enough pressure in the pipeline to keep the natural gas flowing, and it is accomplished with three natural gas fired turbines that drive the compressor units. The facility is permitted to operate 24 hours a day and 365 days a year. The Vail Compressor Station is regulated by the Pima County Department of Environmental Quality (PDEQ) and currently operates pursuant to the conditions of PDEQ Class I Air Quality Permit No. 425.

With this application, EPNG proposes modifications to the existing piping at the Vail Compressor Station. Specifically, the modifications include adding gas cooling facilities (e.g., piping, valves, fans) and gas recycling to allow for operational flexibility. Cooling is required to preserve the pipe's anti-corrosion coating. The fans will be operated on purchased power and do not require an additional emission source to operate. Installation of gas cooling facilities likely will result in fugitive emissions from additional compressor station yard piping components. Once the project is completed, only two of the three turbine units will operate simultaneously at any given time. Note that EPNG is not proposing any physical change or change to the method of operation to the turbines, or the emission sources, as part of this application. Furthermore, EPNG is not proposing any alternate operating scenarios as part of this application. EPNG also proposes to add a natural gas-fired emergency generator to support the gas cooling fans in the event of a purchase power failure. The engine operation will be limited to routine maintenance and testing as well as emergency events.

While some portion of Pima County have been classified as non-attainment with the National Ambient Air Quality Standards (NAAQS), the Vail Compressor Station is located in the portion of Pima County that has been classified as attainment or unclassified with the NAAQS for all regulated pollutants.[1] Therefore, with respect to the federal New Source Review (NSR) permitting program, only the Prevention of Significant Deterioration (PSD) program requirements are considered to be potentially applicable. Natural gas compressor stations are not on the "List of 28" in Title 40 of the Code of Federal Regulations (40 CFR) §52.21(b)(1)(i). Therefore, for PSD program purposes the facility is subject to the major source threshold of 250 tpy. Site-wide potential emissions of $NO_x$ before the modification exceed 250 tpy; therefore, the facility is considered a PSD Major Source.

Based on the post-project site-wide potential to emit (PTE) assuming only two gas turbines operate simultaneously, summarized in Table 1-1, the Vail Compressor Station will continue to be Major Source for Title V and PSD programs. Based on the evaluation contained in Table 1-2, the pollutants experiencing a "significant" emissions increase (i.e., emissions increase greater than the Significant Emission Rate [SER]), and subject to PSD review, are $NO_x$ and CO. Ozone review is also required, per 40 CFR §51.166(b)(23), because the net emissions increase (NEI) for $NO_x$, an ozone precursor, exceeds 40 tpy.

The proposed changes are anticipated to require case-by-case review. Therefore, EPNG is requesting authorization via significant permit revision procedure, under Pima County Code (PCC) §17.12.010(F)-(I). This submittal contains supporting documentation for the application, including the air dispersion modeling analysis.

[1] Per 40 CFR §81.303.

**Table 1-1. Vail Compressor Station – Post Project Potential Emissions**

| Pollutant | Estimated Potential Emissions (tpy) | | | | | Major Source Thresholds (tpy) | | Major Source? | |
|---|---|---|---|---|---|---|---|---|---|
| | Turbine A-1, A-2, or A-3 | Turbine A-1, A-2, or A-3 | Emergency Generator | Fugitives | Total | Title V | PSD | Title V | PSD |
| $NO_x$ | 180.68 | 180.68 | 1.11 | - | 362 | 100 | 250 | Yes | Yes |
| CO | 57.59 | 57.59 | 2.22 | - | 117 | 100 | 250 | Yes | No |
| VOC | 0.48 | 0.48 | 0.55 | 1.27 | 2.78 | 100 | 250 | No | No |
| $SO_2$ | 0.77 | 0.77 | 0.001 | - | 1.55 | 100 | 250 | No | No |
| PM / $PM_{10}$ /$PM_{2.5}$ | 1.50 | 1.50 | 0.09 | - | 3.10 | 100 | 250 | No | No |
| Max HAP | 0.16 | 0.16 | 0.07 | 0.10 | 0.16 | 10 | - | No | No |
| Total HAPs | 0.23 | 0.23 | 0.11 | 0.10 | 0.67 | 25 | - | No | No |
| $CO_2e$ | 26,649 | 26,649 | 230 | 771 | 54,299 | 100,000 | 75,000 | No | No |

**Table 1-2. Vail Compressor Station – Project PSD Applicability**

| Pollutant | Emissions (tpy) | | | | PSD Review Required? [1] |
|---|---|---|---|---|---|
| | Baseline Actual Emissions (BAE) | Projected Actual Emissions (PAE) | Net Emissions Increase (NEI) | PSD Significant Emission Rate (SER) | |
| $NO_x$ | 4.98 | 238 | 232.65 | 40 | Yes |
| CO | 1.35 | 117 | 116.04 | 100 | Yes |
| VOC | - | 2.78 | 2.78 | 40 | No |
| $SO_2$ | 0.02 | 1.55 | 1.53 | 40 | No |
| PM | - | 3.10 | 3.10 | 25 | No |
| $PM_{10}$ | - | 3.10 | 3.10 | 15 | No |
| $PM_{2.5}$ | - | 3.10 | 3.10 | 10 | No |
| $CO_2e$ [2] | 1,310.0 | 54,299 | 52,989 | 75,000 | No |

[1] Ozone PSD Review is required if $NO_x$ OR VOC exceed their respective SER

[2] GHG ($CO_2e$) SER according to 40 CFR 51.166(b)(48)

## 1.1. PDEQ PERMIT APPLICATION REQUIREMENTS

Pursuant to PCC §17.12.010.B, "*To apply for any permit in this section, applicants shall complete the "Standard Permit Application Form" and supply all information required by the "Filing Instructions" as shown in Title 18, Chapter 2, Appendix 1 of the A.A.C.*" However, Title 18, Chapter 2, Appendix 1 of the Arizona Administrative Code (A.A.C.) has been repealed. Therefore, these instructions are based on the content in the Arizona Department of Environmental Quality (ADEQ) "Application Packet for a Class I Permit." Requirements for the permit application are set forth in the following regulations:

- The PDEQ "Standard Permit Application Form for Class I Sources" and "Standard Permit Application Form Filing Instructions."
- Additional requirements for Class I permits as specified in Pima County Code (PCC) §17.12.010(F)-(I).
- Additional requirements for major modifications as specified in PCC §17.16.550(B), §17.16.590(A), §17.16.600, and §17.16.630.
- Requirements for preconstruction PSD approval as specified in 40 CFR § 52.21(n).
- Requirements for approval of construction under the NESHAP program as specified in 40 CFR §63.5(d).

Completed permit application forms are contained in Appendix A. Table 1-3 provides a list of all applicable application components and their location in this application.

**Table 1-3. Vail Compressor Station – Application Components**

| Application Component | Location in Application |
|---|---|
| General Information | Section 2 |
| Emissions Data | Section 4 |
| Emission Calculations | Section 4 |
| Process Description | Section 2 |
| Proposed Process Changes | Section 2 |
| Process Flow Diagram | Section 2 |
| Applicable Requirements | Section 6 |
| Proposed Exemptions | Not Applicable |
| Design Capacity and Operating Schedule | Section 4 |
| Planned Air Pollution Control Systems | Not Applicable |

| Application Component | Location in Application |
|---|---|
| Proposed BACT Determinations | Section 7 |
| Site Diagrams | Section 3 |
| Construction Schedule | Appendix A |
| Applicable Test Methods | Not Applicable |
| Compliance Plan | Not Applicable |
| Certification of Truth, Accuracy, and Completeness | Appendix A |
| Assessment of the applicability of the requirements of NSR | Section 6 |
| Assessment of the applicability of the requirements of PSD | Section 6 |
| Assessment of the Emissions of HAPS | Section 4 |
| Analysis of Impacts to Visibility and Other Air Quality Related Values in Class I Areas | Section 8 |
| Analysis of Ambient Air Quality | Section 8 |
| Analysis of Impacts due to General Commercial, Residential, Industrial and Other Growth Associated with the Project | Section 8 |
| Analysis of Impairment to Soils and Vegetation | Section 8 |
| Analysis of Impairment to Visibility | Section 8 |

## 1.2. PERMIT PROCESSING FEE

Based on PCC §17.12.220, Fees, and the Pima County Air Permit Fee Schedule (effective November 1, 2018), no fee is being submitted with this significant permit revision application. However, EPNG understands that a processing fee is applicable based on a rate of $128.70 per hour and the total actual time spent by PDEQ on processing this application.

# 2. PROCESS DESCRIPTION

This section contains a general overview of the compression process at the Vail Compressor Station, as well as a description of the proposed changes associated with the project. A process flow diagram is provided as Figure 2-1.

## 2.1. GENERAL PROCESS OVERVIEW

EPNG, a Kinder Morgan Company, provides natural gas transportation services for natural gas suppliers and end users throughout the southwest United States and owns and operates a large pipeline network. The Vail Compressor Station is one of such stations that provides natural gas compression to the pipeline network. Natural gas compression is needed to maintain enough pressure in the pipeline to keep the natural gas flowing. The compression process is accomplished with the use of three natural gas fired turbines that drive the compressor units. The Vail Compressor Station is unattended as the units are automated. The Source Classification code for the facility is 4922 (Natural Gas Transmission). The North American Industry Classification System (NAICS) code is 48621 (Pipeline Transportation of Natural Gas).

The compressors, driven by the natural gas fueled turbines, receive a flow of natural gas from a common pipeline system. The turbines operate depending on the amount of natural gas transported to various customers along the pipeline system. Purchased power is the primary electric power used at the Vail Compressor Station. As part of this project, EPNG is proposing to add an emergency generator with a natural gas-fired internal combustion engine to provide electric power in case of unscheduled power disruptions. The engine operation will be limited to routine maintenance and testing as well as emergency events.

For times when compression is not required due to the volume of natural gas being transported, EPNG will shut down operation of the units. When the turbines or the entire facility is shutdown, a small volume of natural gas from the equipment and piping is vented to the atmosphere. These events are referred to as "blowdown" or "Emergency Shutdown" (ESD). Other factors that may also require shutdown are detailed below.

> Maintenance – EPNG uses an "information-based" equipment maintenance system. EPNG collects and analyzes all available information relating to turbine conditions so that necessary or required maintenance can be performed.

> Malfunctions – three typical malfunctions that could automatically shut down a unit include, but are not limited to:
  - Loss of oil pressure;
  - High temperature; and
  - Vibration.

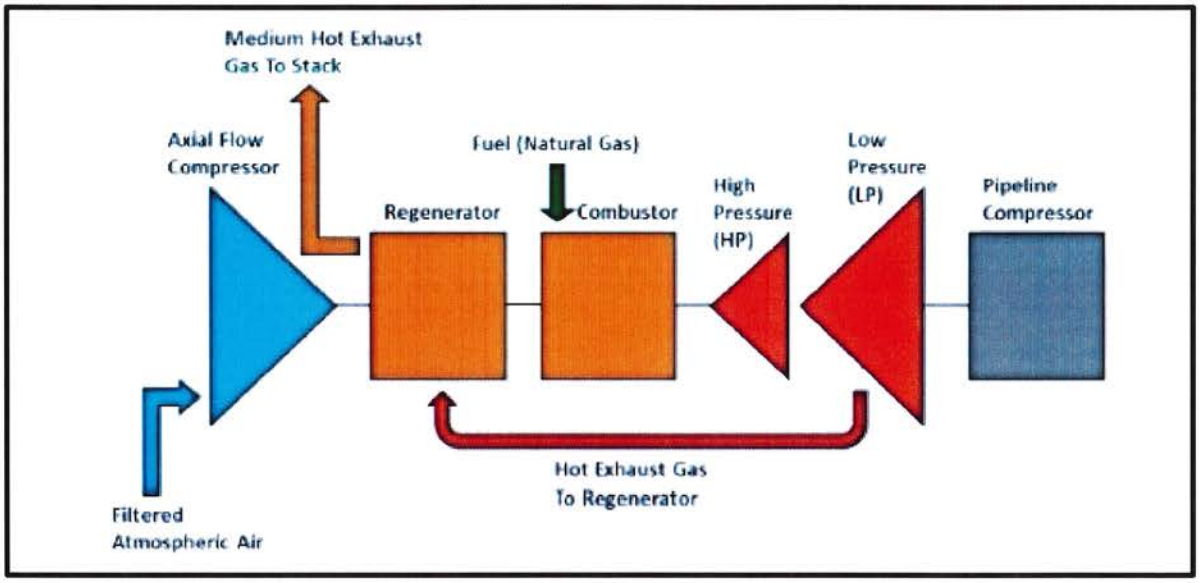
  Any one of these alarms will automatically turn off a unit and block in the fuel line.

> Emergency Shutdown (ESD) – ESD is initiated by glass break, pull switches, or fire eyes. When an ESD is performed at the facility, main inlet/outlet valve and select station valves will close to isolate portions of the facility.

The GE turbines are regenerative cycle, natural gas fired, two shaft turbines. In a regenerative cycle turbine, filtered atmosphere air is first compressed by the axial flow compressor. The compressor discharge air is then diverted to the regenerator where the compressed air is heated from the turbine exhaust gas. The hot compressed air is then fired with natural gas in the combustor. The hot exhaust gases expand through two turbine stages and into the regenerator where it heats the compressed air. The gas high pressure (H.P.) turbine

drives the axial flow air compressor while the low pressure (L.P.) drives the centrifugal pipeline compressor. The pipeline gas compressor moves natural gas through the pipeline by compressing it from an initial "suction" state to a more compressed "discharge" state. No processing is performed at this facility. Figure 2-1 contains the process flow diagram for the turbines at the Vail Compressor Station.

**Figure 2-1. Vail Compressor Station – Turbines Process Flow Diagram**




## 2.2. PROJECT DESCRIPTION

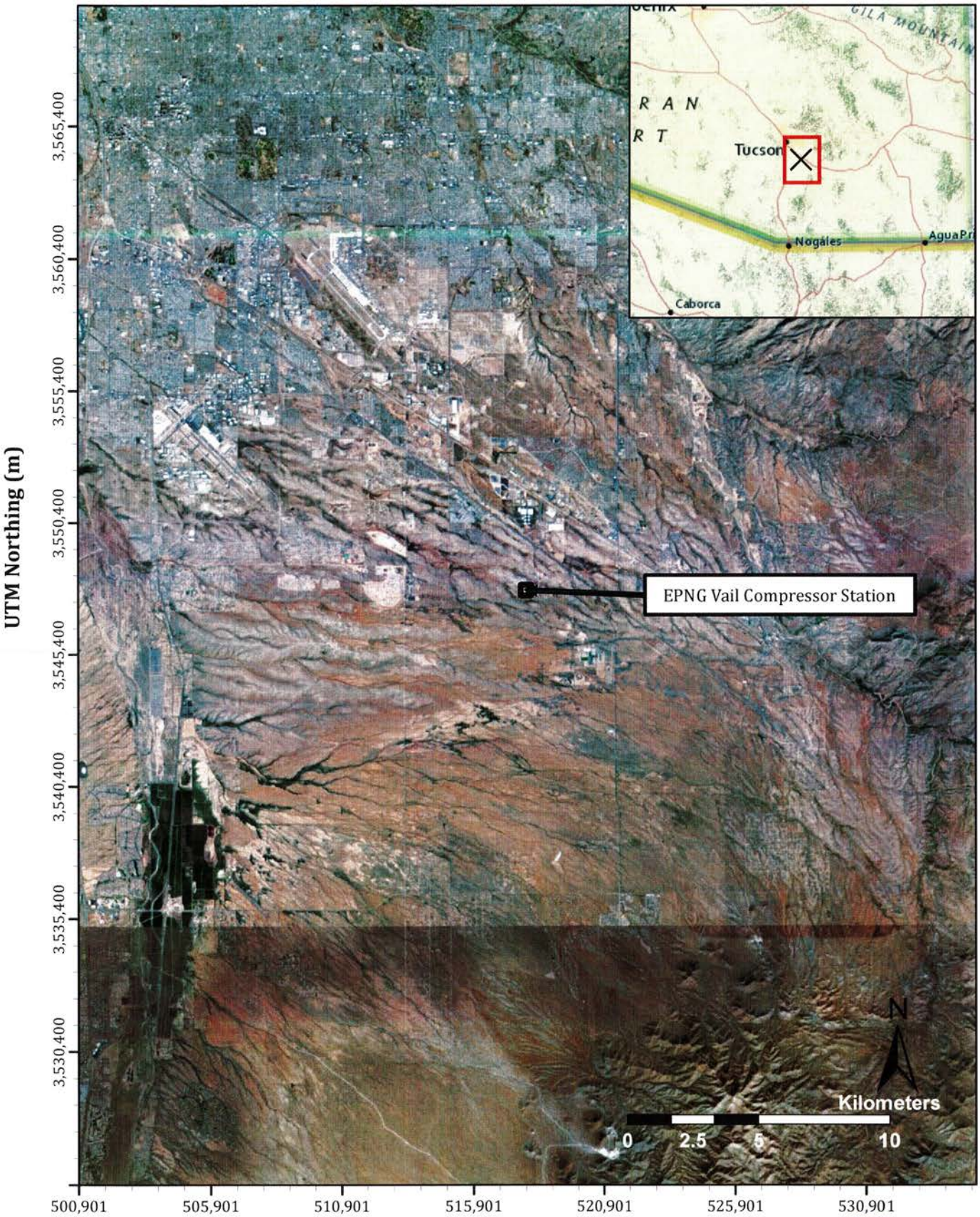
EPNG proposes modifications to the existing piping at the Vail Compressor Station. Specifically, the modifications include adding gas cooling facilities (e.g., piping, valves, fans) and gas recycling to allow for operational flexibility. Cooling is required in order to preserve the pipe's anti-corrosion coating. The fans will operate on purchased power and do not require an additional emission source to operate. Installation of gas cooling facilities will likely result in fugitive emissions from additional compressor station yard piping components. Once the project is completed, only two of the three turbine units will operate simultaneously at any given time.

Note that EPNG is not proposing any physical change or change to the method of operation to the turbines, or the emission sources, as part of this application. Only the existing piping will be modified. Furthermore, EPNG is not proposing any alternate operating scenarios as part of this application. EPNG also proposes to add a natural gas-fired emergency generator to support the gas cooling fans in the event of a purchase power failure. The engine operation will be limited to routine maintenance and testing as well as emergency events.

# 3. SITE MAP & PLAN

The Vail Compressor Station is located near Tucson, Arizona in Pima County. The site map in Figure 3-1 provides the general location of the station with respect to surrounding cities, highways, and federal Class I areas. An aerial photograph of the facility is provided in Figure 3-2, which also depicts the fence line for the site with respect to the surrounding area. The Vail Compressor Station plot plan is provided in Figure 3-3 and Figure 3-4. These depict the location of the modeled emission sources and buildings/structures considered for downwash analysis. Note that all coordinates presented in the figures are established using the Universal Transverse Mercator (UTM) NAD83 coordinate system. The only change associated with this project that impacts the plot plan is the addition of the new emergency generator and control building.

Figure 3-1 - Vail Compressor Station Location Map




EPNG Vail Compressor Station

All Coordinates shown in UTM Coordinates, Zone 12, WGS 84 Datum

Trinity Consultants

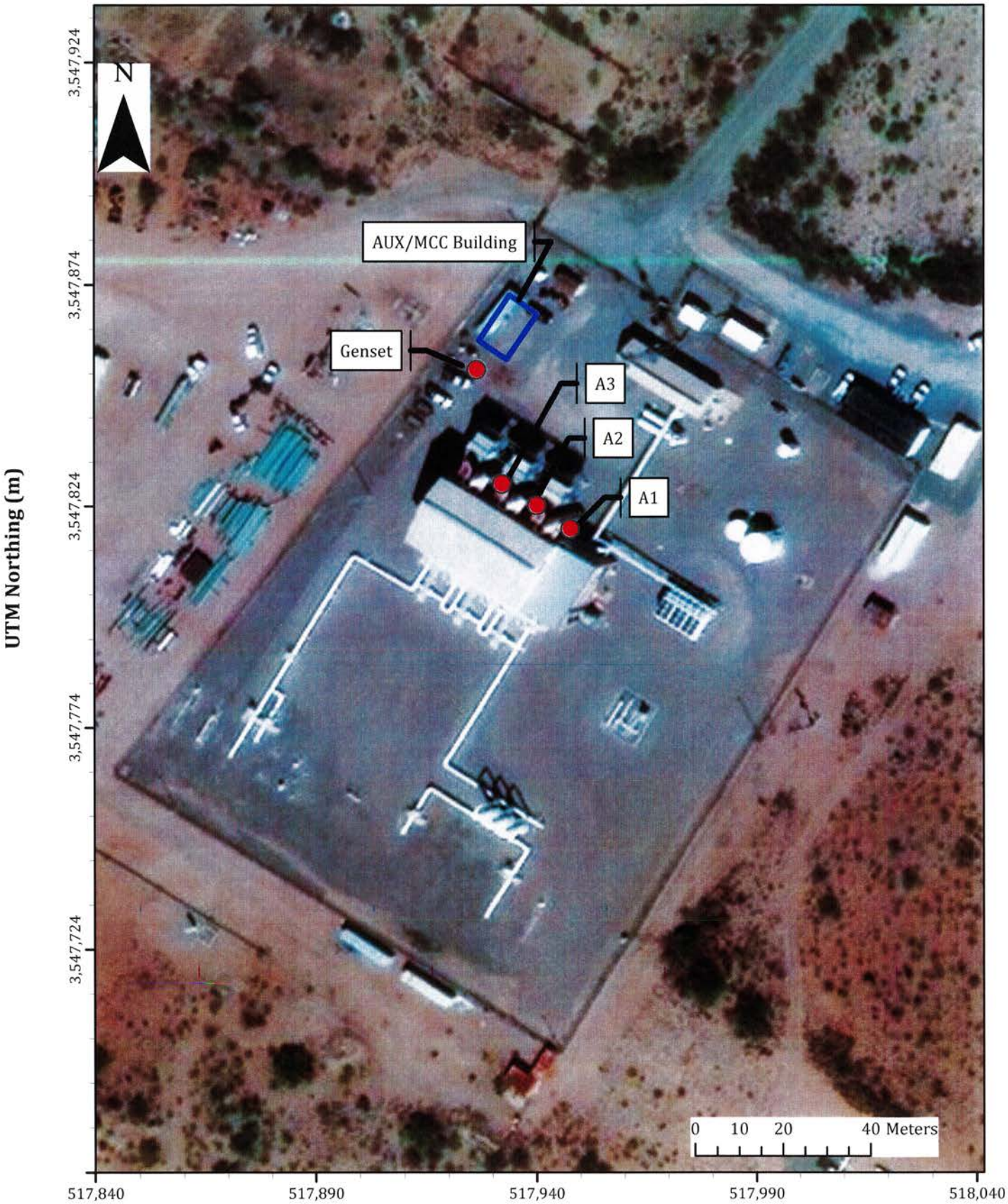
Figure 3-2. Vail Compressor Station - Fenceline

All Coordinates shown in UTM Coordinates, Zone 12, WGS 84 Datum



Trinity Consultants

Figure 3-3 - Vail Compressor Station - Plot Plan - Aerial

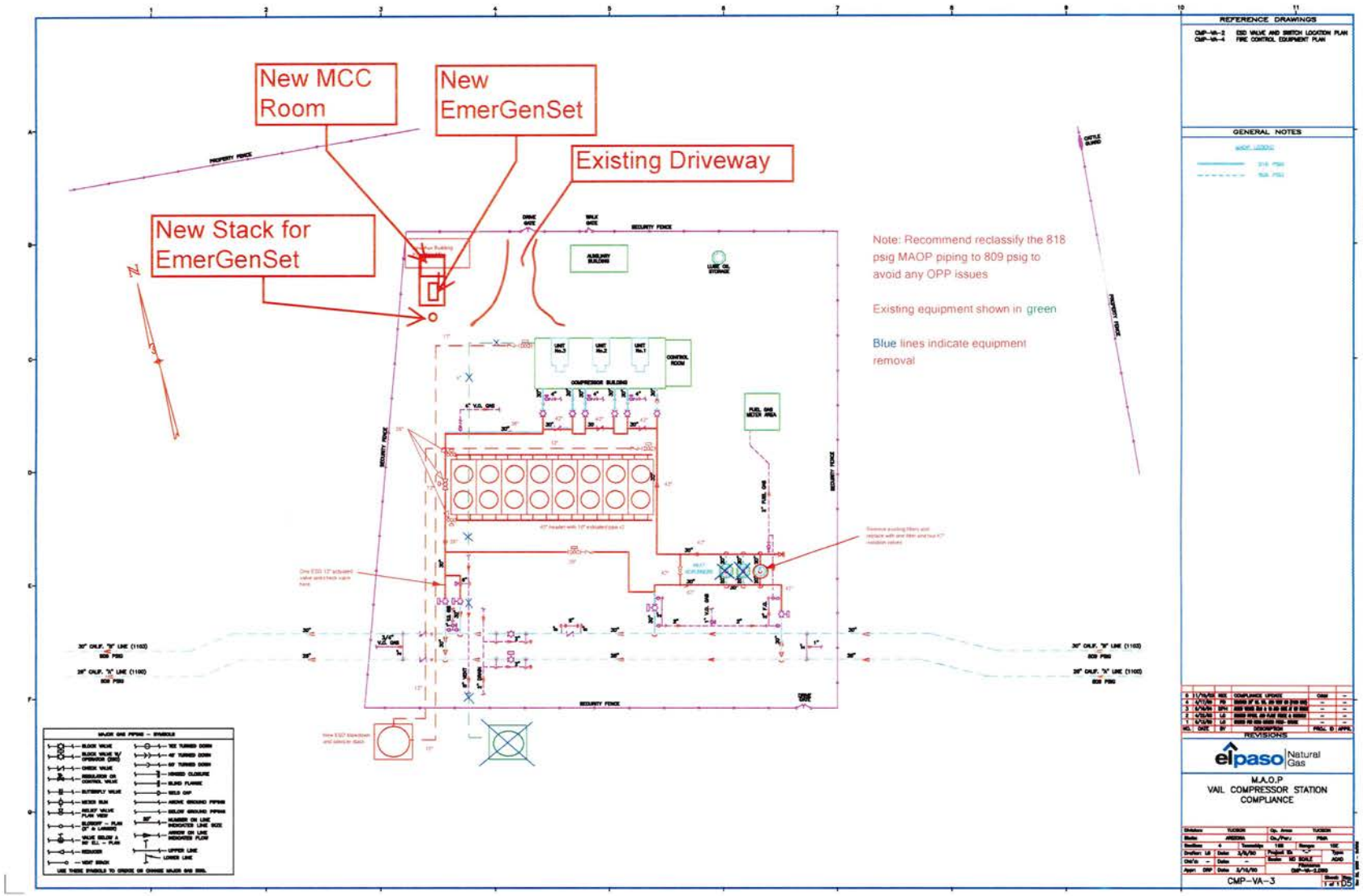



All Coordinates shown in UTM Coordinates, Zone 12, NAD 83 Datum



Trinity Consultants

# Figure 3-4. Vail Compressor Station - Plot Plan - Detailed



# 4. EMISSIONS DATA

Operations at the Vail Compressor Station may generate emissions of the following constituents.

- Nitrogen Oxides ($NO_x$);
- Carbon Monoxide (CO);
- Sulfur Dioxide ($SO_2$);
- Particulate matter (PM);
- Particulate matter with an aerodynamic diameter less than 10 microns ($PM_{10}$);
- Particulate matter with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$);
- Volatile organic compounds (VOC);
- Hazardous air pollutants (HAPs); and
- Greenhouse Gases (GHG).

Emissions associated with the various emission units are calculated using the methodologies described in the following sections. Detailed emission calculation details are provided in Appendix B.

## 4.1. TURBINE EMISSIONS

Emissions from the General Electric turbines are calculated based on turbine heat input capacity and operating hours. Emissions of $NO_x$ and CO are based on historic rates utilized as part of the 2013 air permit renewal application as follows. Note that for annual emission calculation purposes, only two of the three turbine units will operate simultaneously at any given time.

- $NO_x$ – The rate was based on a review of EPNG's turbine database for units similar to the Vail Compressor Station GE Frame III units. At the highest fuel rate, the highest $NO_x$ lb/hr rate is about 37.5 lb/hr $NO_x$. With a 10% safety factor, the estimated rate is approximately 41.25 lb/hr $NO_x$. Please refer to Appendix C: "Opportunity to Correct – Tracking #PC1104-014 – El Paso Natural Gas Company's Vail Compressor Station – PDEQ Permit # 425" (April 28, 2011).

- CO - Based on source test data as noted in Appendix D. The emissions are based on 10% over the maximum measured CO emissions (lb/scf) and 10% over the maximum fuel rate (scfh).

Emission factors for VOC, $SO_2$, $PM/PM_{10}/PM_{2.5}$, and HAPs are obtained from the U.S. Environmental Protection Agency (EPA), AP-42 Section 3.1, "*Stationary Gas Turbines,*" dated April 2000.

Annual Emissions of Criteria Pollutants ($NO_x$ and CO):

$$\text{Max Annual Operating Hours}\left(\frac{\text{hrs}}{\text{yr}}\right) * \text{Emission Factor}\left(\frac{\text{lb}}{\text{hr}}\right) * \frac{1\text{ ton}}{2000\text{ lbs}} = \frac{\text{tons}}{\text{year}}$$

Annual Emissions of Criteria Pollutants (VOC, $SO_2$, PM, $PM_{10}$, and $PM_{2.5}$) and HAPs:

$$\text{Max Annual Operating Hours}\left(\frac{\text{hrs}}{\text{yr}}\right) * \text{Emission Factor}\left(\frac{\text{lb}}{\text{MMBtu}}\right) * \text{Heat Input}\left(\frac{\text{MMBtu}}{\text{hr}}\right) * \frac{1\text{ ton}}{2000\text{ lbs}} = \frac{\text{tons}}{\text{year}}$$

Annual Emissions of Greenhouse Gases:

$$\text{Annual Operating Hours}\left(\frac{\text{hrs}}{\text{yr}}\right) * \text{Equipment Rating (hp)} * \text{Brake Specific Fuel Consumption}\left(\frac{\text{Btu}}{\text{hp}-\text{hr}}\right) * \left(\frac{1\text{ MMBtu}}{1{,}000{,}000\text{ Btu}}\right) * \text{Default Emission Factor}\left(\frac{\text{kg}}{\text{MMBtu}}\right) * \frac{2.205\text{ lbs}}{1\text{ kg}} * \frac{1\text{ ton}}{2000\text{ lbs}} = \frac{\text{tons}}{\text{year}}$$

Annual Greenhouse Gas Equivalents:

$$CO_2\text{ annual emissions} * CO_2\text{ GWP} + CH_4\text{ annual emissions} * CH_4\text{ GWP} + N_2O\text{ annual emission} * N_2O\text{ GWP} = \text{Annual Carbon Dioxide Equivalent Emissions}$$

## 4.2. EMERGENCY GENERATOR EMISSIONS

Potential emissions from the proposed natural gas-fired emergency engine are calculated based on a maximum operating capacity of 500 hr/yr of operation (consistent with EPA guidance[2]) at the maximum engine power rating. Emission factors for $NO_x$, CO, and VOC are obtained from Table 1 in 40 CFR Part 60 Subpart JJJJ, the New Source Performance Standards (NSPS) for Stationary Spark Internal Combustion Engines. Emission factors for $PM/PM_{10}/PM_{2.5}$, $SO_2$, and HAPs are the worst-case emission factors taken from AP-42 Section 3.2 (Natural Gas-fired Reciprocating Engines), Table 3.2-1, Table 3.2-2, and Table 3.3-3. Note that emissions of PM, $PM_{10}$, and $PM_{2.5}$ are conservatively assumed to be equal.

Maximum hourly emissions are calculated as follows:

$$\text{Hourly Emissions}\left(\frac{\text{lb}}{\text{hr}}\right) = \text{Emission Factor}\left(\frac{\text{grams}}{\text{HP}-\text{hr}}\right) \text{ x } \left(\frac{\text{lb}}{453.6\text{ grams}}\right) \text{ x Engine Power (HP)}$$

Annual emissions are calculated as follows:

$$\text{Annual Emissions (tpy)} = \text{Hourly Emisions}\left(\frac{\text{lb}}{\text{hr}}\right) \text{ x } \left(\frac{500\text{ hr}}{\text{yr}}\right) \text{ x } \left(\frac{\text{ton}}{2{,}000\text{ lb}}\right)$$

GHG pollutants expected to be emitted from the engine include carbon dioxide ($CO_2$), methane ($CH_4$), and nitrous oxide ($N_2O$). Standard emission factors for $CO_2$, $N_2O$ and $CH_4$ are provided in 40 CFR Part 98, Subpart C, Table C-1 and Table C-2. The global warming potential for each relevant pollutant is obtained from 40 CFR Part 98, Subpart A, Table A-1. Calculations for GHG pollutants are based on the emission factor for each GHG pollutant, relevant global warming potential, annual hours of operation, and the maximum power of the engine.

## 4.3. FUGITIVE EMISSIONS

Fugitive VOC, HAP, and GHG emissions are estimated based on default component counts from GRI-HAPCalc Version 3.01, which uses a worst-case default number of connections, flanges, open-ended lines, valves, and other components in gas service for a "typical" natural gas compression facility. The default numbers were doubled as a conservative estimate. Fugitive emissions are estimated using the Total Hydrocarbon (THC) emission factor from Table 2-4 of the EPA Protocol for Equipment Leak Emission Estimates (November 1995) and a conservative weight percent of VOCs, HAPs, $CO_2$, and $CH_4$. Supporting calculations are provided in Appendix B.

---

[2] See EPA memorandum "Calculating Potential to Emit (PTE) for Emergency Generators," John S. Seitz (Sept. 6, 1995).

## 4.4. EQUIPMENT LIST

Table 4-1 summarizes the equipment proposed utilized at the Vail Compressor Station.

**Table 4-1. Vail Compressor Station - Equipment List**

| Equipment Type | Fuel Type | Maximum Capacity [1] | Make | Model | Serial Number | Equipment ID | Date of Installation [2] |
|---|---|---|---|---|---|---|---|
| Turbine | Natural Gas | 4,976 hp (51.96 MMBtu/hr) | General Electric | GE M3002-RA | 95062 | A-1 | September 1953 |
| Turbine | Natural Gas | 4,976 hp (51.96 MMBtu/hr) | General Electric | GE M3002-RA | 95065 | A-2 | October 1953 |
| Turbine | Natural Gas | 4,976 hp (51.96 MMBtu/hr) | General Electric | GE M3002-RA | 95067 | A-3 | November 1953 |
| Emergency Generator | Natural Gas | 750 kW | TBD | TBD | TBD | Aux-1 | TBD |

[1] Site horsepower at 80 deg F and 2,951 ft.

[2] Date of manufacture is not available as units were installed in the early 1950s. Date of installation is utilized.

## 4.5. SITE-WIDE EMISSIONS SUMMARY

Table 4-2 contains a summary of the site-wide PTE emissions. Potential emissions of criteria pollutants are above the NSR major source threshold of 250 tpy and the Title V major source threshold of 100 tpy. Therefore, the Vail Compressor Station is subject to the EPA's PSD regulations. Detailed calculations can be found in Appendix B.

## Table 4-2. Vail Compressor Station – Post Project Potential Emissions

| Pollutant | Estimated Potential Emissions (tpy) [1] | | | | | Major Source Thresholds (tpy) | | Major Source? | |
|---|---|---|---|---|---|---|---|---|---|
| | Turbine A-1, A-2, or A-3 | Turbine A-1, A-2, or A-3 | Emergency Generator | Fugitives | Total | Title V | PSD | Title V | PSD |
| $NO_x$ | 180.68 | 180.68 | 0.66 | - | 362 | 100 | 250 | Yes | Yes |
| CO | 57.59 | 57.59 | 1.45 | - | 117 | 100 | 250 | Yes | No |
| VOC | 0.48 | 0.48 | 0.12 | 1.27 | 2.34 | 100 | 250 | No | No |
| $SO_2$ | 0.77 | 0.77 | 0.001 | - | 1.55 | 100 | 250 | No | No |
| PM / $PM_{10}$ /$PM_{2.5}$ | 1.50 | 1.50 | 0.03 | - | 3.04 | 100 | 250 | No | No |
| Max HAP | 0.16 | 0.16 | 0.07 | 0.10 | 0.16 | 10 | - | No | No |
| Total HAPs | 0.23 | 0.23 | 0.11 | 0.10 | 0.67 | 25 | - | No | No |
| $CO_2e$ | 26,649 | 26,649 | 230 | 771 | 54,299 | 100,000 | 75,000 | No | No |

1 Only two of the three turbines (A-1, A-2, and A-3) will operate simultaneously at any given time.

# 5. INSIGNIFICANT ACTIVITIES

In addition to the emissions units detailed in other parts of this application, EPNG may conduct any of the following non-exclusive insignificant activities at the Vail Compressor Station as noted in PCC §17.04.340.A.114

a. Landscaping, building maintenance, or janitorial activities.

b. Gasoline storage tanks with capacity of ten thousand gallons or less.

c. Diesel and fuel oil storage tanks with capacity of forty thousand gallons or less.

d. Batch mixers with rated capacity of five cubic feet or less.

e. Hand-held or manually operated equipment used for buffing, polishing, carving, cutting, drilling, machining, routing, sanding, sawing, surface grinding, or turning of ceramic artwork, precision parts, leather, metals, plastics, fiberboard, masonry, carbon, glass or wood.

f. Powder coating operations.

g. Internal combustion (IC) engine-driven compressors, IC engine-driven electrical generator sets, and IC engine-driven water pumps used only for emergency replacement or standby service.

h. Lab equipment used exclusively for chemical and physical analyses.

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

j. Operation of oil/water/scrubber liquid systems.

k. Operation of cooling water, plant water, wastewater, and other water system.

l. Emissions from testing and sampling.

m. Emissions from natural gas blow downs and pigging operations.

n. Operation of Battery systems.

o. Cathodic Protection Systems.

p. Operation of stationary natural gas fired appliances rated less than 1.0 MMBtu/hr provided the combined capacity of such equipment does not exceed 10.0 MMBtu/hr.

q. Operation of natural gas vents, and gas-driven pneumatic valves and controllers not otherwise considered a source of fugitive emissions in accordance with 40 CFR 60.543a, insofar as the natural gas discharged from the device's vent is not considered a fugitive emissions.

r. Trivial activities as provided in PCC §17.04.340.A.237 a through xx.

Furthermore, with this application, EPNG is providing information and emissions calculations for emergency shutdown (ESD) and blowdown associated with startup and shutdown events. EPNG is providing this additional information, with associated emissions calculations, to assist PDEQ in its review of the permit application. This information is not intended to be included in the permit or used as the basis for a limit on a number of events and is included only to demonstrate that ESD and blowdown emissions at the facility are insignificant. Detailed emissions calculations associated with ESD and blowdown are provided in Appendix E.

# 6. REGULATORY APPLICABILITY

The Vail Compressor Station is subject to certain federal, state, and county air regulations. This section summarizes the following key air quality regulations that apply to the facility under federal, state, and Pima County programs.

- Federal New Source Review applicability; and
- PDEQ and federal applicable requirements.

## 6.1. FEDERAL NEW SOURCE REVIEW APPLICABILITY

The New Source Review (NSR) permitting program generally requires that a stationary source obtain a permit and undertake other obligations prior to construction of any facility if the proposed project results in the potential to emit air pollution in excess of certain threshold levels. The federal NSR program is listed in Title 40 of the Code of Federal Regulations (40 CFR) §51-52.

Two distinct federal NSR permitting programs apply depending on whether the facility is located in an attainment or nonattainment area for a particular pollutant, PSD and Nonattainment NSR (NNSR), respectively. NNSR permitting applies to new construction or modifications that result in emission increases of a particular pollutant for which the area is classified as "nonattainment". The PSD permitting program applies to projects with emissions increases of pollutants for which the area is classified as "attainment" or "unclassifiable".

The Vail Compressor Station is located in the portion of Pima County that has been classified as attainment or unclassified with the NAAQS for all regulated pollutants.[3] Therefore, with respect to the federal NSR permitting program, only PSD requirements are considered potentially applicable to the facility.

Because the Vail Compressor Station is a Major PSD source, any physical change or change in method of operation at the facility must be evaluated to determine if it is a "major modification" as defined in PCC §17.04.340.A.127 and 40 CFR §52.21(b)(2). A project is a "major modification" if it will cause a Net Emissions Increase (NEI) that is significant for any pollutant regulated by the PSD program. "Significant" is defined for each pollutant using the Significant Emission Rates (SERs) at PCC §17.04.340.A.212 and 40 CFR §§52.21(b)(23) and (b)(49)(iii). If the PSD SER is exceeded for any pollutant, the project will be subject to the following primary PSD technical evaluations:

- Best Available Control Technology (BACT) review;
- Air quality analysis; and
- Additional impacts analysis.

Because the PSD program is delegated to PDEQ[4] (and not SIP approved), the agency must apply current, rather than historic, requirements contained at 40 CFR §52.21 for purposes of evaluating major modification at PSD major sources. The following sections provide an overview of the methodology utilized to complete this evaluation for the proposed project.

[3] Per 40 CFR §81.303.

[4] PDEQ PSD program delegation contract CTNDE-18-156, dated June 5, 2018.

### 6.1.1. Step 1. Calculate Baseline Actual Emissions (BAE)

Pursuant to 40 CFR §52.21(b)(48), for existing facilities (other than electric utility steam generating units) baseline actual emissions (**BAE**) are:

> *the average rate, in tons per year, at which the emissions unit actually emitted the pollutant during any consecutive 24-month period selected by the owner or operator within the 10-year period immediately preceding either the date the owner or operator begins actual construction of the project, or the date a complete permit application is received ...*

Therefore, as contained in Appendix B, the 10 years immediately preceding the date of this permit application submittal were reviewed to identify the consecutive 24-month period with the most representative actual emissions. Baseline actual emissions, in tons per year, are determined from annual emissions reported in emission inventories, with the following conclusions:

- $NO_x$, CO, $SO_2$, and GHG emissions – based on average emissions between January 2011 and December 2012.
- VOC, PM, $PM_{10}$, and $PM_{2.5}$ emissions - conservatively assumed to be zero.

### 6.1.2. Step 2. Calculate Projected Actual Emissions (PAE)

Projected actual emissions (PAE) are calculated using methodology described in Section 4. Note that for the new emergency generator and fugitives, the PAE is conservatively assumed equal to the maximum potential to emit (PTE). Detailed PAE emission calculations are provided in Appendix B.

### 6.1.3. Step 3. Calculate Net Emissions Increase (NEI)

The NEI is calculated as the difference between the PAE and the BAE for each pollutant, plus the emissions increases from upstream and downstream support facilities that would have an increase in utilization due to the project. There are no upstream or downstream support facilities with increases as a result of this project at the facility.

### 6.1.4. Step 4. Compare PSD Significant Emission Rates

The calculated NEIs are compared to the major source modification SER for each pollutant. If the NEI exceeds the SER, then PSD review is required. The results of the PSD applicability analysis, summarized in Table 6-1, below, indicate that the proposed project is subject to PSD review for $NO_x$ and CO. Ozone PSD review is also required, per 40 CFR 51.166(b)(23), because the NEI for $NO_x$, an ozone precursor, exceeds 40 tpy. Detailed PSD applicability calculations are provided in Appendix B.

**Table 6-1. Vail Compressor Station – PSD Applicability Summary**

| Pollutant | Emissions (tpy) | | | | PSD Review Required? [1] |
|---|---|---|---|---|---|
| | Baseline Actual Emissions (BAE) | Projected Actual Emissions (PAE) | Net Emissions Increase (NEI) | PSD Significant Emission Rate (SER) | |
| $NO_x$ | 4.98 | 238 | 232.65 | 40 | Yes |
| CO | 1.35 | 117 | 116.04 | 100 | Yes |
| VOC | - | 2.78 | 2.78 | 40 | No |
| $SO_2$ | 0.02 | 1.55 | 1.53 | 40 | No |
| PM | - | 3.10 | 3.10 | 25 | No |
| $PM_{10}$ | - | 3.10 | 3.10 | 15 | No |
| $PM_{2.5}$ | - | 3.10 | 3.10 | 10 | No |
| $CO_2e$ [2] | 1,310.0 | 54,299 | 52,989 | 75,000 | No |

[1] Ozone PSD Review is required if $NO_x$ OR VOC exceed their respective SER

[2] GHG ($CO_2e$) SER according to 40 CFR 51.166(b)(48)

## 6.2. PDEQ AND FEDERAL APPLICABLE REQUIREMENTS

Current operations at the Vail Compressor Station are subject to the PDEQ applicable requirements codified in the July 8, 2015 version of PDEQ Permit No. 425. EPNG is only proposing modifications of adding gas cooling facilities and gas recycling to lower the temperature of the gas before it is discharged into the main pipeline. Cooling helps preserve the pipe's anti-corrosion coating and allows for the transportation of greater volume of gas because natural gas is denser at lower temperatures. The proposed changes do not involve any physical or operational changes to the existing turbines that drive the centrifugal compressors and there is no increase in the capacity, or emissions of the turbines. EPNG also proposes to add an emergency generator with a natural gas-fired internal combustion engine. The engine operation will be limited to routine maintenance and testing as well as emergency events. As a result, additional PDEQ and federal applicable requirements are only applicable to the proposed emergency generator set.

### 6.2.1. New Sources Performance Standards

The following section discuss NSPS applicability to the turbines and emergency generator set.

#### *6.2.1.1. NSPS Applicability to Turbines*

The requirements in 40 CFR §60.2 define a "modification" for NSPS purposes as the following:

> *any physical change in, or change in the method of operation of, an existing facility which increases the amount of any air pollutant (to which a standard applies) emitted into the atmosphere by that facility or which results in the emission of any air pollutant (to which a standard applies) into the atmosphere not previously emitted.*

As noted in other parts of this application, EPNG is not proposing any physical change or change to the method of operation to the turbines, or the emission sources. Only the existing piping will be modified. Furthermore, EPNG is not proposing any emission increases from the turbines or emissions of pollutants not previously emitted. Therefore, the turbines are not considered "modified" as part of the

proposed project. Furthermore, based on their date of installation in 1953 the turbines have not been subject to any potentially applicable NSPS, which all have post-1970 applicability dates. As a result, the turbines are not subject to any NSPS requirements.

### *6.2.1.2. NSPS Applicability to Emergency Generator*

The emergency generator set will be subject to 40 CFR 60 Subpart JJJJ, *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines.* PDEQ follows the federal NSPS and does not differentiate with respect to the general provisions of NSPS and standards for performance for stationary spark ignition internal combustion engines as codified in the PCC §17.16.490.A.

#### 6.2.1.2.1 NSPS Subpart A - General Provisions

The provisions of 40 CFR 60 Subpart A, *General Provisions*, apply to the owner or operator of any stationary source which contains an "affected facility"[5] (or an emission source to which an NSPS standard is applicable). The emergency generator set is considered an affected facility. The general provisions include notifications, recordkeeping, testing, monitoring, and reporting requirements. Pursuant to 40 CFR §60.4246 in NSPS Subpart JJJJ, the following are the specific applicable requirements for the emergency generator set:

- As required by 40 CFR §60.4(a), all required reports and other submittals under the NSPS program shall be submitted in duplicate to the Director, Region IX Air Division, U.S. EPA, 75 Hawthorne Street, San Francisco, CA 94105. In addition, as required by 40 CFR §60.4(b), all reports and required submittals under the NSPS general provisions shall be submitted to PDEQ. Because U.S. EPA has not delegated to PDEQ the authority to implement NSPS Subpart JJJJ, submittal requirements under that rule are not covered by the duplicate submission requirement at 40 CFR §60.4(b).

- Performance testing requirements in 40 CFR §60.8 may be applicable if EPNG elects to comply with the emission standards using the requirements in 40 CFR §60.4243(a)(2)(iii).

- As provided by 40 CFR §60.12, the owner or operator of an affected facility shall not build, erect, install, or use any article, machine, equipment or process, the use of which conceals an emission which would otherwise constitute a violation of an applicable standard.

Finally, pursuant to 40 CFR §60.4246, the following are notable requirements under the NSPS General Provisions which are not applicable:

- Notification and recordkeeping requirements in 40 CFR §60.7 are not applicable except to the limited extent that an initial notification is required pursuant to 40 CFR §60.4245(c).

- General duty requirements in 40 CFR §60.11(d) are not applicable. Instead, the requirements of NSPS Subpart JJJJ apply, including requirements either to operate according to the manufacturer's emission-related written instructions pursuant to 40 CFR §60.4243(a)(1) or to operate the engine in a manner consistent with good air pollution control practice for minimizing emissions pursuant to 40 CFR §60.4243(a)(2)(iii) or (b)(2)(ii).

[5] Per 40 CFR §60.1

> Monitoring requirements in 40 CFR §60.13 are not applicable.

#### 6.2.1.2.2 NSPS Subpart JJJJ - Stationary Spark Ignition Internal Combustion Engines

The emergency generator set will be an "affected facility" under NSPS Subpart JJJJ because it is a "stationary internal combustion engine" using "spark ignition," as those terms are defined at 40 CFR §60.4248, and because pursuant to 40 CFR §60.4230(a)(4)(iv), EPNG will commence construction after June 12, 2006[6], and the engine will be manufactured after January 1, 2009. Following are the specific applicable requirements for the emergency generator engine based on the condition that EPNG will purchase a certified engine. Note that EPNG may operate and maintain the emergency generator engine in a "certified manner" (i.e., according to the manufacturer's emission-related written instructions) or "non-certified manner" (i.e., not according to the manufacturer's emission-related written instructions).

> As noted in 40 CFR §60.4233(e), EPNG will comply with the emission standards in NSPS Subpart JJJJ, Table 1. The emission standards are presented in an output-based limit expressed in g/hp-hr and a concentration-based limit expressed in ppmvd at 15% $O_2$. EPNG may elect to use either limit. EPNG will be installing an emergency engine with a maximum engine power greater than 130 hp manufactured after January 1, 2009. Therefore, the engine will be subject to the following emission standards.

| | | | |
|---|---|---|---|
| $NO_x$ | 2.0 g/hp-hr | | 160 ppmvd at 15% $O_2$ |
| CO | 4.0 g/hp-hr | or | 540 ppmvd at 15% $O_2$ |
| VOC[7] | 1.0 g/hp-hr | | 86 ppmvd at 15% $O_2$ |

> As noted in 40 CFR §60.4236(c), EPNG may not install engines that do not meet the applicable requirements in 40 CFR §60.4233 after January 1, 2011.

> As noted in 40 CFR §60.4237(a), because the engine is not expected to meet the standards applicable to non-emergency engines (which are generally lower than those provided above), EPNG must install a non-resettable hour meter.

> As noted in 40 CFR §60.4234, EPNG will achieve the emission standards as required in 40 CFR §60.4233 over the entire life of the engine.

> As noted in 40 CFR §60.4243(d), EPNG will be subject to the following three requirements:
  - There is no time limit on the use of emergency stationary ICE in emergency situations.
  - An emergency stationary ICE may be operated for a combination of purposes for a maximum of 100-hours per year. The purposes include maintenance checks and readiness testing, emergency demand response, and periods where there is a deviation of voltage or frequency of 5 percent or greater below standard voltage or frequency
  - Emergency stationary ICE may be operated for up to 50 hours per calendar year in non-emergency situations.

> As noted in 40 CFR §60.4243(a)(2)(iii), if the emergency generator engine is operated and maintained in a "non-certified manner" EPNG will keep a maintenance plan and records of conducted maintenance and will, to the extent practicable, maintain and operate the engine

[6] For purposes of NSPS Subpart JJJJ, the date that construction commences is the date the engine is ordered by EPNG.
[7] When calculating emissions of volatile organic compounds, emissions of formaldehyde should not be included.

in a manner consistent with good air pollution control practice for minimizing emissions. In addition, EPNG will conduct an initial performance test within 1 year of engine startup and conduct subsequent performance testing to demonstrate compliance every 8,760 hours or 3 years, whichever comes first.

- As noted in 40 CFR §60.4244, if the emergency generator engine is operated and maintained in a "non-certified manner" EPNG will conduct the performance tests according to the procedures in 40 CFR §60.4244 (a) through (f).

- As noted in 40 CFR §§60.4245(a)(1) and (a)(2), EPNG will keep records of all notifications submitted to comply with this subpart and all documentation supporting any notification, as well as maintenance conducted on the engine.

- As noted in 40 CFR §60.4245(a)(3), if the engine is certified, documentation from the manufacturer that the engine is certified to meet the emission standards and information as required in 40 CFR parts 90, 1048, 1054, and 1060, as applicable.

- As noted in 40 CFR §60.4245(a)(4), if the emergency generator engine is operated and maintained in a "non-certified manner" EPNG will maintain documentation that the engine meets the emission standards.

- As noted in 40 CFR §60.4245(b)(4), if the emergency generator engine is operated and maintained in a "non-certified manner" EPNG will maintain documentation that the engine meets the emission standards.

- As noted in 40 CFR §60.4245(b), EPNG will keep records of the hours of operation of the engine that is recorded through the non-resettable hour meter as well as document how many hours are spent for emergency operation, what classified the operation as emergency, and how many hours are spent for non-emergency operation.

## 6.2.2. National Emission Standard for Hazardous Air Pollutants

The following section discuss National Emission Standard for Hazardous Air Pollutants (NESHAP) applicability to the turbines and emergency generator set.

### *6.2.2.1. NESHAP Applicability to Turbines*

Based on their date of installation in 1953 the turbines have not been subject to any potentially applicable NESHAP, which all have post-2003 applicability dates for "existing" sources. As a result, the turbines are not subject to any NESHAP requirements.

### *6.2.2.2. NESHAP Applicability to Emergency Generator*

The emergency generator set will be subject to 40 CFR 63 Subpart ZZZZ, *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.* PDEQ follows the federal NESHAP and does not differentiate with respect to the general provisions of NESHAP and standards for stationary spark ignition internal combustion engines as codified in the PCC §17.16.530.B.

#### 6.2.2.2.1 NESHAP Subpart A - General Provisions

The provisions of 40 CFR 63 Subpart A, *General Provisions*, apply to the owner or operator of any stationary source which contains an "affected facility"[8] (or an emission source to which a NESHAP standard is applicable). While the emergency generator set is considered an affected facility, pursuant to 40 CFR §63.6590(c)(1) the NESHAP requirements can be met by meeting the requirements of NSPS Subpart JJJJ and no further requirements apply under NESHAP Subpart ZZZZ. Therefore, NESHAP provisions are not applicable to the emergency generator set.

#### 6.2.2.2.2 NESHAP Subpart ZZZZ - Stationary Reciprocating Internal Combustion Engines

Pursuant to 40 CFR §63.6590, the emergency generator set will be an "affected facility" under NESHAP Subpart ZZZZ because it is a stationary reciprocating internal combustion engines (RICE) located at a major or area source of HAP emissions. However, pursuant to 40 CFR §63.6590(c)(1), the requirements of NESHAP Subpart ZZZZ can be met by meeting the requirements of NSPS Subpart JJJJ. Therefore, no further requirements apply to the emergency generator set under NESHAP Subpart ZZZZ.

## 6.2.3. PDEQ Applicable Requirements

The following provides a summary of the potentially applicable requirements for the Vail compressor Station as well as historic exemptions.

### *6.2.3.1. PDEQ Applicable Requirements*

As noted in other parts of this application, EPNG is not proposing any physical change or change to the method of operation to the turbines, or the emission sources. Only the existing piping will be modified. Furthermore, EPNG is not proposing any emission increases from the turbines or emissions of pollutants not previously emitted. Therefore, the turbines are not considered "modified" as part of the proposed project. As a result, currently applicable requirements noted below for the turbines, as contained in PDEQ Permit No. 425, will not change due to the proposed project. However, the following considerations are expected to change some of the site-wide applicable requirements. Additional details are contained in Appendix F.

- Addition of the emergency generator;
- Additional record keeping requirements to document the starting and stopping time of each turbine;
- Restriction that only two of the three turbines will be operated simultaneously at any given time.

### *6.2.3.2. Historic Exemptions*

As part of this application, EPNG is presenting the following exemptions which have been historically claimed as part of other historic permit actions:

- There is lubricating oil in tanks at the facility that meets PDEQ's definition for petroleum liquid (PCC §17.04.340.A.167). However, the tanks are less than 40,000 gallons in capacity and vapor pressure is low (less than 1.5 pounds per square inch absolute under actual storage conditions). PDEQ previously exempted these tanks as PCC §17.16.230.B & E are not on the list of applicable

[8] Per 40 CFR §63.2

requirements in the current Class I permit. Accordingly, EPNG requests that PDEQ reaffirm the exemption of the oil storage tanks from the provisions of PCC §17.16.230.B & E.

> PCC §17.16.010.C exempts sources burning natural gas from the recordkeeping requirements of Chapter 17.16. Because the units at the facility subject to PCC §17.16.340 burn only pipeline quality natural gas that contains less than 0.8% sulfur by weight, EPNG requests exemption from the provisions of PCC §17.16.340.I and J to record daily the sulfur content and lower heating value of the fuel, and to report instances where the sulfur exceeds 0.8%.

### 6.2.4. Compliance Assurance Monitoring

The Compliance Assurance Monitoring Rule (CAM) applies to each Pollutant Specific Emission Unit (PSEU) that meets all elements of a three-part test.

> Subject to an emission limitation or standard, and
> Use a control device to achieve compliance, and
> Have pre-control emissions that exceed or are equivalent to the major source threshold.

None of the units at the Vail Compressor Station use any add-on control devices to achieve compliance. Therefore, CAM requirements are not applicable.

### 6.2.5. Chemical Accident Prevention

40 CFR Part 68 Subpart B outlines requirements for risk management prevention (RMP) plans pursuant to CAA Section 112(r). Applicability of this subpart is determined based on the type and quantity of the chemicals stored at the facility. The Vail Compressor Station will not store any RMP chemicals in quantities greater than the RMP trigger thresholds. Therefore, the requirements of 40 CFR Part 68 are not applicable to the facility. However, the Vail Compressor Station is subject to the provisions of the CAA General Duty Clause (GDC), Section 112, as it pertains to accidental releases of hazardous material. The GDC recognizes that EPNG has a general duty and responsibility to prevent and mitigate the consequences of chemical accidents.

### 6.2.6. Stratospheric Ozone Protection Regulations

The requirements originating from Title VI of the Clean Air Act, *Protection of Stratospheric Ozone*, are contained in 40 CFR Part 82. Subparts A, B, D, E, and G of 40 CFR Part 82 will not be applicable to the facility. 40 CFR Part 82 Subpart C, *Protection of Stratospheric Ozone: Ban on nonessential Class I and Class II Products*, and 40 CFR Part 82 Subpart F, *Recycling and Emissions Reduction*, potentially apply if the facility maintains, repairs, services, or disposes of appliances that utilize Class I or Class II ozone depleting substances. Subpart C generally requires that nonessential Class I and Class II products be avoided. Subpart F generally requires persons completing the repairs, service, or disposal to be properly certified. An appropriately certified technician will complete all repairs, service, and disposal of ozone depleting substances from the comfort cooling components at the Vail Compressor Station.

# 7. BEST AVAILABLE CONTROL TECHNOLOGY

For a major modification under the PSD program, BACT applicability is set forth through PCC §17.16.590.A.2, which is substantially the same as the definition in federal PSD rule 40 CFR §52.21(j)(3).

> *A major modification shall apply BACT for each [PSD pollutant] for which the modification would result in a significant net emissions increase at the source. This requirement applies to each proposed emissions unit at which a net emissions increase in the pollutant would occur as a result of a physical change or change in the method of operation in the unit.*

As discussed in this application, the proposed project is subject to PSD review for $NO_x$ and CO. Therefore, a BACT analysis is presented for these pollutants for the sources included in the project, the turbines and the natural gas-fired emergency generator engine.

## 7.1. BACT ANALYSIS FOR TURBINES

A BACT analysis is not required for the turbines based on agency guidance. The U.S. EPA provided a case example of how the turbines at the Vail Compressor Station would not be considered a "modified" emission unit. In August 2001, correspondence between Jenny Reinersten of the Minnesota Pollution Control Agency and Robert Miller of U.S. EPA provided the following guidance on the Rochester Public Utilities' (RPU) Silver Lake Plant PSD application[9]:

> *Tapping one of the steam lines would constitute a physical change to the associated boiler only if the boiler and steam line were part of the same emission unit. We do not view the steam line or steam turbine as part of the boiler emission unit. Accordingly, tapping the steam lines does not constitute a physical change to Silver Lake's boilers.*

A similar example can be found in Eric Massey of ADEQ's correspondence with EPNG in June 2011 related to the El Paso Willcox Lateral Project[10]:

> *The El Paso Willcox Lateral Project involves enhancing compression on a lateral line at the compressor station... The compressors (not the engines) will be retrofitted to handle the higher pressures. The resulting emissions increases do not occur as a "result of a physical change or change in the method of operation in the unit (A.A.C. R18-2-406(A)(2))," but rather as a result of the a change in the associated compressor unit that will allow for increased utilization of the engines. As a result, the engines themselves, which are not being modified, would not be subject to BACT under A.A.C. R18-2-406(A)(2).*

As noted by Robert Miller and confirmed by Lisa Beckman in her correspondence[11], the turbines are separate emission units from the transmission line akin to the RPU's steam lines and steam turbines being considered separate from their own boiler emission unit and the El Paso Willcox engines being considered separate from the compressor retrofit. The conclusion of no physical change being made to the RPU's boilers and El Paso Willcox's engines is the same in EPNG's case for the turbines. Since there is no physical change to the turbines, no BACT analysis is required for the turbines at the Vail Compressor Station based on PCC §17.16.590.A.2, below.

---

[9] Letter from Robert Miller, EPA, to Jenny L. Reinersten, Minnesota Pollution Control Agency, dated August 6, 2001.
[10] Letter from Eric Massey, ADEQ, to Eric Hiser of Jorden Bischoff & Hiser, P.L.C. dated June 30, 2011.
[11] BACT Applicability to Emission Units, Email from Lisa Beckman, EPA, to Rupesh Patel, PDEQ, dated November 4, 2019.

*A major modification shall apply BACT for each pollutant listed in Section 17.04.340(A)(212)(a) for which the modification would result in a significant net emissions increase at the source. This requirement applies to each proposed emissions unit at which a net emissions increase in the pollutant would occur as a result of a physical change or change in the method of operation in the unit.*

As noted from the case examples of RPU Silver Lake Plant's boilers and El Paso Willcox's engines, in addition to the correspondence between EPA and PDEQ dated November 4th, 2019, the turbines at the Vail Compressor Station are not under any physical change or change in the method of operation with respect to the proposed project. Therefore, a BACT analysis is not required for the turbines at the Vail Compressor Station.

## 7.2. BACT ASSESSMENT

The generalized BACT assessment used by EPNG in this application is described below.

### 7.2.1. BACT Definition

BACT is defined in PCC §17.04.340.A.37 as follows. The underlined terms in the definition are discussed further below.

> *Best available control technology (BACT)" means an emission limitation, including a visible emissions standard, based on the maximum degree of reduction for each regulated air pollutant which would be emitted from any proposed major stationary source or major modification which the control officer on a case-by-case basis, taking into account energy, environmental and economic impact and other costs, determines to be achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combination techniques for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR parts 60 and 61. If the control officer determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard or combination thereof may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results.*

#### *7.2.1.1. Emission Limitation*

BACT is "an emission limitation," not an emission reduction rate or a specific technology. While BACT is prefaced upon the application of technologies reflecting the maximum reduction rate achievable, the final result of BACT is an emission limit. Typically, when quantifiable and measurable[12], this limit would be expressed as an emission rate limit of a pollutant (e.g., lb/MMBtu, ppm, or lb/hr)[13].

[12] The definition of BACT allows use of a work practice where emissions are not easily measured or enforceable. 40 CFR §52.21(b)(12).

[13] Emission limits can be broadly differentiated as "rate-based" or "mass-based." For an engine, a rate-based limit would typically be in units of lb/MMBtu (mass emissions per heat input). In contrast, a typical mass-based limit would be in units of lb/hr (mass emissions per time).

### *7.2.1.2. Each Pollutant*

Since BACT applies to "each pollutant subject to regulation under the Act," the BACT evaluation process is typically conducted for each regulated NSR pollutant individually and not for a combination of pollutants.[14]

### *7.2.1.3. Case-By-Case Basis*

Unlike many of Clean Air Act (CAA) programs, a BACT evaluation is case-by-case. BACT permit limits are not simply the requirement for a control technology because of its application elsewhere or the direct transference of the lowest emission rate found in other permits for similar sources, applied to the source. Rather, EPA has explained the top-down BACT analysis process works on a case-by-case basis. To assist applicants and regulators with the case-by-case process, in 1990 EPA issued a Draft Manual on New Source Review permitting which included and discussed the "top-down" BACT analysis procedure.

> *In brief, the top-down process provides that all available control technologies be ranked in descending order of control effectiveness. The PSD applicant first examines the most stringent--or "top"- alternative. That alternative is established as BACT unless the applicant demonstrates, and the permitting authority in its informed judgment agrees, that technical considerations, or energy, environmental, or economic impacts justify a conclusion that the most stringent technology is not "achievable" in that case. If the most stringent technology is eliminated in this fashion, then the next most stringent alternative is considered, and so on.*[15]

The five steps in a top-down BACT evaluation can be summarized as follows:

- Step 1. Identify all available control technologies;
- Step 2. Eliminate technically infeasible options;
- Step 3. Rank the technically feasible control technologies by control effectiveness;
- Step 4. Evaluate most effective controls; and
- Step 5. Select BACT.

Additionally, it is important to note that the top-down process is conducted on a unit-by-unit, pollutant-by-pollutant basis and only considers the portions of the facility that are considered "emission units" as defined under the PSD regulations.[16]

### *7.2.1.4. Achievable*

BACT is to be set at the lowest value that is "achievable." However, there is an important distinction between emission rates achieved at a specific time on a specific unit, and an emission limitation that a unit must be able to meet continuously over its operating life. As discussed by the DC Circuit Court of Appeals:

---

[14] Pursuant to 40 CFR §52.21(b)(12).

[15] Draft NSR Manual at B-2. "The NSR Manual has been used as a guidance document in conjunction with new source review workshops and training, and as a simple guide for state and federal permitting officials with respect to PSD requirements and policy. Although it is not binding Agency regulation, the NSR Manual has been looked to be this Board as a statement of the Agency's thinking on certain PSD issues. e.g., In re RockGen Energy Ctr., 8 E.A.D. 536, 542 n. 10 (EAB 1999), In re Knauf Fiber Glass, GmbH, 8 E.A.D. 121, 129 n. 13 (EAB 1999)." In re Prairie State Generating Company 13 E.A.D. 1, 13 n 2 (2006).

[16] Pursuant to 40 CFR §52.21(a)(7), emission unit means any part of a stationary source that emits or would have the potential to emit any regulated NSR pollutant.

*In National Lime Assn v. EPA, 627 F.2d 416, 431 n.46 (D.C. Cir. 1980), we said that where a statute requires that a standard be "achievable," it must be achievable" under most adverse circumstances which can reasonably be expected to recur."*[17]

EPA has reached similar conclusions in prior determinations for PSD permits.

*Agency guidance and our prior decisions recognize a distinction between, on the one hand, measured 'emissions rates,' which are necessarily data obtained from a particular facility at a specific time, and on the other hand, the 'emissions limitation' determined to be BACT and set forth in the permit, which the facility is required to continuously meet throughout the facility's life. Stated simply, if there is uncontrollable fluctuation or variability in the measured emission rate, then the lowest measured emission rate will necessarily be more stringent than the "emissions limitation" that is "achievable" for that pollution control method over the life of the facility. Accordingly, because the "emissions limitation" is applicable for the facility's life, it is wholly appropriate for the permit issuer to consider, as part of the BACT analysis, the extent to which the available data demonstrate whether the emissions rate at issue has been achieved by other facilities over a long term.*[18]

Thus, BACT must be set at the lowest feasible emission rate recognizing that the facility must be in compliance with that limit for the lifetime of the facility on a continuous basis. While viewing individual unit performance can be instructive in evaluating what BACT might be, any actual performance data must be viewed carefully, as rarely will the data be adequate to truly assess the performance that a unit will achieve during its entire operating life. To assist in meeting a BACT limit, the source must consider production processes or available methods, systems or techniques, as long as those considerations do not redefine the source.

#### *7.2.1.5. Production Process*

The definition of BACT lists both production processes and control technologies as possible means for reducing emissions.

#### *7.2.1.6. Available*

The term "available" in the definition of BACT is implemented through a feasibility analysis – a determination that the technology being evaluated is demonstrated or available and applicable.

#### *7.2.1.7. Floor*

For criteria pollutants, the least stringent emission rate typically allowable for BACT is any applicable limit under either an NSPS or a NESHAP. Emission limitations that derive from an NSPS reflect "best demonstrated technology." The "floor" for emissions limitations in NESHAPs (i.e., Maximum Achievable Control Technology or "MACT") that apply to existing sources must equal to the average current emissions limitations achieved by the best-performing 12 percent of sources in the source category, if there are 30 or more existing sources (if there are fewer than 30 existing sources, the MACT floor must equal the average current emissions limitation achieved by the best-performing five sources in the category) - for new sources, the MACT floor must equal the current level of emissions control achieved by the best-controlled similar source.

---

[17] As quoted in Sierra Club v. U.S. EPA (97-1686).

[18] U.S. EPA Environmental Appeals Board decision, in re: Newmont Nevada Energy Investment L.L.C. PSD Appeal No. 05-04, decided December 21, 2005. Environmental Administrative Decisions, Volume 12, Page 442.

## 7.2.2. BACT Methodology

For the purposes of this BACT analysis, BACT has been evaluated via a "top-down" approach which includes the steps outlined in the subsections below.

### *7.2.2.1. Step 1 - Identify All Available Control Technologies*

Available control technologies with the practical potential for application to the emission unit and regulated air pollutant in question are identified. Available control options include the application of alternate production processes and control methods, systems, and techniques including fuel cleaning and innovative fuel combustion, when applicable and consistent with the project. The application of demonstrated control technologies in other similar source categories to the emission unit in question can also be considered. While identified technologies may be eliminated in subsequent steps in the analysis based on technical and economic infeasibility or environmental, energy, economic or other impacts, control technologies with potential application to the emission unit under review are identified in this step.

Under Step 1 of a BACT analysis, the following resources are typically consulted when identifying potential technologies:

1. EPA's Reasonably Available Control Technology (RACT)/Best Available Control Technology (BACT)/Lowest Achievable Emission Reduction (LAER) Clearinghouse (RBLC) database;
2. Determinations of BACT by regulatory agencies for other similar sources or air permits and permit files from federal or state agencies;
3. Engineering experience with similar control applications;
4. Information provided by air pollution control equipment vendors with significant market share in the industry; and/or
5. Review of literature from industrial technical or trade organizations.

EPA's "top-down" BACT analysis procedure also recommends the consideration of inherently lower emitting processes as available control options under Step 1.[19]

### *7.2.2.2. Step 2 - Eliminate All Technically Infeasible Options*

After the available control technologies have been identified, each technology is evaluated with respect to its technical feasibility in controlling individual pollutant emissions from the source in question. The first question in determining whether or not a technology is feasible is whether or not it is demonstrated. Whether or not a control technology is demonstrated is considered to be a relatively straightforward determination, although a source may cite site-specific differences to eliminate a technology from consideration.

> *Demonstrated "means that it has been installed and operated successfully elsewhere on a similar facility." Prairie State, slip op. at 45. "This step should be straightforward for control technologies that are demonstrated--if the control technology has been installed and operated successfully on the type of source under review it is demonstrated, and it is technically feasible."*[20]

[19] PSD and Title V Permitting Guidance for Greenhouse Gases. March 2011, page 24.
[20] NSR Workshop Manual (Draft), Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR) Permitting, page B.17.

An undemonstrated technology is only technically feasible if it is "available" and "applicable." A control technology or process is only considered available if it has reached the licensing and commercial sales phase of development and is "commercially available".[21] Control technologies in the R&D and pilot scale phases are not considered available. Based on EPA guidance, an available control technology is presumed to be applicable if it has been permitted or actually implemented by a similar source. Decisions about technical feasibility of a control option consider the physical or chemical properties of the emissions stream in comparison to emissions streams from similar sources successfully implementing the control alternative. The NSR Manual explains the concept of applicability as follows: "An available technology is "applicable" if it can reasonably be installed and operated on the source type under consideration."[22] Applicability of a technology is determined by technical judgment and consideration of the use of the technology on similar sources as described in the NSR Manual.

#### *7.2.2.3. Step 3 - Rank Remaining Control Technologies by Control Effectiveness*

All remaining technically feasible control options are ranked based on their overall control effectiveness for the pollutant under review.

#### *7.2.2.4. Step 4 - Evaluate Most Effective Controls and Document Results*

After identifying and ranking available and technically feasible control technologies, the economic, environmental, and energy impacts are evaluated to select the best control option. If adverse collateral impacts do not disqualify the top-ranked option from consideration it is selected as the basis for the BACT limit. Alternatively, in the judgment of the permitting agency, if unreasonable adverse economic, environmental, or energy impacts are associated with the top control option, the next most stringent option is evaluated. This process continues until a control technology is identified.

Permitting authorities have historically considered the effects of multiple pollutants in the application of BACT as part of the PSD review process, including the environmental impacts of collateral emissions resulting from the implementation of emission control technologies. To clarify the permitting agency's expectations with respect to the BACT evaluation process, states have sometimes prioritized the reduction of one pollutant above another. For example, technologies historically used to control $NO_x$ emissions frequently caused increases in CO emissions. Accordingly, several states prioritized the reduction of $NO_x$ emissions above the reduction of CO emissions, approving low $NO_x$ control strategies as BACT that result in higher CO emissions relative to the uncontrolled emissions scenario.

#### *7.2.2.5. Step 5 - Select BACT*

In the final step, the BACT emission limit is determined for each emission unit under review based on evaluations from the previous step.

Although the first four steps of the top-down BACT process involve technical and economic evaluations of potential control options (i.e., defining the appropriate technology), the selection of BACT in the fifth step involves an evaluation of emission rates achievable with the selected control technology. BACT is an emission limit unless technological or economic limitations of the measurement methodology would make the imposition of an emission standard infeasible, in which case a work practice or operating standard can be imposed.

---

[21] NSR Workshop Manual (Draft), Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR) Permitting, page B.18.
[22] NSR Workshop Manual (Draft), Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR) Permitting, page B.18.

Establishing an appropriate averaging period for the BACT limit is a key consideration under Step 5 of the BACT process.

## 7.3. BACT ANALYSIS FOR NATURAL GAS-FIRED EMERGENCY GENERATOR

The following sections present the BACT analysis for the natural gas-fired internal combustion engine/generator set used for emergency operations at the Vail compressor station. This section presents the required BACT analyses for $NO_x$ and CO emissions from the proposed natural gas-fired emergency internal combustion engine/generator set.

### 7.3.1. Background of Pollutant Formation

Emissions of CO from natural gas-fired emergency engine occurs as a result of incomplete combustion of fuel. Emissions of CO occur when there is insufficient residence time at high temperature to complete the final step in hydrocarbon oxidation.[23]

In combustion processes, $NO_x$ is formed by three different mechanisms: Fuel $NO_x$, Thermal $NO_x$ and Prompt $NO_x$. "Fuel $NO_x$" forms when fuels containing nitrogen are burned. When these fuels are burned, the nitrogen bonds break and some of the resulting free nitrogen oxidizes to form $NO_x$. With excess air, the degree of fuel $NO_x$ formation is primarily a function of the nitrogen content of the fuel. "Thermal $NO_X$" is formed by a series of chemical reactions in which oxygen and nitrogen present in the combustion air dissociates and react to form $NO_x$ at high combustion temperatures. "Prompt $NO_x$", a form of thermal $NO_x$, forms in fuel-rich environments where temperatures are low and residence times are short. It forms in a fast reaction involving nitrogen, oxygen and hydrocarbon radicals. The contribution of prompt $NO_x$ to total $NO_x$ is relatively low. Thermal $NO_x$ is the primary $NO_x$ generated during natural gas combustion in engines.

### 7.3.2. Identify All Available Control Technologies

$NO_x$ and CO reduction in internal combustion engines can be accomplished by combustion control techniques and post combustion control methods. Combustion control techniques incorporate fuel or air staging that reduce peak flame temperature or introduce inerts that limit initial $NO_x$ formation, or both. Post-combustion $NO_x$ control technologies employ various strategies to chemically reduce $NO_x$ to elemental nitrogen ($N_2$) and CO and hydrocarbons to water ($H_2O$) and Carbon Dioxide ($CO_2$) with the use of a catalyst.

These controls may be viable options for prime use generators or older and high pollutant emitting emergency generators; however, implementing such controls on a new emergency engine would not be cost effective and have little to no impact on emission reduction. A new natural gas-fired engine would be a more effective control measure as the engine is rated at lower emission factors and ultimately is a cost-effective option for EPNG.

### 7.3.3. Selection of BACT

The proposed emergency engine/generator set will be a certified pursuant to the requirements of NSPS Subpart JJJJ which limits the emissions of $NO_x$, CO, and VOC through cleaner fuel burning technology. EPA certified engines and generators are currently the cleanest fuel-burning engines on the market and will effectively limit $NO_x$ and CO emissions from EPNG's routine maintenance and emergency operations.

[23] U.S. EPA, AP-42, Section 3.2.3.2, "Natural Gas-Fired Reciprocating Engines", Carbon Monoxide and Volatile Organic Compounds

# 8. AIR DISPERSION MODELING ANALYSIS

As part of the PSD review process, the completion of an air quality dispersion modeling analysis is required to demonstrate that potential impacts from the proposed project will not:

- Cause or contribute to a violation of any applicable NAAQS;
- Exceed a PSD increment; or
- Significantly affect Air Quality Related Values (AQRV) and visibility in Class I areas.

This section describes the air quality dispersion modeling methodologies for the PSD review process. This section is prepared in accordance with Appendix W of the Guideline on Air Quality Models (Revised)[24], Air Dispersion Modeling Guidelines for Arizona Air Quality Permits[25], Federal Land Managers' Air Quality Related Values Workgroup (FLAG) Phase I Report – Revised (referenced herein as FLAG 2010),[26] and Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report (referenced herein as IWAQM Phase 2)[27]. The modeling analysis is performed in the following two steps:

- Step 1 – A significant impact analysis, and if required;
- Step 2 – A full impact analysis.

## 8.1. MODEL OVERVIEW

This section contains a description of the model, meteorological data, terrain data, building wake effects, and receptors that used in the air dispersion modeling analysis.

### 8.1.1. Dispersion Model Selection

The U.S. EPA American Meteorological Society / Environmental Protection Agency Regulatory Model (AERMOD) model includes a state-of-the-science downwash algorithm and utilizes AERMET, a meteorological data preprocessor that utilizes current planetary boundary layer (PBL) theory to calculate the dispersion coefficients ($\sigma_y$ and $\sigma_z$).[28] The most current version of the AERMOD model (version 19191) was used in conducting the modeling analysis. The modeling was performed using the regulatory default option, which includes the following:

- Stack-tip downwash; and
- A routine for processing averages when calm wind conditions occur or when meteorological data is missing.

[24] U.S. EPA, 40 CFR Part 51, Appendix W, January 17, 2017.

[25] Arizona Department of Environmental Quality, Air Dispersion Modeling Guidelines for Arizona Air Quality Permits, November 1, 2019.

[26] U.S. Forest Service, National Park Service, and U.S. Fish and Wildlife Service, Federal Land Managers' Air Quality Related Values Work Group (FLAG) Phase I report - Revised (2010). National Resource Report NPS/NRPC/NRR-2010/232. National Park Service, Denver, Colorado. November 2010.

[27] EPA, IWAQM Phase 2 Summary Report and Recommendations for Modeling Long-Range Transport Impacts, Research Triangle Park, North Carolina, EPA-454/R-95-006, 1995.

[28] U.S. EPA, User's Guide for the AMS/EPA Regulatory Model-AERMOD, September 2004.

### 8.1.2. Meteorological Data

EPA modeling guidance allows the use of five years of off-site meteorological data or at least one year of on-site meteorological data. EPNG utilized ADEQ model-ready data developed from five years of surface and upper air meteorological data from the Tucson International Airport (station identifier KTUS). This data was processed by ADEQ using the most recent version of EPA's AERMET (Version 19191) and used in this modeling demonstration. ADEQ has Quality Assured the data to ensure it meets EPA guidance that a meteorological database "*must be 90 percent complete (before substitution) in order to be acceptable for use in regulatory dispersion modeling*" and "*The 90 percent requirement applies on a quarterly basis such that 4 consecutive quarters with 90 percent recovery are required for an acceptable one-year data base.*"[29]

### 8.1.3. Terrain

The terrain elevation for each modeled receptor, building, and source was determined using the USGS National Elevation Dataset (NED). Specifically, the USGS NED 1/3 arc second (approximately 10-meter resolution) was used.

The terrain height for each modeled receptor was calculated using the AERMOD terrain processor (AERMAP version 18081). In addition to terrain elevation, an additional parameter called the hill height scale is required for each receptor to execute AERMOD's terrain modeling algorithms. AERMOD computes the impact at a receptor as a weighted interpolation between horizontal and terrain-following states using a critical dividing streamline approach. This scheme assumes that part of the plume mass will have enough energy to ascend and traverse over a terrain feature and the remainder will impinge and traverse around a terrain feature under certain meteorological conditions. The hill height scale was computed by the AERMAP terrain preprocessor for each receptor as a measure of the one terrain feature in the modeling domain that would have the greatest effect on plume behavior at that receptor.

The hill height scale does not represent the critical dividing streamline height itself but supplies the computational algorithms with an indication of the relative relief within the modeling domain for the determination of the critical dividing streamline height for each hour of meteorological data.

According to Section 2.2.1 of the AERMOD Users Guide, the NED array boundary for AERMAP must include all terrain features that exceed a 10 percent elevation slope from any given receptor to properly calculate the hill height scale at each receptor.[30] The domain for the hill height analysis was set to the minimum coverage required for proper handling of elevation slope.

### 8.1.4. Building Wake Effects (Downwash)

The emission sources considered in this analysis were evaluated in terms of their proximity to nearby structures. The purpose of this evaluation is to determine if stack discharge might become caught in the turbulent wakes of these structures. Wind blowing around a building creates zones of turbulence that are greater than if the building was absent. Plumes entrained in the zones of turbulence experience enhanced plume growth and restricted plume rise. AERMOD incorporates the Plume Rise Model Enhancements (PRIME) algorithms using dimensions from the EPA's Building Profile Input Program (BPIP) for estimating for plumes affected by building wakes. The site layout was used to digitize buildings and structures to be included in the downwash analysis.

---

[29] EPA, 2000: Meteorological Monitoring Guidance for Regulatory Modeling Applications. U.S. Environmental Protection Agency, Research Triangle Park, NC.

[30] U.S. Environmental Protection Agency, User's Guide for the AMS/EPA Regulatory Model - AERMOD, Research Triangle Park, North Carolina, EPA-454/B-03-001, September, 2004.

Direction-specific building dimensions and the dominant downwash structure parameters was determined using the *BREEZE*® BPIPP software, developed by Trinity Consultants, Inc. This software incorporates the algorithms of the U.S. EPA-sanctioned Building Profile Input Program with PRIME enhancement (BPIP-PRIME), version 04274.[31]

## 8.1.5. Receptor Grid

### *8.1.5.1. Class II Receptor Grid*

Four receptor grids will be used covering a region that extends 50 km beyond the facility fence line. Note that all receptor coordinates were established using the UTM NAD83 coordinate system. The primary receptor grids will include the following:[32]

1. The "fence line grid" is a discrete receptor grid with the receptors spaced at 25-meter intervals along the fence line.
2. The "fine grid" contains 100-meter spaced receptors extending approximately 1 km from the fence line, excluding the receptors within the fence line.
3. The "medium grid" contains 500-meter spaced receptors extending from 1 km to 5 km from the fence line.
4. The "coarse grid" contains 1,000-meter spaced receptors extending from 5 km to 50 km from the fence line.

The receptor grid elevations and scaling heights were calculated using AERMAP based on USGS NED 1/3 arc second data files.

### *8.1.5.2. Class I Receptor Grid*

Various Class I areas are located within 300 km from EPNG, with Saguaro Wilderness East and West located within 50 km of the facility. For Saguaro Wilderness East and West, the Class I area receptors developed by the NPS were used in the Class I area modeling analysis. As discussed in other parts of this report, the determination of impacts outside 50 km from the facility is not expected to be required.

## 8.1.6. Land Use Classification

As depicted in Figure 3-2, the Facility is located in an area with desert shrub land and agricultural as the dominant land cover. EPA guidance provides two procedures to determine whether the character of an area is predominantly urban or rural. One procedure is based on land-use typing and the other is based on population density. Both procedures require an evaluation of characteristics within a 3-km radius from a source. The land-use typing method is based on the work of August Auer and is preferred because it is more directly related to the surface characteristics of the evaluated area that affect dispersion rates.[33] The Auer land-use approach considers four primary land-use types: Industrial (I), Commercial (C), Residential (R), and Agricultural (A). Within these primary types, subtypes are identified in Table 8-1.

---

[31] U S. Environmental Protection Agency, User's Guide to the Building Profile Input Program, Research Triangle Park, NC, EPA-454/R-93-038.

[32] Per ADEQ, Air Dispersion Modeling Guidelines for Arizona Air Quality Permits, November 1, 2019.

[33] Per J. Appl. Meteor., Correlation of Land Use and Cover with Meteorological Anomalies, August Auer Jr., 1978.

**Table 8-1. Vail Compressor Station – Land Use Types and Corresponding Dispersion Classification** *

| Type | Description | Class |
|---|---|---|
| I1 | Heavy industrial | Urban |
| I2 | Light/Moderate Industrial | Urban |
| C1 | Commercial | Urban |
| R1 | Common Residential (Normal Easements) | Rural |
| R2 | Compact Residential (Single-Family) | Urban |
| R3 | Compact Residential (Multi-Family) | Urban |
| R4 | Estate Residential (Multi-Acre) | Rural |
| A1 | Metropolitan Natural | Rural |
| A2 | Agricultural | Rural |
| A3 | Undeveloped (Grass/Weeds) | Rural |
| A4 | Undeveloped (Heavily Wooded) | Rural |
| A5 | Water Surfaces | Rural |

* Per ADEQ, Air Dispersion Modeling Guidelines for Arizona Air Quality Permits, November 1, 2019.

EPNG conducted a land cover analysis using the draft version of the EPA AERSURFACE model (version 19039) within 3-km radius from the facility. The draft version of AERSURFACE was used so that more recent 2011 land use data could be used. AERSURFACE provides a tally of the number of land cover grid cells for land cover categories that are present in the area of interest. Table 8-2 contains the results from the AERSURFACE model for the number of different land cover categories encountered in the 3-km analysis area. In addition, in Table 8-2, a classification of "rural" or "urban" was assigned to the land cover categories based on Table 8-1. As contained in Table 8-2, almost 92% of land within 3 km from EPNG is considered "rural." Therefore, because the land use classification is over 50% rural, the urban dispersion coefficient will not be applied.

**Table 8-2. Vail Compressor Station – Land Cover Analysis**

| Category No. | Category Description | Class | Counts | % of Total |
|---|---|---|---|---|
| 0 | Missing, Out-of-Bounds, or Undefined: | Unclassified | 0 | 0.00% |
| 11 | Open Water: | Rural | 0 | 0.00% |
| 12 | Perennial Ice/Snow: | Rural | 0 | 0.00% |
| 21 | Developed, Open Space | Urban | 1143 | 3.64% |
| 22 | Developed, Low Intensity | Urban | 818 | 2.60% |
| 23 | Developed, Medium Intensity | Urban | 453 | 1.44% |
| 24 | Developed, High Intensity | Urban | 218 | 0.69% |
| 31 | Bare Rock/Sand/Clay: | Rural | 289 | 0.92% |
| 32 | Unconsolidated Shore | Rural | 0 | 0.00% |
| 41 | Deciduous Forest: | Rural | 0 | 0.00% |
| 42 | Evergreen Forest: | Rural | 0 | 0.00% |
| 43 | Mixed Forest: | Rural | 0 | 0.00% |
| 51 | Dwarf Shrub land: | Rural | 0 | 0.00% |
| 52 | Shrub/Scrub | Rural | 28,122 | 89.51% |
| 71 | Grasslands/Herbaceous: | Rural | 373 | 1.19% |
| 72 | Sedge/Herbaceous | Rural | 0 | 0.00% |
| 73 | Lichens | Rural | 0 | 0.00% |
| 74 | Moss | Rural | 0 | 0.00% |
| 81 | Pasture/Hay: | Rural | 0 | 0.00% |
| 82 | Cultivated Crops: | Rural | 0 | 0.00% |
| 90 | Woody Wetlands: | Rural | 0 | 0.00% |
| 91 | Palustrine Forested Wetland | Rural | 0 | 0.00% |
| 92 | Palustrine Scrub/Shrub Wetland | Rural | 0 | 0.00% |
| 93 | Estuarine Forested Wetland | Rural | 0 | 0.00% |
| 94 | Estuarine scrub/Shrub Wetland | Rural | 0 | 0.00% |
| 95 | Emergent Herbaceous Wetland | Rural | 0 | 0.00% |
| 96 | Palustrine Emergent Wetland | Rural | 0 | 0.00% |
| 97 | Estuarine Emergent Wetland | Rural | 0 | 0.00% |
| 98 | Palustrine Aquatic Bed | Rural | 0 | 0.00% |
| 99 | Estuarine Aquatic Bed | Rural | 0 | 0.00% |
| ***Total – Counts*** | | | ***31,416*** | - |
| ***Percentage – Rural*** | | | - | ***91.62%*** |
| ***Percentage – Urban*** | | | - | ***8.38%*** |

## 8.1.7. Considerations for 1-hour $NO_2$ Modeling

The EPA's memorandums dated June 28, 2010 and March 1, 2011[34, 35] recommended the following three-tiered approach for 1-hour $NO_2$ modeling:

- Tier 1 Total Conversion - assuming full conversion of NO to $NO_2$ without any additional justification.
- Tier 2 Ambient Ratio Method 2 (ARM2) - multiply Tier 1 result by empirically-derived $NO_2/NO_x$ ratio, with 0.8 as default ambient ratio for the 1-hour $NO_2$ standard without additional justification.

[34] U.S. EPA, Applicability of Appendix W Modeling Guidance for the 1-hour NO2 National Ambient Air Quality Standard, Research Triangle Park, North Carolina 27711, June 28, 2010.

[35] U.S. EPA, Additional Clarification Regarding the Application of Appendix W Modeling Guidance for the 1-hour NO2 National Ambient Air Quality Standard, Research Triangle Park, North Carolina 27711, March 1, 2011.

- Tier 3 - Plume Volume Molar Ratio Method (PVMRM)/ Ozone Limiting Method (OLM) - the two approaches are available as non-regulatory-default options within the AERMOD model.

In this modeling analysis, EPNG utilized the Tier 3 approach using the PVMRM algorithm. The PVMRM accounts for ambient conversion of NO to $NO_2$ in the presence of ozone, namely the ozone titration mechanism. The ozone background data for use in the analysis was obtained from the Fairground monitor in southeast Tucson (AQS site ID 04-019-1020), for the period from 2014 through 2018, due to its close proximity to the Vail Compressor Station. Any missing ozone background data was substituted using the maximum monthly/hourly value over the 5 year period.[36] Modeling for the facility was conducted using an in-stack $NO_2/NO_x$ ratio (ISR) of 0.5 for the emergency generator per EPA guidance.[37] An ISR of 0.124 was used for the turbines based on the analysis contained in Table 8-3.

**Table 8-3. Vail Compressor Station – Turbines ISR**

| Parameter | Vail Compressor Station | Selected ISR [1] |
|---|---|---|
| Manufacturer | General Electric | Solar |
| Max. Output (hp) | 5,290 | 4,400 |
| Fuel Type | Natural Gas | Natural Gas |
| ISR | | 0.124 |

[1] Per EPA Alpha Database (https://www3.epa.gov/scram001/no2_isr_Database.htm)

## 8.1.8. Background Concentration

A "representative" background concentration is required for each modeled pollutant and averaging period to complete the NAAQS modeling analysis. In this modeling analysis NAAQS is only required for the $NO_2$ 1-hour averaging period. The background concentration accounts for sources of air pollution other than those explicitly modeled (i.e., the facility and the industrial neighbors identified to represent the nearby inventory sources). Typically, background concentrations are accounted for by using air quality data measured at an appropriate monitoring station.

Appendix W of 40 CFR Part 50 discusses requirements for obtaining representative background concentrations. Specifically, "air quality data should be used to establish background concentrations in the vicinity of the source(s) under consideration". Based on this, the $NO_2$ background concentration was determined from the 3 most recent years of complete data collected at the 22nd & Craycroft monitor, 10.3 miles from the facility. This monitor is representative of the actual background concentration at the facility due to its close proximity to the site along with its similar climatology and elevation. A summary of the monitor's yearly background data is contained in Table 8-4. The complete evaluation of background concentrations is contained in Appendix G.

[36] EPA, Technical Support Document (TSD) for NO2 - related AERMOD modifications, EPA- 454/B-15-004, July 2015.
[37] U.S. EPA, Additional Clarification Regarding the Application of Appendix W Modeling Guidance for the 1-hour NO2 National Ambient Air Quality Standard, Research Triangle Park, North Carolina 27711, March 1, 2011.

**Table 8-4. Vail Compressor Station – Representative Background Concentrations**

| Pollutant | Averaging Period | Site Name | Distance to the Vail Compressor Station (miles) | Year | Percent Complete [1] | Concentration Format | Concentration ($\mu g/m^3$) [1] | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Actual | Selected |
| $NO_2$ | 1-hr | 22nd & Craycroft | 10.3 | 2016 | 97 | 98th Percentile | 63.0 | 70.2 |
| | | | | 2017 | 100 | | 70.3 | |
| | | | | 2018 | 100 | | 77.5 | |

[1] Background concentrations obtained from EPA's AirData Air Quality Monitors.

Actual values are converted to $\mu g/m^3$ with the following conversion 1 ppb = 1.88 $\mu g/m^3$.

## 8.1.9. Impact Analysis for Class I Area

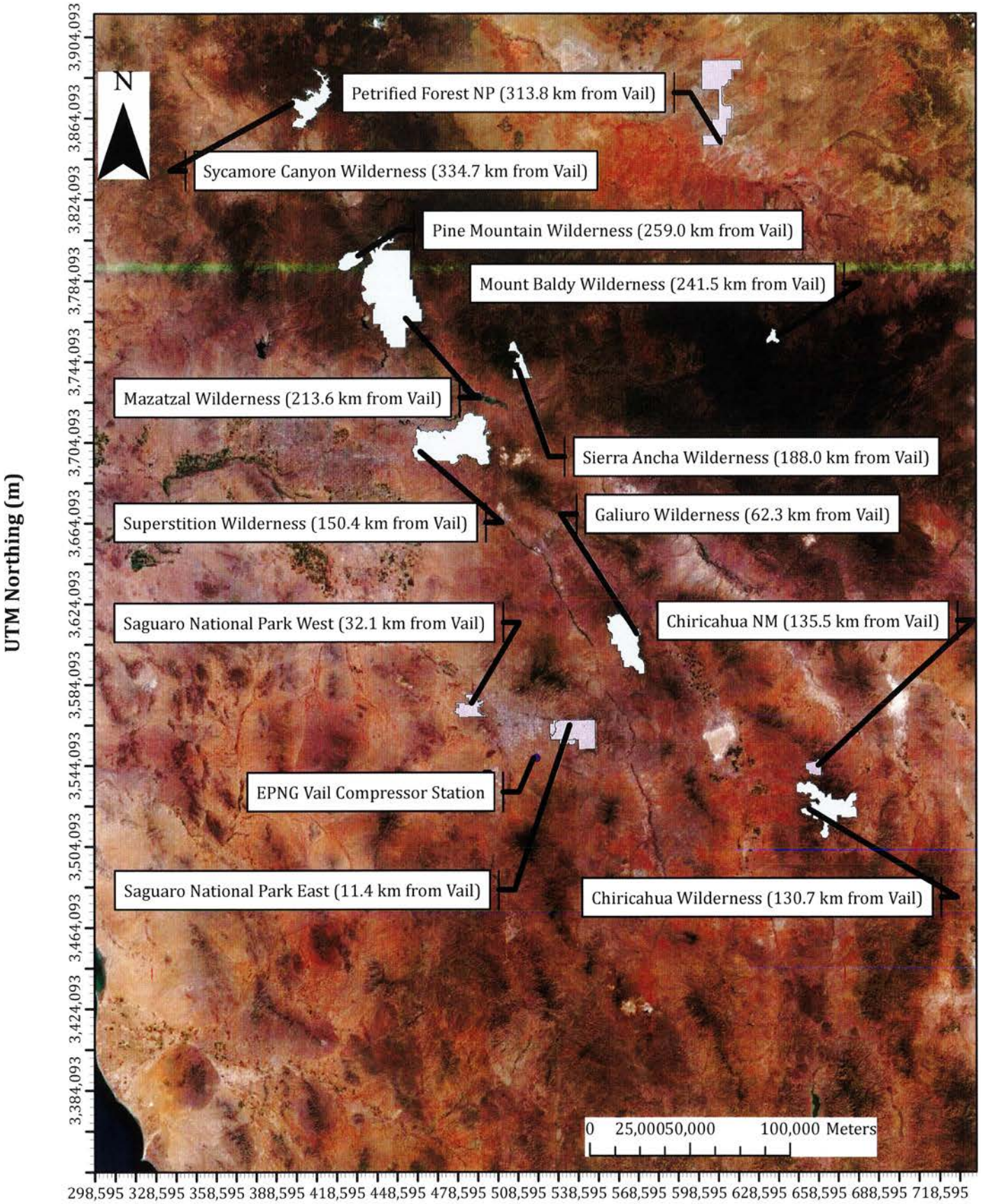
Class I areas are federally protected areas for which more stringent air quality standards apply. Class I areas are generally defined as federal lands such as national parks (NP), national wilderness areas, and national monuments. There are ten (10) Class I areas within 300 km of the facility location. A list of these Class I areas, approximate distance of each area from the facility, and the responsible Federal Land Manager (FLM) for each area is contained in Table 8-4. Figure 8-1 depicts various Class I areas and their distances from the facility. The following two principal air quality impacts are considered for Class I areas within 300 km of the EPNG Vail Compressor Station. In this case, emissions of $NO_x$ and the resulting $NO_2$ impacts are the only relevant PSD triggering pollutants for the Class I area analyses.

- Assessment of the proposed project's emissions impacts on air quality related values (AQRV); and
- PSD increment analysis for the Class I areas for pollutants greater than the applicable SERs and for which a PSD increment exists.

**Table 8-4. Vail Compressor Station – Class I Areas within 300 km**

| Name | Distance of Closest Point to EPNG (km) | Federal Land Manager |
|---|---|---|
| Saguaro National Park East | 11.4 | U.S. National Park Service |
| Saguaro National Park West | 32.1 | U.S. National Park Service |
| Galiuro Wilderness | 62.3 | U.S. Forest Service |
| Chiricahua Wilderness | 130.7 | U.S. Forest Service |
| Chiricahua NM | 135.5 | U.S. National Park Service |
| Superstition Wilderness | 150.4 | U.S. Forest Service |
| Sierra Ancha Wilderness | 188.0 | U.S. Forest Service |
| Mazatzal Wilderness | 213.6 | U.S. Forest Service |
| Mount Baldy Wilderness | 241.5 | U.S. Forest Service |
| Pine Mountain Wilderness | 259.0 | U.S. Forest Service |

# Figure 8-1 - Vail Compressor Station - Class I Areas within 300 km




**UTM Easting (m)**
All Coordinates shown in UTM Coordinates, Zone 12, NAD 83 Datum



Trinity Consultants

## 8.2. EMISSIONS MODELED & SOURCE CHARACTERIZATION

The following sections discuss the source inventory for the modeling analysis, including the source characterization, parameters, and emission rates to be included in the modeling demonstration.

### 8.2.1. EPNG Sources

The source characterization and emissions modeled for all $NO_x$ and CO emission sources at the facility are detailed below.

#### *8.2.1.1. Source Characterization*

Table 8-5 contains a summary of the facility emission sources that evaluated in this modeling demonstration. The facility does not operate any other emission sources. The emission sources were modeled as point sources with the appropriate stack parameters.

**Table 8-5. Vail Compressor Station – Model Emission Sources & Stack Parameters**

| Emission | | Exhaust Height | | Exhaust Diameter | | Exhaust Velocity | | Exhaust Temperature | |
|---|---|---|---|---|---|---|---|---|---|
| Model ID | Unit | (ft) | (m) | (ft) | (m) | (ft/sec) | (m/sec) | (deg F) | (deg K) |
| A1 | Turbine A-1 | 51 | 15.54 | 6 | 1.83 | 99.47 | 30.32 | 550 | 560.93 |
| A2 | Turbine A-2 | 51 | 15.54 | 6 | 1.83 | 99.47 | 30.32 | 550 | 560.93 |
| A3 | Turbine A-3 | 51 | 15.54 | 6 | 1.83 | 99.47 | 30.32 | 550 | 560.93 |
| GENSET | eGen Aux-1 | 8.06 | 2.46 | 0.5 | 0.15 | 404.72 | 123.36 | 898 | 754.26 |

#### *8.2.1.2. Emissions Modeled*

The post-project PTE for site-wide sources, as contained in Appendix B, were modeled. As summarized in Table 8-6, hourly emission rates were used to develop the short term modeled concentrations (including 1-hour and 8-hour), and annual emission rates were used to develop the annual modeled concentrations.

Per EPA guidance[38], the emergency generator can be considered an "intermittent" emission source. The ADEQ allows such sources to be excluded from the 1-hour $NO_2$ NAAQS modeling evaluations, if they meet the following criteria:[39]

- Any intermittent units that operate no more than 200 hours per year;
- Emergency generators that operate up to 500 hours per year and no more than 100 hours per year for maintenance and readiness testing purposes; and
- Infrequent startup/shutdown operations.

Per ADEQ guidance, because the emergency generator operates up to 500 hours per year and no more than 100 hours per year for maintenance and readiness testing purposes, it is classified as an intermittent source. Therefore, $NO_2$ model impacts for the emergency generator are based on annualized hourly emission rate rather than the maximum hourly emission rate. Specifically, the

[38] EPA memo "Additional Clarification Regarding the Application of Appendix W Modeling Guidance for the 1-hour NO2 National Ambient Air Quality Standard," March 1, 2011.

[39] Per Arizona Department of Environmental Quality, Air Dispersion Modeling Guidelines for Arizona Air Quality Permits, November 1, 2019.

annualized emission rate is based on the ratio of operating hours to hours in a year, or 500 hours out of 8,760 hours.

**Table 8-6. Vail Compressor Station – Model Emission Rates**

| Source | | Significant Impact/NAAQS Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | CO Emissions | | $NO_2$ Emissions | | | | |
| | | Short-Term | | Short-Term | | | Annual | |
| Model ID | Unit | (lb/hr) | (g/sec) | Calculated | Modeled | (g/sec) | (tpy) | (g/sec) |
| A1 | Turbine A-1 | 13.15 | 1.66 | 41.25 | 41.25 | 5.20 | 180.68 | 5.20 |
| A2 | Turbine A-2 | 13.15 | 1.66 | 41.25 | 41.25 | 5.20 | 180.68 | 5.20 |
| A3 | Turbine A-3 | 13.15 | 1.66 | 41.25 | 41.25 | 5.20 | 180.68 | 5.20 |
| GENSET | eGen Aux-1 | 5.79 | 0.73 | 2.65 | 0.15 | 0.02 | 0.66 | 0.02 |

### *8.2.1.3. Determination of Worst-Case Combination*

As noted in other parts of this application, only two of the turbine units will operate simultaneously at any given time. Therefore, an analysis was completed to evaluate the different combinations of turbines that can operate at any time and determine the worst-case combination for modeling impacts purposes. For purposes of this evaluation, the source parameters in Table 8-5 were considered with a unit emission rate of one gram/second (1 g/sec). The results of the unit run analysis are contained in Table 8-7a to Table 8-7d.

A unit run for $NO_2$ 1-hour is modeled with the concatenated 2014-2018 met data set. As shown, the Units A-1 and A-2 combination is the worst-case scenario for the 1-hour averaging period with this data set. Therefore, for $NO_2$ 1-hour modeling, the turbine combination is the simultaneous operation of Units A-1 and A-2.

For CO short-term modeling, the Units A-1 and A-2 combination has the worst overall result for both the 1-hour averaging period (2014) and 8-hour averaging period (2017). Therefore, for CO short-term modeling, the turbine combination is the simultaneous operation of Units A-1 and A-2.

For $NO_2$ annual modeling, the Units A-1 and A-2 combination is the worst-case scenario for each of the five years of met data. Therefore, for $NO_2$ annual modeling, the turbine combination is the simultaneous operation of Units A-1 and A-2.

The major conclusion drawn from the unit run is that the difference in model results between each turbine combinations for any given averaging period and met data year is minimal, often on the order of a hundredth of a $\mu g/m^3$ or smaller. Therefore, the turbine combination modeled makes a marginal difference in the conclusion of the analysis.

**Table 8-7a. Vail Compressor Station – Determination of Worst-Case Combination- 1hr $NO_2$**

| 1-hr Averaging Period Modeled Concentrations | | | | |
|---|---|---|---|---|
| **Model Year** | **A-1 & A-2** | **A-1 & A-3** | **A-2 & A-3** | **Max** |
| 2014-2018 | 381.090 | 381.088 | 381.088 | A-1 & A-2 |

**Table 8-8b. Vail Compressor Station – Determination of Worst-Case Combination – 1-hr CO**

| 1-hr CO Averaging Period Modeled Concentrations | | | | |
|---|---|---|---|---|
| **Model Year** | **A-1 & A-2** | **A-1 & A-3** | **A-2 & A-3** | **Max** |
| 2014 | 375.13 | 375.13 | 375.14 | A-2 & A-3 |
| 2015 | 381.090 | 381.088 | 381.088 | A-1 & A-2 |
| 2016 | 353.849 | 353.848 | 353.848 | A-1 & A-2 |
| 2017 | 376.107 | 376.105 | 376.104 | A-1 & A-2 |
| 2018 | 380.1291 | 380.1285 | 380.1288 | A-1 & A-2 |

**Table 8-9c. Vail Compressor Station – Determination of Worst-Case Combination – 8-hr CO**

| 8-hr CO Averaging Period Modeled Concentrations | | | | |
|---|---|---|---|---|
| **Model Year** | **A-1 & A-2** | **A-1 & A-3** | **A-2 & A-3** | **Max** |
| 2014 | 85.396 | 85.397 | 85.399 | A-2 & A-3 |
| 2015 | 123.845 | 123.846 | 123.847 | A-2 & A-3 |
| 2016 | 93.218 | 93.2186 | 93.2194 | A-2 & A-3 |
| 2017 | 129.56784 | 129.5676 | 129.56779 | A-1 & A-2 |
| 2018 | 99.85 | 99.85 | 99.86 | A-2 & A-3 |

**Table 8-10d. Vail Compressor Station – Determination of Worst-Case Combination – Annual $NO_2$**

| Annual Averaging Period Modeled Concentrations | | | | |
|---|---|---|---|---|
| **Model Year** | **A-1 & A-2** | **A-1 & A-3** | **A-2 & A-3** | **Max** |
| 2014 | 10.6091 | 10.6085 | 10.6013 | A-1 & A-2 |
| 2015 | 9.151 | 9.149 | 9.139 | A-1 & A-2 |
| 2016 | 9.330 | 9.329 | 9.324 | A-1 & A-2 |
| 2017 | 10.91 | 10.90 | 10.89 | A-1 & A-2 |
| 2018 | 11.1165 | 11.1157 | 11.1025 | A-1 & A-2 |

### 8.2.2. Off-Site Emissions Inventory

A Full Impact Analysis was performed for emissions of $NO_x$; therefore, in accordance with EPA modeling guidelines, off-site sources were evaluated. EPNG submitted a public records request to PDEQ for data on $NO_x$ emission sources within 50 km of the facility. PDEQ provided the $NO_x$ inventory data, and also provided separately $NO_x$ emission data on hot mix asphalt plants within 50 km of the facility. Additionally, per discussions at the October 31, 2019 pre-application meeting with PDEQ and EPA, the Full Impact Analysis included recently permitted $NO_x$ emissions from reciprocating internal combustion engines (RICE) at Tucson Electric Power Company's (TEP) Irvington Generating Station (IGS). Note that the IGS permit indicates selective catalytic reduction (SCR) $NO_x$ emissions control will be applied to the RICE sources, but the $NO_x$ emission rate listed in the IGS permit did not account for this emissions control. Therefore, to avoid over-conservatism in the modeling analysis, a conservative SCR $NO_x$ control efficiency of 70% is applied. This is conservative because 70% is the lowest $NO_x$ control efficiency for SCR operation per EPA guidance[40]. The inventory data was then formatted for compatibility with the AERMOD model. Note that for any source with a missing stack parameter, conservative default values were used, such as one-foot release heat and 0.003 fps stack exit velocity. A summary of the off-site $NO_x$ inventory is contained in Table 8-11.

## 8.3. MODELING APPROACH & RESULTS

### 8.3.1. Significant Impact Analysis

In the significant impact analysis, only project sources are modeled to determine if the proposed emission changes have a significant impact on the surrounding areas. The threshold for a significant impact is established through significant impact levels (SILs). The maximum modeled concentrations from the significant impact analysis are compared to the applicable SIL for each pollutant and averaging period undergoing analysis.[41] If the maximum modeled concentration is less than the SIL, no further analysis is required to demonstrate compliance with the NAAQS or PSD Increment. For any location where the maximum modeled concentration exceeds the applicable SIL, a full impact analysis must be completed. For Class I areas located more than 50 km from the facility (e.g., Chiricahua Wilderness and others), impacts at the boundary of the model (i.e., 50 km from the facility) were compared with Class I area SILs. If the concentration at the modeling boundary is less than the SIL, no further analysis will be required for Class I areas greater than 50 km distance from the source. Table 8-8 summarizes the applicable SILs and model results for each modeled pollutant. Based on the results presented below, the only pollutant proceeding to a Full Impact Analysis is $NO_2$ for the 1-hr averaging period.

[40] Per EPA Air Pollution Control Technology Fact Sheet, Selective Catalytic Reduction (SCR), EPA-452/F-03-032.

[41] Significant Impact Levels per ADEQ, Air Dispersion Modeling Guidelines for Arizona Air Quality Permits, November 1, 2019.

**Table 8-11. Vail Compressor Station – Significant Impact Levels & Results**

| Pollutant | Averaging Period | Design Concentration | Significant Impact Level (µg/m³) | | Significant Impact Analysis Results (µg/m³) | | |
|---|---|---|---|---|---|---|---|
| | | | Class I | Class II | Model Year | Class I | Class II |
| $NO_2$ | 1-hour | H1H | - | 7.5 | 2014 - 2018 | - | 40.61 |
| | Annual | H1H | 0.1 | 1 | 2014 | 0.01 | 0.91 |
| | | | | | 2015 | 0.04 | 0.72 |
| | | | | | 2016 | 0.01 | 0.85 |
| | | | | | 2017 | 0.01 | 0.88 |
| | | | | | 2018 | 0.01 | 0.81 |
| CO | 1-hour | H1H | - | 2,000 | 2014 | - | 420.16 |
| | | | | | 2015 | - | 426.85 |
| | | | | | 2016 | - | 396.34 |
| | | | | | 2017 | - | 421.27 |
| | | | | | 2018 | - | 425.77 |
| | 8-hour | H1H | - | 500 | 2014 | - | 95.72 |
| | | | | | 2015 | - | 138.71 |
| | | | | | 2016 | - | 104.41 |
| | | | | | 2017 | - | 145.13 |
| | | | | | 2018 | - | 111.86 |

## 8.3.2. Full Impact Analysis

Because project CO and annual $NO_2$ impacts were under the SIL, only 1-hour $NO_2$ impacts required consideration under the Full Impact Analysis. A significant impact area (SIA, or area in which project impacts exceeded the SIL) was defined for 1-hour $NO_2$. Therefore, the analysis was completed at receptors where impacts from the Significant Impact Analysis are above the SIL. The full impact analysis also considered post-project facility-wide emissions (i.e., not just the project sources) as well as off-site $NO_x$ emissions inventory within 50 km of the facility, as detailed in Section 8.2.2 and summarized in Table 8-11. The modeled H8H impacts from site-wide and off-site emission sources were added to the background concentrations detailed in Section 8.1.8. The overall impact is compared to the appropriate NAAQS, as applicable, in Table 8-9. The results of the analysis demonstrate that the project will not cause or contribute to a violation of any applicable NAAQS.

**Table 8-12. Vail Compressor Station – NAAQS and PSD Increment Results**

| Pollutant | Averaging Period | Design Concentration | NAAQS (μg/m³) | NAAQS Analysis Results (μg/m³) | PSD Increment (μg/m³) | | PSD Increment Results (μg/m³) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Class I | Class II | Class I | Class II |
| $NO_2$ | 1-hour | H8H | 188 | 96.05 [2] | - | - | - | - |
| | Annual | H1H | 100 | N/A [1] | 2.5 | 25 | N/A [1] | N/A [1] |
| CO | 1-hour | H2H | 40,000 | N/A [1] | - | - | - | - |
| | 8-hour | H2H | 10,000 | N/A [1] | - | - | - | - |

[1] Project impacts less than SIL.

[2] Based on maximum modeled concentration of 25.85 μg/m³ as well as background concentration of 70.2 μg/m³.

## 8.3.3. Pre-Construction Monitoring Analysis

As part of a PSD modeling analysis, a pre-construction monitoring analysis must be performed to determine whether preconstruction monitoring may be required to evaluate existing air quality before the permit is issued. The U.S. EPA's Significant Monitoring Concentrations (SMC) establish the levels at which a facility may need to conduct pre-construction ambient air quality monitoring for pollutants subject to PSD review in order to evaluate the existing air quality. The SMCs are compared to the Significant Impact Analysis results for $NO_2$ and CO in Table 8-10 below. As shown, the maximum impacts did not exceed the corresponding SMC, and pre-construction monitoring is not required.

**Table 8-13. Vail Compressor Station – Significant Monitoring Concentrations & Results**

| Pollutant | Averaging Period | SMC (μg/m³) | SMC Results (μg/m³) |
|---|---|---|---|
| $NO_2$ | 1-hour | - | - |
| | Annual | 14 | 0.65 |
| CO | 1-hour | - | - |
| | 8-hour | 575 | 85.77 |

## Table 8-14. Vail Compressor Station – NAAQS Off-Site Inventory

| Source | Model ID | UTM Location (m) East | UTM Location (m) North | Distance to EPNG Vail (km) | $NO_x$ Emission Rates (tpy) | Q/d | Source Modeled? | Exhaust Height (ft) | Exhaust Temp. (deg F) | Exhaust Velocity (fps) | Exhaust Diameter (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Granite Construction - Swan Road | 5 | 510,989 | 3,549,248 | 7.10 | 47.97 | 6.76 | Yes | 16 | 213 | 81.55 | 3.26 |
| Los Reales Landfill | 40 | 511,399 | 3,553,697 | 8.80 | 1.40 | 0.16 | Yes | 35.9 | 681.0 | 33.1 | 2.90 |
| Vulcan Asphalt - Black Angus | 7 | 524,405 | 3,555,491 | 10.04 | 86.00 | 8.57 | Yes | 1 | 215.0 | 0.003 | 2.73 |
| Raytheon | 33 | 506,879 | 3,550,929 | 11.49 | 8.41 | 0.73 | Yes | 27.1 | 182.0 | 32.4 | 1.40 |
| Raytheon | 26 | 505,775 | 3,551,791 | 12.80 | 7.38 | 0.58 | Yes | 27.1 | 182.0 | 32.4 | 1.40 |
| Raytheon | 25 | 505,669 | 3,551,946 | 12.95 | 2.40 | 0.19 | Yes | 27.1 | 182.0 | 32.4 | 1.40 |
| Raytheon | 21 | 505,603 | 3,551,782 | 12.96 | 1.70 | 0.13 | Yes | 27.1 | 182.0 | 32.4 | 1.40 |
| Davis-Monthan AFB AZ | 34 | 511,015 | 3,558,882 | 13.06 | 27.19 | 2.08 | Yes | 35.6 | 313.0 | 31.4 | 2.30 |
| Raytheon | 24 | 505,547 | 3,552,332 | 13.19 | 1.15 | 0.09 | Yes | 27.1 | 182.0 | 32.4 | 1.40 |
| TEP IGS | 1 | 509,448 | 3,557,910 | 13.20 | | - | Yes | 160.0 | 628.7 | 95.1 | 7.40 |
| TEP IGS | 2 | 509,448 | 3,557,910 | 13.20 | | - | Yes | 160.0 | 628.7 | 95.10 | 7.40 |
| TEP IGS | 3 | 509,448 | 3,557,910 | 13.20 | | - | Yes | 160.0 | 576.6 | 84.61 | 9.10 |
| TEP IGS | 4 | 509,448 | 3,557,910 | 13.20 | | - | Yes | 160.0 | 576.6 | 84.61 | 9.10 |
| Raytheon | 20 | 505,488 | 3,552,237 | 13.22 | 1.77 | 0.13 | Yes | 27.1 | 182.0 | 32.35 | 1.40 |
| Raytheon | 22 | 505,460 | 3,552,172 | 13.22 | 1.85 | 0.14 | Yes | 27.1 | 182.0 | 32.35 | 1.40 |
| Raytheon | 27 | 505,336 | 3,552,017 | 13.29 | 1.06 | 0.08 | Yes | 27.1 | 182.0 | 32.35 | 1.40 |
| Raytheon | 23 | 505,373 | 3,552,175 | 13.31 | 0.83 | 0.06 | Yes | 27.1 | 182.0 | 32.35 | 1.40 |
| Raytheon | 29 | 505,127 | 3,552,339 | 13.59 | 2.76 | 0.20 | Yes | 27.1 | 182.0 | 32.35 | 1.40 |
| Raytheon | 28 | 504,831 | 3,552,160 | 13.81 | 2.76 | 0.20 | Yes | 27.1 | 182.0 | 32.35 | 1.40 |
| Raytheon | 32 | 504,428 | 3,552,008 | 14.15 | 0.88 | 0.06 | Yes | 27.1 | 182.0 | 32.35 | 1.40 |
| Raytheon | 30 | 504,262 | 3,552,175 | 14.36 | 3.61 | 0.25 | Yes | 27.1 | 182.0 | 32.35 | 1.40 |
| Raytheon | 31 | 504,269 | 3,552,327 | 14.40 | 4.60 | 0.32 | Yes | 27.1 | 182.0 | 32.35 | 1.40 |
| Learjet Inc - Tucson Facility | 38 | 504,338 | 3,553,139 | 14.61 | 1.97 | 0.13 | Yes | 41.6 | 73.0 | 45.05 | 4.50 |
| SFPP- LP - Tucson Terminal | 35 | 508,458 | 3,560,297 | 15.68 | 4.36 | 0.28 | Yes | 30.3 | 151.0 | 6.85 | 1.30 |
| University of Arizona | 18 | 504,581 | 3,565,981 | 22.55 | 29.91 | 1.33 | Yes | 64.0 | 407.0 | 35.19 | 3.30 |
| University of Arizona | 19 | 504,849 | 3,567,169 | 23.37 | 19.72 | 0.84 | Yes | 64.0 | 407.0 | 35.19 | 3.30 |
| ASARCO - Mission Complex | 17 | 495,213 | 3,540,058 | 24.02 | 88.00 | 3.66 | Yes | 64.6 | 216.0 | 39.36 | 5.20 |
| TEP - DeMoss Petrie Generating | 39 | 500,738 | 3,568,397 | 26.83 | 1.57 | 0.06 | Yes | 85.5 | 565.0 | 67.33 | 9.30 |

| Source | Model ID | UTM Location (m) East | UTM Location (m) North | Distance to EPNG Vail (km) | $NO_x$ Emission Rates (tpy) | Q/d | Source Modeled? | Exhaust Height (ft) | Exhaust Temp. (deg F) | Exhaust Velocity (fps) | Exhaust Diameter (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Freeport-McMoRan Sierrita | 16 | 490,110 | 3,526,678 | 34.95 | 134.73 | 3.86 | Yes | 64.6 | 216.0 | 39.36 | 5.20 |
| Vulcan Materials - Orange Grove | 9 | 494,697 | 3,576,562 | 36.97 | 14.78 | 0.40 | Yes | 13.0 | 215.0 | 54.76 | 3.35 |
| Vulcan Materials - Marana | 8 | 524,334 | 3,585,099 | 37.83 | 19.00 | 0.50 | Yes | 14.0 | 299.0 | 41.00 | 4.50 |
| TEP - North Loop Generating | 37 | 488,118 | 3,584,767 | 47.49 | 3.66 | 0.08 | Yes | 85.5 | 565.0 | 67.33 | 9.30 |
| CalPortland Rillito Cement | 11 | 485,771 | 3,585,944 | 49.89 | 1,131.23 | 22.67 | Yes | 161.7 | 309.0 | 69.063 | 7.2 |
| CalPortland Rillito Cement | 10 | 485,771 | 3,585,944 | 49.89 | 1,063.57 | 21.32 | Yes | 161.7 | 309.0 | 69.063 | 7.2 |
| CalPortland Rillito Cement | 12 | 485,771 | 3,585,944 | 49.89 | 7.00 | 0.14 | Yes | 25.9 | 296.0 | 54.858 | 2.8 |
| CalPortland Rillito Cement | 14 | 485,771 | 3,585,944 | 49.89 | 0.03 | 0.00 | Yes | 39.7 | 370.0 | 25.569 | 1.9 |
| CalPortland Rillito Cement | 13 | 485,771 | 3,585,944 | 49.89 | 0.01 | 0.00 | Yes | 39.7 | 370.0 | 25.569 | 1.9 |
| Granite Construction - Tangerine | 6 | 483,206 | 3,587,463 | 52.72 | 57.28 | 1.09 | No | - | - | - | - |
| Marana Landfill | 41 | 473,665 | 3,586,143 | 58.57 | 0.16 | 0.00 | No | - | - | - | - |

## 8.3.4. Class I Area AQRV Analysis

For the AQRV analysis, a Q/D screening analysis was performed in a manner consistent with the proposed method outlined in *FLAG 2010*. As per the FLM guidance, if this screening is passed, then the impact on all AQRVs are assumed to be insignificant and no further modeling analysis is required. This method compares the ratio of project-wide annual emissions of visibility-affecting pollutants [VAP, which includes $NO_x$, $SO_2$, $PM_{10}$, and sulfuric acid mist ($H_2SO_4$)] to the distance from proposed project to the Class I area. For the *FLAG 2010* approach; "Q" includes $NO_x$, $SO_2$, $PM_{10}$ and $H_2SO_4$ emissions and is calculated as the net emission increase associated with the project. The "D"' term in the ratio is defined as the distance, in kilometers (km), from the compressor station to the closest boundary in each corresponding Class I area. If a source has a Q/D screening ratio less than the *FLAG 2010* recommended threshold of ten (10), any potential impacts are assumed to be acceptable, and no further AQRV modeling will be required. This applies to both the Class I visibility impacts and deposition analysis. Class I areas other than Saguaro National Park East and West will have a Q/d < 10 and will not be subject to AQRV review.

### *8.3.4.1. Class I Area AQRV Analysis - Visibility*

To demonstrate that local visibility impairment does not result from operation of the EPNG Vail Compressor Station operation the EPA VISCREEN Model was used following the guidelines published in the *Workbook for Plume Visual Impact Screening and Analysis* to assess potential plume impairment.[42] The primary variables that affect whether a plume is visible or not at a certain location are (1) quantity of emissions, (2) type of emissions, (3) relative location of source and observer, and (4) the background visibility range. The VISCREEN model is designed to determine whether a plume from a facility may be visible from a given vantage point using these four variables to determine the level of impact. As shown in Figure 8-1, the two Class I areas under the Q/d threshold were the Saguaro National Park West and Saguaro National Park East. Because potential $NO_x$ emissions from the Vail Compressor Station triggers a PSD review, all VISCREEN visibility affecting pollutants emitted by the proposed project were considered in the analysis. Direct emissions of primary $NO_2$, Soot, and Primary $SO_4$ were treated as zero emissions (the VISCREEN default) due to either their accounting elsewhere ($NO_x$) or due to the nature of the source not producing measurable quantities of these pollutants. Pursuant to the FLAG 2010[43]

> *Applicants should calculate the 24-hour average net emission increase for each pollutant from modified facilities as the maximum allowable 24-hour average minus the actual hourly rate averaged over the past two years (annual emissions over past two years/hours of operation over last two years).*

Because the turbines have not be in operation for the past two years, the maximum allowable turbine emissions, or PTE, are used for purposes of evaluating visibility impacts.

Two levels of visibility screening are available in the VISCREEN Model. Level-1 is designed to provide a conservative estimate of plume visual effects and Level-2 provides a more realistic estimate of visual effects based on more detailed information about the source, meteorology, and area of interest. If the Level-1 screening is passed, then the analysis is deemed complete.

---

[42] Workbook for Plume Visual Impact Screening and Analysis (Revised), EPA-450/R-92-023, U.S. Environmental Protection Agency, Research Triangle Park, NC, October 1992.

[43] U.S. Forest Service, National Park Service, and U.S. Fish and Wildlife Service, Federal Land Managers' Air Quality Related Values Work Group (FLAG) Phase I report - Revised (2010). National Resource Report NPS/NRPC/NRR-2010/232. National Park Service, Denver, Colorado. November 2010.

For views at the observer location selected, calculations are performed by the model for two assumed plume-viewing backgrounds: the horizon sky and a dark terrain object. VISCREEN assumes that the terrain object is black and located adjacent to the plume on the side of the centerline opposite the observer. The VISCREEN model output shows separate tables for inside and outside of the sensitive area. Each table contains several variables: theta, azi, distance, alpha, critical and actual plume ΔE, and critical and actual plume contrast. These variables are defined as:

- *Theta* - Scattering angle (the angle between direction solar radiation and the line of sight). If the observer is looking directly at the sun, theta equals zero degrees. If the observer is looking away from the sun, theta equals 180 degrees.
- *Azi* - The azimuthal angle between the line connecting the observer and the line of sight.
- *Alpha* - The vertical angle between the line of sight and the plume centerline.
- *ΔE* - Used to characterize the perceptibility of a plume on the basis of the color difference between the plume and a viewing background. A ΔE less than 2.0 signifies that the plume is not perceptible.
- *Contrast* - The contrast at a given wavelength of two-colored objects such as plume/sky or plume/terrain. A value less 0.05 signifies that the plume is not perceptible by contrast or color.

The analysis is considered satisfactory if ΔE and Green Contrast are less than critical screening values of 2.0 and 0.05, respectively.

VISCREEN conducts four (4) tests of screening calculations. The first two tests refer to visual impacts caused by plume parcels located ***inside*** the boundaries of the given area. Tests of impacts inside the boundary are used to determine visual impacts when integral vistas are not protected.[44] The last two tests are for plume parcels located ***outside*** the boundaries of the area. The tests of visual impacts outside the boundaries of Class I areas are only required if analyses for protected integral vistas are required. An integral vista is a view from a location inside a Class I area of landscape features located outside the boundaries of the Class I area.[45]

For a VISCREEN Level-1 screening analysis, default particulate size and density and worst-case meteorological conditions of F stability with a 1.0 m/s wind speed were used. These worst-case meteorological conditions were assumed to persist for up to 12 hours with a wind direction that would transport the plume directly adjacent to the observer causing the highest, most conservative level of loss of contrast (*Δ*E) and color obscuration. Direct particulate and $NO_x$ emissions increases associated with the proposed project were used as inputs to the model. PM emissions were used to represent direct particulate as PM usually has the highest, net emissions increase from among the available PM species (PM, $PM_{10}$, and $PM_{2.5}$). In this case the estimated PM, $PM_{10}$ and $PM_{2.5}$ emissions are equal. Remaining VISCREEN Level-1 input parameters were set to those values specified by the VISCREEN user's manual as listed in Table 8-12.[46]

---

[44] Workbook for Plume Visual Impact Screening and Analysis, p. 27.

[45] Ibid.

[46] EPA OAQPS, Tutorial Package for the VISCREEN Model, Research Triangle Park, NC, June 1992.

**Table 8-15. Vail Compressor Station – VISCREEN Level-1 Inputs**

| Parameter | Input Value |
|---|---|
| Particulate Emission Rate | 3.04 tpy |
| $NO_x$ Emission Rate | 362.02 tpy |
| Default VISCREEN primary $NO_2$, soot & $H_2SO_4$ Rate | 0 tpy |
| Distance between EPNG & observer (Saguaro East / West) | 11.6 / 37.45 km |
| Distance between EPNG & nearest Saguaro East / West boundary | 11.6 / 37.45 km |
| Distance between EPNG & farthest Saguaro East / West boundary | 34.95 / 47.27 km |
| Background visual range (Default in VISCREEN manual) | 110.0 km |

The VISCREEN Level-1 screening technique results contained in Appendix H showed a potential exceedance of both the ΔE and Green Contrast critical screening values of 2.0 and 0.05, respectively for the Saguaro East National Park. Therefore, a Level 2 visibility impact analysis was performed for Saguaro East National Park.

A VISCREEN Level 2 analysis involves an analysis of the dispersion characteristics and meteorological conditions. The *Workbook for Plume Visual Impact Screening and Analysis* specifies the methodology to identify the worst-case wind direction, wind speed, and atmospheric stability to identify the conditions for the VISCREEN Level-2 evaluation. The first step is to construct a table that shows worst-case dispersion condition ranked in order of decreasing severity and the frequency of occurrence of these conditions associated with the wind direction that could transport emissions toward the Class I area. Dispersion conditions are ranked by evaluating the product $\sigma_y \sigma_z u$, where $\sigma_y$ and $\sigma_z$ are the Pasquill-Gifford horizontal and vertical diffusion coefficients for the given stability class and downwind distance. The values are ranked smallest value (worst case) of $\sigma_y \sigma_z u$ to largest. The transport time for each condition is added based on the midpoint value of the wind speed. Any transit time over 12 hours is not considered since it is assumed that the steady-state plume conditions would not persist for that time[47]. Table 8-13 contains a summary of this evaluation.

Step 3 is to sum the frequency of occurrences of the worst-case conditions. The first condition where the sum of the frequencies is 1 or higher is considered the worst-case condition for modeling purposes. Step 4 is to run VISCREEN with the worst-case meteorological condition and compare the results to the screening threshold.

[47] Pursuant to EPA, Workbook for Plume Visual Impact Screening and Analysis (Revised), EPA-454/R-92-023, October 1992.

**Table 8-16. Vail Compressor Station – VISCREEN Level 2 Meteorological Conditions Review**

| Dispersion Condition (stability, wind speed) | σyσzu (m^3/s) | Transport Time (hours) | Frequency (f) and Cumulative Frequency (cf) of occurrence of given dispersion condition associated with source-site wind directions for given time of day (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 - 6 | | 7 - 12 | | 13 - 18 | | 19 - 24 | |
| | | | f | cf | f | cf | f | cf | f | cf |
| F,1 | 1.51E+04 | 6.4 | 0.06 | 0.06 | 0.04 | 0.04 | 0.00 | 0.00 | 0.03 | 0.03 |
| F,2 | 3.02E+04 | 2.1 | 2.48 | **2.54** | 0.30 | 0.34 | 0.06 | 0.06 | 3.63 | **3.66** |
| E,1 | 3.89E+04 | 6.4 | 0.00 | 2.54 | 0.00 | 0.34 | 0.00 | 0.06 | 0.00 | 3.66 |
| F,3 | 4.52E+04 | 1.3 | 2.10 | 4.64 | 0.13 | 0.47 | 0.01 | 0.07 | 5.30 | 8.96 |
| E,2 | 7.78E+04 | 2.1 | 0.00 | 4.64 | 0.05 | 0.52 | 0.01 | 0.08 | 0.01 | 8.97 |
| D,1 | 8.99E+04 | 6.4 | 0.00 | 4.64 | 0.00 | 0.52 | 0.00 | 0.08 | 0.00 | 8.97 |
| E,3 | 1.17E+05 | 1.3 | 1.05 | 5.69 | 0.12 | 0.64 | 0.05 | 0.13 | 2.85 | 11.82 |
| E,4 | 1.56E+05 | 0.9 | 1.01 | 6.70 | 0.05 | 0.69 | 0.14 | 0.27 | 3.89 | 15.71 |
| D,2 | 1.80E+05 | 2.1 | 0.00 | 6.70 | 0.03 | 0.72 | 0.00 | 0.27 | 0.00 | 15.71 |
| E,5 | 1.94E+05 | 0.7 | 0.29 | 6.99 | 0.05 | 0.77 | 0.14 | 0.41 | 1.64 | 17.35 |
| D,3 | 2.70E+05 | 1.3 | 0.00 | 6.99 | 0.07 | 0.84 | 0.04 | 0.45 | 0.05 | 17.40 |
| D,4 | 3.59E+05 | 0.9 | 0.01 | 7.00 | 0.04 | 0.88 | 0.10 | 0.55 | 0.09 | 17.49 |
| D,5 | 4.49E+05 | 0.7 | 0.06 | 7.06 | 0.04 | 0.92 | 0.23 | 0.78 | 0.58 | 18.07 |
| D,6 | 5.39E+05 | 0.6 | 0.16 | 7.22 | 0.06 | 0.98 | 0.45 | **1.23** | 1.32 | 19.39 |
| D,7 | 6.29E+05 | 0.5 | 0.11 | 7.33 | 0.07 | **1.05** | 0.61 | 1.84 | 0.74 | 20.13 |
| D,8 | 7.19E+05 | 0.4 | 0.05 | 7.38 | 0.09 | 1.14 | 0.74 | 2.58 | 0.43 | 20.56 |

The VISCREEN Level-2 analysis for the Saguaro National Park East, predicted a worst-case meteorological condition of stability class F and a wind speed of 2 m/s. These values were input into the VISCREEN models along with the default particle characteristics. Actual $NO_2$ emission rates were used in the VISCREEN Level-2 modeling along with an estimate of downwind $NO_2$ formation based on 10% of the remaining $NO_x$ emitted[48]. Primary $NO_2$ from the turbines was calculated using the ISR factor of 0.124. That yielded 44.809 tpy of primary $NO_2$. The remaining turbine $NO_x$ was estimated as the difference between the total $NO_x$ emissions and the primary $NO_2$ emissions, or 316.55 tpy. VISCREEN assumes 10% of the $NO_x$ is converted to $NO_2$; 10% of the remaining turbine $NO_x$ is 31.655 tpy. This value along with 10% of the emergency generator $NO_x$ (0.066 tpy) was added to the primary $NO_2$ yielding a total in-plume $NO_2$ of 76.530 tpy.

As contained in Appendix H, for Saguaro East National Park the VISCREEN Level 2 predicted visual impacts were below the screening criteria for the areas inside the Class I areas. Areas outside the Class I areas are only required if analyses for protected integral vistas are required and Saguaro National Park is not currently considered a protected integral vista. Because the predicted impacts inside the Class I areas were below the screening criteria, there will be negligible visibility impact at both Class I areas and no further analysis is required.[49]

[48] Pursuant to EPA, Workbook for Plume Visual Impact Screening and Analysis (Revised), EPA-454/R-92-023, October 1992.
[49] U.S. Forest Service, National Park Service, and U.S. Fish and Wildlife Service, Federal Land Managers' Air Quality Related Values Work Group (FLAG) Phase I report - Revised (2010). National Resource Report NPS/NRPC/NRR-2010/232. National Park Service, Denver, Colorado. November 2010.

### *8.3.4.2. Class I Area AQRV Analysis - Deposition*

Because of the location of the Saguaro National Park East and West within 50 km of the facility, the AERMOD model was utilized for the assessment of deposition impacts at these areas. AERMOD is the preferred model for distances less than 50 km and the model contains gaseous deposition algorithms. Sulfur deposition was considered insignificant given the low emission rate of $SO_2$. Nitrogen deposition was conducted by modeling the $NO_x$ deposition rate.

The oxidation of nitrogen oxides is a complicated process that can include a large variety of nitrogen species, such as nitrogen dioxide ($NO_2$), nitric acid ($HNO_3$) and organic nitrates ($RNO_3$) such as peroxyacetylnitrate (PAN). Atmospheric chemical reactions that occur in sunlight result in the formation of ozone and other compounds. Depending on atmospheric conditions, these reactions can start to occur within several hundred meters of the original $NO_x$ source, or after the pollutants have been carried tens of kilometers downwind. Ultimately, some nitrogen oxides are converted to nitric acid vapor or particulate nitrates. Precipitation is one mechanism that removes these pollutants from the air. Forms of atmospherically derived nitrogen are removed from the atmosphere by both wet deposition (rain) or dry deposition (direct uptake by vegetation and surfaces).

Ammonia and ammonium are other forms in which nitrogen occurs. Ammonia is a gas that becomes ammonium when dissolved in water, or when present in soils or airborne particles. Unlike $NO_x$, which forms during combustion, soil microorganisms naturally form ammonia and ammonium compounds of nitrogen and hydrogen.

In urban atmospheres, the oxidation rate of $NO_x$ to $HNO_3$ is estimated to be approximately 20 percent per hour, with a range of 10 to 30 percent per hour[50]. Aerosol nitrates ($NO_3$) are present, mainly in the form of ammonium nitrate ($NH_4NO_3$). Nitrate and ammonium ($NH_4$) are the predominant forms by which plants absorb nitrogen. In California, ammonium nitrate is the predominant airborne nitrate bearing particle in the atmosphere.[51]

To assess the potential for nitrogen deposition, AERMOD was used. No chemistry was used in the AERMOD analysis. Instead, all emissions of $NO_x$ were assumed to instantaneously form depositional nitrogen in stack, thus being immediately available for deposition. AERMOD used Class I receptors provided by the NPS. AERMAP was run to assign receptor elevations and hill heights for AERMOD's complex terrain algorithms. The following gas diffusion parameters were used in AERMOD:

- Diffusivity in air = 0.14E-04 $cm^2/s$
- Diffusivity in water = 0.30E-08 $cm^2/s$
- Leaf Lipid Resistance = 0.18E+4 s/cm
- Henry's Law Coefficient = 0.80E-07 $m^3/mol$

AERMOD also requires land use categories by season through the GDLANUSE keyword. The surrounding area around EPNG is primarily undeveloped desert so the land use category of Barren land, mostly desert was applied. The maximum annual nitrogen deposition rate predicted by AERMOD was 0.000487 kg/ha/yr, well below the NPS threshold for Saguaro National Park of 3 kg/ha/yr[52].

---

[50] CARB (Air Resources Board). The Effects of Oxides of Nitrogen on California Air Quality. By Technical Support Division State of California Air Resources Board. Report Number: TSD-85-01. March 1986

[51] Ibid.

[52] Pursuant to https://irma.nps.gov/DataStore/Reference/Profile/2252031

## 8.4. SECONDARY $PM_{2.5}$ & OZONE ASSESSMENT

Precursor pollutants for $PM_{2.5}$ (i.e., $NO_x$, and $SO_2$) can undergo photochemical reactions with gases in the atmosphere, such as ammonia ($NH_3$) and VOC, resulting in the formation of secondary $PM_{2.5}$ downwind of an emission source, which can add to concentrations resulting from direct (or primary) emissions of $PM_{2.5}$. Two of the largest constituents of secondary $PM_{2.5}$ in the U.S. are sulphates ($SO_4^{2-}$) and nitrates ($NO_3^-$), both of which are formed from their respective precursor pollutants (i.e., $SO_2$ for $SO_4^{2-}$, $NO_x$ for $NO_3^-$). Pursuant to Table ES-1 of EPA's May 20, 2014 $PM_{2.5}$ modeling guidance, a proposed project with an increase of $NO_x$ and/or $SO_2$ emissions in excess of 40 tpy triggers a secondary $PM_{2.5}$ air impact analysis. Furthermore, pursuant to 40 CFR §52.21, a proposed project with an increase of VOC or $NO_x$ emissions in excess of 100 tpy triggers an ambient ozone impact analysis for that project. Since the project emission increase for $NO_x$ exceeds 100 tpy, an analysis must be performed on the secondary formation of $PM_{2.5}$ and ozone.

To address the secondary formation of $PM_{2.5}$ and ozone, EPA devised a two-tier approach as detailed in 40 CFR 51. A Tier 1 assessment uses the relationship between source characterization and modeled concentration of a representative (hypothetical) source and location to assess potential impacts from a new source. EPA has published hypothetical source modeled concentrations with relationship to location and source characterization in the April 2019 Modeled Emission Rates for Precursors (MERP) Memo. These hypothetical sources use one year of meteorological data from 2011 to determine modeled impacts.[53]

Table 8-5 contains a summary of the maximum terrain and urban fraction between the three Arizona hypothetical facilities contained in the EPA MERP guidance and the facility. Similarly, Figure 8-2 depicts the locations of these facilities in Arizona. Based on an evaluation of proximity, elevations, urban fraction, and climatology unique to each location, hypothetical Facility 14 (FIPS 4007) is considered most representative of the facility location.

**Table 8-5. Vail Compressor Station - EPA Arizona MERP Facilities**

| Reference | FIPS | County | Source | Latitude | Longitude | Max Nearby Terrain (m) | Max Nearby Urban (%) |
|---|---|---|---|---|---|---|---|
| EPA MERP Guidance | 4005 | Coconino | 36 | 35.428 | -111.270 | 2,483 | 7.4 |
| | 4007 | Gila | 14 | 33.469 | -110.789 | 1,592 | 4.3 |
| | 4012 | La Paz | 17 | 33.400 | -113.408 | 757 | 0.9 |
| EPNG Vail | - | Pima | - | 32.066 | -110.810 | 900 | 8.4 |

[53] EPA Memorandum, Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier I Demonstration Tool for Ozone and PM2.5 under the PSD Permitting Program , April 30, 2019.

**Figure 8-2. Vail Compressor Station - Location of EPA Arizona MERP Facilities**

To evaluate the facility's impact on secondary pollutants, EPNG will follow the EPA April 2019 MERP Memo.

- Step 1: Calculate the MERP based on the equation provided by EPA guidelines:

$$\text{MERP} = \text{SIL Value x } \frac{\text{Modeled emission rate from hypothetical source}}{\text{Modeled air quality impact from hypothetical source}}$$

The modeled emission rate and air quality impacts are obtained from EPA's December 28, 2018, workbook with underlying maximum impact and MERPs information for each hypothetical source.[54]

[54] The workbook is available on EPA's Clean Air Act Permit Modeling Guidance webpage, https://www.epa.gov/scram/clean-air-act-permit-modeling-guidance.

EPNG used the hypothetical source assuming the lowest emission rate of 500 tpy and the lowest stack height of 10 m. Table 8-6 lists the calculated MERPs.

**Table 8-6. Vail Compressor Station - Calculated MERPs**

| Secondary Pollutant | Source Pollutant | Stack Height (m) | Source # | Emission Rate (tpy) | Max Impact (ppb) | SIL (ppb) | Calculated MERP (tpy) |
|---|---|---|---|---|---|---|---|
| Ozone | $NO_x$ | 10 | 14 | 500 | 1.226 | 1 | 407 |
| **Secondary Pollutant** | **Source Pollutant** | **Stack Height (m)** | **Source #** | **Emission Rate (tpy)** | **Max Impact (μg/m³)** | **SIL (μg/m³)** | **Calculated MERP (tpy)** |
| $PM_{2.5}$ - 24hr | $NO_x$ | 10 | 14 | 500 | 0.011 | 1.2 | 54,500 |
| $PM_{2.5}$ - Annual | $NO_x$ | 10 | 14 | 500 | 0.00094 | 0.3 | 159,000 |

- Step 2a: For each pollutant and averaging period, the emissions from the facility are compared to the MERP values as summarized in Table 8-7. EPNG's proposed emissions are below the MERP values so the SIL will not be exceeded.
- Step 2b: EPA has requested that EPNG additionally provide pre and post-project background concentrations for $PM_{2.5}$ and ozone. Table 8-7 summarizes the impact on background concentration by applying the estimated percent-of-SIL impact to the pre-project background concentration to determine the post-project background concentrations.

**Table 8-7. Vail Compressor Station - Emissions Compared to MERP**

| Secondary Pollutant | Source Pollutant | EPNG NEI (tpy) | Calculated MERP (tpy) | Total Impact (ppb) | Pre-Project Background Concentration [1] (ppb) | Post-Project Background Concentration (ppb) | Tier 1 MERP Modeled Air Quality Impact as % of SIL |
|---|---|---|---|---|---|---|---|
| Ozone | $NO_x$ | 232.20 | 407 | 0.57 | 68.33 | 68.90 | 57% |
| **Secondary Pollutant** | **Source Pollutant** | **EPNG NEI (tpy)** | **Calculated MERP (tpy)** | **Total Impact (μg/m³)** | **Pre-Project Background Concentration [2] (μg/m³)** | **Post-Project Background Concentration (μg/m³)** | **Tier 1 MERP Modeled Air Quality Impact as % of SIL** |
| $PM_{2.5}$ - 24hr | $NO_x$ | 232.20 | 54,500 | 0.0051 | 15.07 | 15.08 | 0.43% |
| $PM_{2.5}$ - Annual | $NO_x$ | 232.20 | 159,000 | 0.00044 | 6.13 | 6.13 | 0.15% |

[1] Pre-project ozone concentration determined using average 2016, 2017, and 2018 data from the Fairground Monitor (AQS Site ID 04-019-1020) and applying the annual fourth-highest daily maximum 8-hr concentration.

[2] Pre-project $PM_{2.5}$ concentration determined using average 2016, 2017, and 2018 data from the Children's Park Monitor (AQS Site ID 04-019-1028) and applying the 98th percentile concentration for the 24-hr averaging period and the annual mean for the annual averaging period.

## 8.5. ADDITIONAL IMPACTS ANALYSIS

The PSD additional impacts analysis depends on existing air quality, the quantity of emissions, and the sensitivity of local soils, vegetation, and visibility in the source's impact area.

### 8.5.1. Growth Analysis

The purpose of the growth analysis is to quantify project associated growth; that is, to predict how much new growth is likely to occur in order to support the source or modification under review, and then to estimate the air quality impacts from this growth. Because the Vail Compressor Plant is an existing facility and the permit action will not significantly increase full-time employment after the project is completed, the proposed project is anticipated to have a limited growth impact in employment or nearby Pima County infrastructure and therefore, on any emissions growth in the area. While some workers employed during the construction phase of the project are likely to currently reside outside the region and thus may commute to the area, any related potential air quality impacts from these out-of-town workers was considered to be insignificant and too small to be reasonably quantified. Furthermore, no increases in employment levels at the EPNG Vail Compressor Station are expected. Therefore, the project was considered to have insignificant impact on emissions due to any growth related air quality impacts.

### 8.5.2. Soil and Vegetation Analysis

An analysis of the project's potential impact on soils and vegetation in the vicinity of the facility was performed in accordance with the procedures recommended in EPA's "A Screening Procedure for Impacts of Air Pollution Sources on Plants, Soils and Animals"[55] The highest modeled concentrations of $NO_2$ and CO were compared to the screening concentrations as shown in Table 8-14. As shown, the modeled

[55] U.S. EPA, A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals. EPA-450/2-81-078., 1980.

concentrations are all well below their screening thresholds; therefore, no significant impacts on local vegetation is expected as a result of the project.

**Table 8-17. Vail Compressor Station – Impacts on Vegetation**

| Pollutant | Averaging Period | Maximum Modeled Concentration (µg/m³) | EPA's 1980 Screening Concentration [1] (µg/m³) |
|---|---|---|---|
| $NO_2$ | 4 hour [2] | 40.61 | 3,760 |
| | 8 hour [2] | | 3,760 |
| | 1 month [2] | | 564 |
| | 1 year | 0.91 | 188 |
| CO | 1 week [3] | 145.13 | 1,800,000 |

[1] "A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals". EPA 450/2-81-078, December 1980.

[2] $NO_2$ impact is the 1-hour significant analysis impact.

[3] CO impact is the 8-hour significant analysis impact.

## 8.6. ELECTRONIC FILES

The electronic files provided contain all of the AERMOD air dispersion modeling analyses electronic input, output, and other files used to generate the modeling results. The following is a list of files provided:

- All AERMOD input and output files
- AERMOD meteorological data files
- AERMOD terrain data files
- Ozone background file
- All BPIP/BPIPP input and output files

# APPENDIX A. PDEQ CLASS I PERMIT APPLICATION FORM, CERTIFICATION & CHECKLIST

**PIMA COUNTY DEPARTMENT OF ENVIRONMENTAL QUALITY**
**Air Program**
**33 N. Stone Avenue ▪ Suite 700 ▪ Tucson, AZ 85701 ▪ Phone: (520) 724-7400**

# STANDARD PERMIT APPLICATION FORM FOR CLASS I SOURCES

(As required by A.R.S. § 49-480, and Title 17 of the Pima County Code)

1. **Permit to be issued to (Arizona Corporate Commission Registered Name):** EL PASO NATURAL GAS COMPANY, L.L.C. (EPNG) - Vail Compressor Station

2. **Mailing Address:** 5151 E. Broadway, Suite 1680
   **City:** Tucson **State:** AZ **ZIP:** 85711

3. **Plant Name (if different than item #1):** Vail Compressor Station

4. **Name (or names) of Owner or Operator:** El Paso Natural Gas Company, LLC
   **FAX #:** (520) 663-4259 **Phone:** (520) 663-4224
   **Email:** Philip_Baca@kindermorgan.com

5. **Name of Owner's Agent:** _____
   **FAX #:** _____ **Phone:** _____

6. **Plant/Site Manager/Contact Person:** Donald Cantrell
   **FAX #:** (520) 574-4928 **Phone:** (520) 574-4924
   **Email:** Donald_Cantrell@kindermorgan.com

7. **Proposed Equipment/Plant Location Address:** 10200 S. Rita Road
   **City:** Tucson **State:** AZ **ZIP:** 85747
   **Indian Reservation (if applicable):** N/A **T/R/S, Lat/Long, Elev:** Sec 4, T16S, R15E

8. **General Nature of Business:** Pipeline transmission of natural gas
   **Standard Industrial Classification Code:** 4922 **State Permit Class:** Class I

9. **Type of Organization:** ☒ **Corporation** ☐ **Individual Owner** ☐ **Partnership** ☐ **Government Entity** ☐ **Other**

10. **Permit Application Basis** ***(Check all that apply):*** ☐ **New Source** ☐ **General Permit**
    ☐ **Renewal** ***Revision:*** ☐ **Administrative** ☐ **Minor** ☒ **Significant** **Existing Permit #** 425
    **Date of Commencement of Construction or Modification:** Q4 2020
    **Is any of the equipment to be leased to another individual or entity?** ☐ **Yes** ☑ **No**

11. **Signature of Responsible Official of Organization:** Philip Baca
    **Official Title of Signer:** Director

12. **Typed or Printed Name & E-mail of Signer:** Philip Baca Philip_Baca@kindermorgan.com
    **Date:** 2-7-2020 **Telephone Number:** (520) 663-4224

# EQUIPMENT LIST

The following table should include all equipment utilized at the facility and be complete with all data requested. The date of manufacture must be included in order to determine if portions of the facility are subject to NSPS. Make additional copies of this form if necessary.

| Type of Equipment | Maximum Rated Capacity | Make | Model | Serial Number | Equipment ID Number | Date of Manufacture |
|---|---|---|---|---|---|---|
| Gas Turbine | 4,976 hp | General Electric | GE M3002-RA | 95062 | A-1 | Sept 1953 |
| Gas Turbine | 4,976 hp | General Electric | GE M3002-RA | 95065 | A-2 | Oct 1953 |
| Gas Turbine | 4,976 hp | General Electric | GE M3002-RA | 95067 | A-3 | Nov 1953 |
| Emergency Generator | 750 kW | TBD | TBD | TBD | Aux-1 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

# EMISSION SOURCES

COMPANY NAME: El Paso Natural Gas Company (EPNG) - Vail Compressor Station


DATE Dec 2019

Estimated "Potential to Emit" per 17.04.340.A.164.
Review of applications and issuance of permits will be expedited by supplying all necessary information on this Table.

| REGULATED AIR POLLUTANT DATA | | | | | EMISSION POINT DISCHARGE PARAMETERS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EMISSION POINT [1] | | CHEMICAL COMPOSITION OF TOTAL STREAM | REG. AIR POLLUTANT EMISSION RATE | | UTM COORDINATES OF EMISSION POINT [5] | | | STACK SOURCES [6] | | | | | NONPOINT SOURCES [7] | |
| | | | | | | | | HEIGHT ABOVE GROUND (ft) | HEIGHT ABOVE STRUC. (ft) | EXIT DATA | | | | |
| NUMBER | NAME | REGULATED AIR POLLUTANT NAME [2] | #/ HR. [3] | TONS/ YEAR [4] | ZONE | EAST (Mtrs) | NORTH (Mtrs) | | | DIA. (ft) | VEL (fps) | TEMP. (°F) | LENGTH (ft) | WIDTH (ft) |
| A-1 | General Electric M3002-RA | NOx | See application | | 12 | 517948.5 | 3547818.2 | 51 | 6 | 6 | 99.47 | 550 | | |
| | | CO | materials | | | | | | | | | | | |
| | | VOC | | | | | | | | | | | | |
| | | SO2 | | | | | | | | | | | | |
| | | PM/PM10/PM2.5 | | | | | | | | | | | | |
| | | HAPs | | | | | | | | | | | | |
| | | CO2e | | | | | | | | | | | | |
| A-2 | General Electric M3002-RA | NOx | See application | | 12 | 517940.4 | 3547823.4 | 51 | 6 | 6 | 99.47 | 550 | | |
| | | CO | materials | | | | | | | | | | | |

GROUND ELEVATION OF FACILITY ABOVE MEAN SEA LEVEL 2951 feet. PDEQ STANDARD CONDITIONS ARE 293K AND 101.3 KILOPASCALS (17.04.340.A.210)

**General Instructions:**

1. Identify each emission point with a unique number for this plant site, consistent with emission point identification used on plot plan, previous permits, and Emissions Inventory Questionnaire. Include fugitive emissions. Limit emission point number to eight (8) character spaces. For each emission point use as many lines as necessary to list regulated air pollutant data. Typical emission point names are: heater, vent, boiler, tank, reactor, separator, baghouse, fugitive, etc. Abbreviations are O.K.
2. Components to be listed include regulated air pollutants as defined in 17.04.340.A.182. Examples of typical component names are: Carbon Monoxide (CO), Nitrogen Oxides ($NO_X$), Sulfur Dioxide ($SO_2$), Volatile Organic Compounds (VOC), particulate matter (PM), particulate less than 10 microns ($PM_{10}$), etc. Abbreviations are O.K.
3. Pounds per hour (#/HR) is maximum potential emission rate expected by applicant.
4. Tons per year is annual maximum potential emission expected by applicant, which takes into account process operating schedule.
5. As a minimum applicant shall furnish a facility plot plan as described in the filing instructions. UTM coordinates are required only if the source is a major source or is required to perform refined modeling for the purposes of demonstrating compliance with ambient air quality guidelines.
6. Supply additional information as follows if appropriate:
   (a) Stack exit configuration other than a round vertical stack. Show length and width for a rectangular stack. Indicate if horizontal discharge with a note.
   (b) Stack's height above supporting or adjacent structures if structure is within 3 times the "stack height above the ground" of stack.
7. Dimensions of nonpoint sources as defined in 17.04.34.A.147.

# EMISSION SOURCES

COMPANY NAME: El Paso Natural Gas Company (EPNG) - Vail Compressor Station


DATE Dec 2019

Estimated "Potential to Emit" per 17.04.340.A.164.
Review of applications and issuance of permits will be expedited by supplying all necessary information on this Table.

| REGULATED AIR POLLUTANT DATA | | | | | EMISSION POINT DISCHARGE PARAMETERS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EMISSION POINT [1] | | CHEMICAL COMPOSITION OF TOTAL STREAM | REG. AIR POLLUTANT EMISSION RATE | | UTM COORDINATES OF EMISSION POINT [5] | | | STACK SOURCES [6] | | | | | NONPOINT SOURCES [7] | |
| NUMBER | NAME | REGULATED AIR POLLUTANT NAME [2] | #/HR. [3] | TONS/YEAR [4] | ZONE | EAST (Mtrs) | NORTH (Mtrs) | HEIGHT ABOVE GROUND (ft) | HEIGHT ABOVE STRUC. (ft) | EXIT DATA DIA. (ft) | EXIT DATA VEL (fps) | EXIT DATA TEMP. (°F) | LENGTH (ft) | WIDTH (ft) |
| | | VOC | See application | | | | | | | | | | | |
| | | SO2 | materials | | | | | | | | | | | |
| | | PM/PM10/PM2.5 | | | | | | | | | | | | |
| | | HAPs | | | | | | | | | | | | |
| | | CO2e | | | | | | | | | | | | |
| A-3 | General Electric M3002-RA | NOx | See application | | 12 | 517932.4 | 3547828.6 | 51 | 6 | 6 | 99.47 | 550 | | |
| | | CO | materials | | | | | | | | | | | |
| | | VOC | | | | | | | | | | | | |
| | | SO2 | | | | | | | | | | | | |

GROUND ELEVATION OF FACILITY ABOVE MEAN SEA LEVEL 2951 feet. PDEQ STANDARD CONDITIONS ARE 293K AND 101.3 KILOPASCALS (17.04.340.A.210)

**General Instructions:**

1. Identify each emission point with a unique number for this plant site, consistent with emission point identification used on plot plan, previous permits, and Emissions Inventory Questionnaire. Include fugitive emissions. Limit emission point number to eight (8) character spaces. For each emission point use as many lines as necessary to list regulated air pollutant data. Typical emission point names are: heater, vent, boiler, tank, reactor, separator, baghouse, fugitive, etc. Abbreviations are O.K.
2. Components to be listed include regulated air pollutants as defined in 17.04.340.A.182. Examples of typical component names are: Carbon Monoxide (CO), Nitrogen Oxides ($NO_X$), Sulfur Dioxide ($SO_2$), Volatile Organic Compounds (VOC), particulate matter (PM), particulate less than 10 microns ($PM_{10}$), etc. Abbreviations are O.K.
3. Pounds per hour (#/HR) is maximum potential emission rate expected by applicant.
4. Tons per year is annual maximum potential emission expected by applicant, which takes into account process operating schedule.
5. As a minimum applicant shall furnish a facility plot plan as described in the filing instructions. UTM coordinates are required only if the source is a major source or is required to perform refined modeling for the purposes of demonstrating compliance with ambient air quality guidelines.
6. Supply additional information as follows if appropriate:
   (a) Stack exit configuration other than a round vertical stack. Show length and width for a rectangular stack. Indicate if horizontal discharge with a note.
   (b) Stack's height above supporting or adjacent structures if structure is within 3 times the "stack height above the ground" of stack.
7. Dimensions of nonpoint sources as defined in 17.04.34.A.147.

# EMISSION SOURCES

COMPANY NAME: El Paso Natural Gas Company (EPNG) - Vail Compressor Station


DATE Dec 2019

Estimated "Potential to Emit" per 17.04.340.A.164.
Review of applications and issuance of permits will be expedited by supplying all necessary information on this Table.

| REGULATED AIR POLLUTANT DATA | | | | | EMISSION POINT DISCHARGE PARAMETERS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EMISSION POINT [1] | | CHEMICAL COMPOSITION OF TOTAL STREAM | REG. AIR POLLUTANT EMISSION RATE | | UTM COORDINATES OF EMISSION POINT [5] | | | STACK SOURCES [6] | | | | | NONPOINT SOURCES [7] | |
| NUMBER | NAME | REGULATED AIR POLLUTANT NAME [2] | #/HR. [3] | TONS/YEAR [4] | ZONE | EAST (Mtrs) | NORTH (Mtrs) | HEIGHT ABOVE GROUND (ft) | HEIGHT ABOVE STRUC. (ft) | EXIT DATA DIA. (ft) | EXIT DATA VEL (fps) | EXIT DATA TEMP. (°F) | LENGTH (ft) | WIDTH (ft) |
| | | PM/PM10/PM2.5 | See application | | | | | | | | | | | |
| | | HAPs | materials | | | | | | | | | | | |
| | | CO2e | | | | | | | | | | | | |
| Aux-1 | Emergency Generator | NOx | See application | | 12 | 517928 | 3547856 | 8.06 | | 0.5 | 404.72 | 898 | | |
| | | CO | materials | | | | | | | | | | | |
| | | VOC | | | | | | | | | | | | |
| | | SO2 | | | | | | | | | | | | |
| | | PM/PM10/PM2.5 | | | | | | | | | | | | |
| | | HAPs | | | | | | | | | | | | |

GROUND ELEVATION OF FACILITY ABOVE MEAN SEA LEVEL 2951 feet. PDEQ STANDARD CONDITIONS ARE 293K AND 101.3 KILOPASCALS (17.04.340.A.210)

**General Instructions:**

1. Identify each emission point with a unique number for this plant site, consistent with emission point identification used on plot plan, previous permits, and Emissions Inventory Questionnaire. Include fugitive emissions. Limit emission point number to eight (8) character spaces. For each emission point use as many lines as necessary to list regulated air pollutant data. Typical emission point names are: heater, vent, boiler, tank, reactor, separator, baghouse, fugitive, etc. Abbreviations are O.K.
2. Components to be listed include regulated air pollutants as defined in 17.04.340.A.182. Examples of typical component names are: Carbon Monoxide (CO), Nitrogen Oxides ($NO_X$), Sulfur Dioxide ($SO_2$), Volatile Organic Compounds (VOC), particulate matter (PM), particulate less than 10 microns ($PM_{10}$), etc. Abbreviations are O.K.
3. Pounds per hour (#/HR) is maximum potential emission rate expected by applicant.
4. Tons per year is annual maximum potential emission expected by applicant, which takes into account process operating schedule.
5. As a minimum applicant shall furnish a facility plot plan as described in the filing instructions. UTM coordinates are required only if the source is a major source or is required to perform refined modeling for the purposes of demonstrating compliance with ambient air quality guidelines.
6. Supply additional information as follows if appropriate:
   (a) Stack exit configuration other than a round vertical stack. Show length and width for a rectangular stack. Indicate if horizontal discharge with a note.
   (b) Stack's height above supporting or adjacent structures if structure is within 3 times the "stack height above the ground" of stack.
7. Dimensions of nonpoint sources as defined in 17.04.34.A.147.

# EMISSION SOURCES

COMPANY NAME: El Paso Natural Gas Company (EPNG) - Vail Compressor Station


DATE Dec 2019

Estimated "Potential to Emit" per 17.04.340.A.164.
Review of applications and issuance of permits will be expedited by supplying all necessary information on this Table.

| REGULATED AIR POLLUTANT DATA | | | | | EMISSION POINT DISCHARGE PARAMETERS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EMISSION POINT [1] | | CHEMICAL COMPOSITION OF TOTAL STREAM | REG. AIR POLLUTANT EMISSION RATE | | UTM COORDINATES OF EMISSION POINT [5] | | | STACK SOURCES [6] | | | | | NONPOINT SOURCES [7] | |
| | | | | | | | | | | EXIT DATA | | | | |
| NUMBER | NAME | REGULATED AIR POLLUTANT NAME [2] | #/HR. [3] | TONS/YEAR [4] | ZONE | EAST (Mtrs) | NORTH (Mtrs) | HEIGHT ABOVE GROUND (ft) | HEIGHT ABOVE STRUC. (ft) | DIA. (ft) | VEL (fps) | TEMP. (°F) | LENGTH (ft) | WIDTH (ft) |
| | | CO2e | See application | | | | | | | | | | | |
| Fugitives | | VOC | materials | | | | | | | | | | | |
| | | HAPs | | | | | | | | | | | | |
| | | CO2e | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

GROUND ELEVATION OF FACILITY ABOVE MEAN SEA LEVEL 2951 feet. PDEQ STANDARD CONDITIONS ARE 293K AND 101.3 KILOPASCALS (17.04.340.A.210)

**General Instructions:**

1. Identify each emission point with a unique number for this plant site, consistent with emission point identification used on plot plan, previous permits, and Emissions Inventory Questionnaire. Include fugitive emissions. Limit emission point number to eight (8) character spaces. For each emission point use as many lines as necessary to list regulated air pollutant data. Typical emission point names are: heater, vent, boiler, tank, reactor, separator, baghouse, fugitive, etc. Abbreviations are O.K.
2. Components to be listed include regulated air pollutants as defined in 17.04.340.A.182. Examples of typical component names are: Carbon Monoxide (CO), Nitrogen Oxides ($NO_X$), Sulfur Dioxide ($SO_2$), Volatile Organic Compounds (VOC), particulate matter (PM), particulate less than 10 microns ($PM_{10}$), etc. Abbreviations are O.K.
3. Pounds per hour (#/HR) is maximum potential emission rate expected by applicant.
4. Tons per year is annual maximum potential emission expected by applicant, which takes into account process operating schedule.
5. As a minimum applicant shall furnish a facility plot plan as described in the filing instructions. UTM coordinates are required only if the source is a major source or is required to perform refined modeling for the purposes of demonstrating compliance with ambient air quality guidelines.
6. Supply additional information as follows if appropriate:
   (a) Stack exit configuration other than a round vertical stack. Show length and width for a rectangular stack. Indicate if horizontal discharge with a note.
   (b) Stack's height above supporting or adjacent structures if structure is within 3 times the "stack height above the ground" of stack.
7. Dimensions of nonpoint sources as defined in 17.04.34.A.147.

## *Certification of Compliance with all Applicable Requirements*

Permit Number (If existing source) 425

This certification must be signed by a Responsible Official. Applications without a signed certification will be deemed incomplete.

> *The responsible official is defined as a person who is in charge of principal business functions or who performs policy or decision making functions for the business. This may also include an authorized representative for such persons. For a complete definition, see Pima County Air Quality Control, Title 17, Section 17.04.340(A)(200).*

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Pima County Department of Environmental Quality (PDEQ) as public record. I also attest that I am in compliance with the applicable requirements and will continue to comply with such requirements and any future requirements that become effective during the life of my permit. I will present a certification of compliance to PDEQ no less than annually and more frequently if specified by PDEQ. I further state that I will assume responsibility for the construction, modification, or operation of the source in accordance with the requirements of Title 17 of the Pima County Code and any permit issued thereof.

Name (Print/Type): Philip Baca Title: Director

(Signature): Philip Baca Date: 2-7-2020

## *Certification of Truth, Accuracy, and Completeness*

17.12.010(H) - Certification of Truth, Accuracy, and Completeness. Any application form, report, or compliance certification submitted pursuant to this Chapter shall contain certification by a responsible official of truth, accuracy, and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the documents are true, accurate, and complete.

By my signature I,(Name) Philip Baca, hereby certify that based on information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete.

Signature of Responsible Official of Organization: Philip Baca

Title: Director Date: 2-7-2020

# APPENDIX B. DETAILED EMISSION CALCULATIONS

# EMISSION CALCULATIONS

*Table B-1. PSD Applicability Evaluation*

| Pollutant | Emissions (tpy) | | | | PSD Review Required? [1] |
|---|---|---|---|---|---|
| | Baseline Actual Emissions (BAE) | Projected Actual Emissions (PAE) | Net Emissions Increase (NEI) | PSD Significant Emission Rate (SER) | |
| NOx | 4.98 | 238 | 232.65 | 40 | Yes |
| CO | 1.35 | 117 | 116.04 | 100 | Yes |
| VOC | - | 2.78 | 2.78 | 40 | No |
| $SO_2$ | 0.02 | 1.55 | 1.53 | 40 | No |
| PM | - | 3.10 | 3.10 | 25 | No |
| $PM_{10}$ | - | 3.10 | 3.10 | 15 | No |
| $PM_{2.5}$ | - | 3.10 | 3.10 | 10 | No |
| $CO_2e$ [2] | 1,310.0 | 54,299 | 52,989 | 75,000 | No |

[1] Ozone PSD Review is required if NOx **OR** VOC exceed their respective SER

[2] GHG ($CO_2e$) SER according to 40 CFR 51.166(b)(48)

## EMISSION CALCULATIONS

*Table B-2a. Site-Wide Potential Emissions - Post Project*

| Pollutant | Estimated Potential Emissions (tpy) | | | | | Major Source Thresholds (tpy) | | Major Source? | |
|---|---|---|---|---|---|---|---|---|---|
| | Turbine A-1, A-2, or A-3 | Turbine A-1, A-2, or A-3 | Emergency Generator | Fugitives | Total | Title V | PSD | Title V | PSD |
| NOx | 180.68 | 180.68 | 1.11 | - | 362 | 100 | 250 | Yes | Yes |
| CO | 57.59 | 57.59 | 2.22 | - | 117 | 100 | 250 | Yes | No |
| VOC | 0.48 | 0.48 | 0.55 | 1.27 | 2.78 | 100 | 250 | No | No |
| $SO_2$ | 0.77 | 0.77 | 0.001 | - | 1.55 | 100 | 250 | No | No |
| $PM/PM_{10}/PM_{2.5}$ | 1.50 | 1.50 | 0.09 | - | 3.10 | 100 | 250 | No | No |
| Max HAP | 0.16 | 0.16 | 0.07 | 0.10 | 0.16 | 10 | - | No | No |
| Total HAPs | 0.23 | 0.23 | 0.11 | 0.10 | 0.67 | 25 | - | No | No |
| $CO_2e$ | 26,649 | 26,649 | 230 | 771 | 54,299 | 100,000 | 75,000 | No | No |

# EMISSION CALCULATIONS

***Table B-2b. Site-Wide Potential Emissions - Change***

| Pollutant | Estimated Potential Emissions (tpy) | | |
|---|---|---|---|
| | Pre-Project | Post-Project | Change |
| NOx | 361 | 362 | 1.11 |
| CO | 115 | 117 | 2.22 |
| VOC | 2.22 | 2.78 | 0.55 |
| $SO_2$ | 1.55 | 1.55 | 0.00 |
| $PM/PM_{10}/PM_{2.5}$ | 3.00 | 3.10 | 0.09 |
| Max HAP | 0.16 | 0.16 | 0.00 |
| Total HAPs | 0.56 | 0.67 | 0.11 |
| $CO_2e$ | 54,069 | 54,299 | 230 |

*Table B-2c.i. Potential to Emit - Turbines - Unit Details*

| | | |
|---|---|---|
| **Unit** | A-1, A-2, or A-3 | |
| **Make & Model** | GE / M3002-RA | |
| **Type** | Natural Gas Fired Turbine | |
| **Rating** [1] | 4,976 | hp |
| **BSFC** | 10,442 | Btu/hp-hr |
| **Heat Input** | 51.96 | MMBtu/hr |
| **Annual Operating Hours** | 8,760 | hours |

[1] Site horsepower at 80 deg F.

*Table B-2c.ii. Potential to Emit - Turbines - Emissions - Criteria Pollutants*

| Pollutant | Emission Factor | | Basis | Emission Rate | |
|---|---|---|---|---|---|
| | Value | Units | | (lb/hr) | (tpy) |
| $NO_x$ | 41.25 | lb/hr | 2013 Air Permit Renewal Application | 41.25 | 180.68 |
| CO | 13.15 | lb/hr | 2013 Air Permit Renewal Application | 13.15 | 57.59 |
| VOC | 0.0021 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for stationary gas turbines | 0.11 | 0.48 |
| $SO_2$ | 0.0034 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for stationary gas turbines | 0.18 | 0.77 |
| PM | 0.0066 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for stationary gas turbines | 0.34 | 1.50 |
| $PM_{10}$ | 0.0066 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for stationary gas turbines | 0.34 | 1.50 |
| $PM_{2.5}$ | 0.0066 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for stationary gas turbines | 0.34 | 1.50 |

*Table B-2c.iii. Potential to Emit - Turbines - Emissions - Hazardous Air Pollutants (HAPs)*

| Pollutant | Emission Factor | | Basis | Emission Rate | |
|---|---|---|---|---|---|
| | Value | Units | | (lb/hr) | (tpy) |
| 1,3-Butadiene | 4.30E-07 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for natural gas-fired stationary gas turbines | 2.23E-05 | 9.79E-05 |
| Acetaldehyde | 4.00E-05 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for natural gas-fired stationary gas turbines | 2.08E-03 | 9.10E-03 |
| Acrolein | 6.40E-06 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for natural gas-fired stationary gas turbines | 3.33E-04 | 1.46E-03 |
| Benzene | 1.20E-05 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for natural gas-fired stationary gas turbines | 6.24E-04 | 2.73E-03 |
| Ethylbenzene | 3.20E-05 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for natural gas-fired stationary gas turbines | 1.66E-03 | 7.28E-03 |
| Formaldehyde | 7.10E-04 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for natural gas-fired stationary gas turbines | 3.69E-02 | 1.62E-01 |
| Naphthalene | 1.30E-06 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for natural gas-fired stationary gas turbines | 6.75E-05 | 2.96E-04 |
| PAH | 2.20E-06 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for natural gas-fired stationary gas turbines | 1.14E-04 | 5.01E-04 |
| Propylene Oxide | 2.90E-05 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for natural gas-fired stationary gas turbines | 1.51E-03 | 6.60E-03 |
| Toluene | 1.30E-04 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for natural gas-fired stationary gas turbines | 6.75E-03 | 2.96E-02 |
| Xylene | 6.40E-05 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for natural gas-fired stationary gas turbines | 3.33E-03 | 1.46E-02 |
| | | | **Max** | **0.04** | **0.16** |
| | | | **Total** | **0.05** | **0.23** |

## EMISSION CALCULATIONS

***Table B-2d.i. Potential to Emit - Emergency Generator - Unit Details***

| | | |
|---|---|---|
| **Unit** | Aux-1 | |
| **Make & Model** | TBD | |
| **Type** | Natural Gas Backup Generator | |
| **Rating** | 750 | kW |
| | 1,006 | hp |
| | 7.86 | MMBtu/hr |
| **BSFC** [1] | 7,053 | Btu/hp-hr |
| | 10,476 | Btu/kW-hr |
| **Annual Operating Hours** [2] | 500 | hours |

[1] Heat rate per site specific technical data report.

[2] Proposed annual hours of operation per EPA memorandum

*"Calculating Potential to Emit (PTE) for Emergency Generators"*, John S. Seitz, September 6, 1995:

***Table B-2d.ii. Potential to Emit - Emergency Generator - Emissions - Criteria Pollutants***

| Pollutant [1] | Emission Factor [2, 3] | Unit | Emission Rate | |
|---|---|---|---|---|
| | | | (lb/hr) | (tpy) |
| $NO_x$ | 2.0 | g/HP-hr | 4.43 | 1.11 |
| CO | 4.0 | g/HP-hr | 8.87 | 2.22 |
| VOC | 1.00 | g/HP-hr | 2.22 | 0.55 |
| $SO_2$ | 5.88E-04 | lb/MMBtu | 0.0046 | 0.0012 |
| PM | 4.83E-02 | lb/MMBtu | 0.38 | 0.095 |
| $PM_{10}$ | 4.83E-02 | lb/MMBtu | 0.38 | 0.095 |
| $PM_{2.5}$ | 4.83E-02 | lb/MMBtu | 0.38 | 0.095 |

[1] Assumes PM = $PM_{10}$ = $PM_{2.5}$

[2] Emission factors for $NO_x$, CO, and VOC per 40 CFR Part 60 Subpart JJJJ (*Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*) Table 1

[3] Emission factors for $SO_2$ and PM/$PM_{10}$/$PM_{2.5}$ per AP-42 Section 3.2 (*Natural Gas-fired Reciprocating Engines*), Table 3.2-1, Table 3.2-2, and Table 3.3-3. For AP-42 emission factor selection, the worst-case factor from either 2-stroke lean-burn engines, 4-stroke lean-burn engines, or 4-stroke rich-burn engines for each pollutant was selected.

## EMISSION CALCULATIONS

***Table B-2d.iii. Potential to Emit - Emergency Generator - Emissions - Hazardous Air Pollutants (HAPs)***

| Pollutant | Emission Factor [1] | | Emission Rate | |
|---|---|---|---|---|
| | Value | Units | (lb/hr) | (tpy) |
| 1,1,2,2-Tetrachloroethane | 6.63E-05 | lb/MMBtu | 3.51E-04 | 8.77E-05 |
| 1,1,2-Trichloroethane | 5.27E-05 | lb/MMBtu | 2.79E-04 | 6.97E-05 |
| 1,1-Dichloroethane | 3.91E-05 | lb/MMBtu | 2.07E-04 | 5.17E-05 |
| 1,2-Dichloroethane | 4.22E-05 | lb/MMBtu | 2.23E-04 | 5.58E-05 |
| 1,2-Dichloropropane | 4.46E-05 | lb/MMBtu | 2.36E-04 | 5.90E-05 |
| 1,3-Butadiene | 8.20E-04 | lb/MMBtu | 4.34E-03 | 1.08E-03 |
| 1,3-Dichloropropene | 4.38E-05 | lb/MMBtu | 2.32E-04 | 5.79E-05 |
| 2,2,4-Trimethylpentane | 8.46E-04 | lb/MMBtu | 4.48E-03 | 1.12E-03 |
| Acetaldehyde | 8.36E-03 | lb/MMBtu | 4.42E-02 | 1.11E-02 |
| Acrolein | 7.78E-03 | lb/MMBtu | 4.12E-02 | 1.03E-02 |
| Benzene | 1.94E-03 | lb/MMBtu | 1.03E-02 | 2.57E-03 |
| Carbon Tetrachloride | 6.07E-05 | lb/MMBtu | 3.21E-04 | 8.03E-05 |
| Chlorobenzene | 4.44E-05 | lb/MMBtu | 2.35E-04 | 5.87E-05 |
| Chloroethane | 1.87E-06 | lb/MMBtu | 9.89E-06 | 2.47E-06 |
| Chloroform | 4.71E-05 | lb/MMBtu | 2.49E-04 | 6.23E-05 |
| Ethylbenzene | 1.08E-04 | lb/MMBtu | 5.71E-04 | 1.43E-04 |
| Ethylene Dibromide | 7.34E-05 | lb/MMBtu | 3.88E-04 | 9.71E-05 |
| Formaldehyde | 5.52E-02 | lb/MMBtu | 2.92E-01 | 7.30E-02 |
| Methanol | 2.50E-03 | lb/MMBtu | 1.32E-02 | 3.31E-03 |
| Methylene Chloride | 1.47E-04 | lb/MMBtu | 7.78E-04 | 1.94E-04 |
| Naphthalene | 9.71E-05 | lb/MMBtu | 5.14E-04 | 1.28E-04 |
| n-Hexane | 1.11E-03 | lb/MMBtu | 5.87E-03 | 1.47E-03 |
| PAH | 1.34E-04 | lb/MMBtu | 7.09E-04 | 1.77E-04 |
| Phenol | 4.21E-05 | lb/MMBtu | 2.23E-04 | 5.57E-05 |
| Styrene | 5.48E-05 | lb/MMBtu | 2.90E-04 | 7.25E-05 |
| Tetrachloroethane | 2.48E-06 | lb/MMBtu | 1.31E-05 | 3.28E-06 |
| Toluene | 9.63E-04 | lb/MMBtu | 5.09E-03 | 1.27E-03 |
| Vinyl Chloride | 2.47E-05 | lb/MMBtu | 1.31E-04 | 3.27E-05 |
| Xylenes | 2.68E-04 | lb/MMBtu | 1.42E-03 | 3.54E-04 |
| ***Max HAP*** | | | ***0.29*** | ***0.07*** |
| ***Total HAPs*** | | | ***0.43*** | ***0.11*** |

[3] Emission factors for HAPs per AP-42 Section 3.2 (*Natural Gas-fired Reciprocating Engines*), Table 3.2-1, Table 3.2-2, and Table 3.3-3. For AP-42 emission factor selection, the worst-case factor from either 2-stroke lean-burn engines, 4-stroke lean-burn engines, or 4-stroke rich-burn engines for each pollutant was selected.

*Table B-2e. Potential to Emit - Fugitive Components - Emissions*

| Component | Component Count [1] | THC Emission Factor (lbs/hr-SRC) [2] | Stream Content (wt%) [3] | | | | VOC Emissions | | HAP Emissions | | $CH_4$ Emissions | | $CO_2$ Emissions | | $CO_2e$ [4] Emissions |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | VOC | HAP | $CH_4$ | $CO_2$ | (lb/hr) | (tpy) | (lb/hr) | (tpy) | (lb/hr) | (tpy) | (lb/hr) | (tpy) | (tpy) |
| Valves | 514 | 0.00992 | 4.00% | 0.30% | 97.00% | 5.00% | 0.20 | 0.89 | 0.015 | 0.067 | 4.95 | 21.66 | 0.25 | 1.12 | 542.74 |
| Flanges | 240 | 0.00086 | 4.00% | 0.30% | 97.00% | 5.00% | 0.0083 | 0.036 | 0.00062 | 0.0027 | 0.20 | 0.88 | 0.010 | 0.045 | 21.96 |
| Connections | 1,474 | 0.00044 | 4.00% | 0.30% | 97.00% | 5.00% | 0.026 | 0.11 | 0.0019 | 0.0085 | 0.63 | 2.76 | 0.032 | 0.14 | 69.17 |
| Open-ended lines | 28 | 0.00441 | 4.00% | 0.30% | 97.00% | 5.00% | 0.0049 | 0.022 | 0.00037 | 0.0016 | 0.12 | 0.52 | 0.0062 | 0.027 | 13.14 |
| Others | 60 | 0.01940 | 4.00% | 0.30% | 97.00% | 5.00% | 0.047 | 0.20 | 0.0035 | 0.015 | 1.13 | 4.95 | 0.058 | 0.25 | 123.89 |
| **Totals** | | | | | | | **0.29** | **1.27** | **0.022** | **0.10** | **7.03** | **30.77** | **0.36** | **1.59** | **770.91** |

[1] Component counts default values obtained from GRI-HAPCalc Version 3.01 for a "typical" compressor station, doubled as a conservative measure

The GRI HAP Calc Version 3.01 for a "typical" compressor station assumes six turbines and six reciprocating engines.

[2] THC emission factors from Table 2-4 of EPA-453/R-95-017, Protocol for Equipment Leak Emission Estimates (November, 1995).

The THC emissions factors were multiplied by the VOC weight percent and HAP weight percent to calculate VOC lb/hr and HAP lb/hr.

The THC emissions factors were multiplied by the $CO_2$ weight percent and $CH_4$ weight percent to calculate $CO_2$ lb/hr and $CH_4$ lb/hr.

[3] Stream content calculated using the stream data contained in Table B-2g.

VOC content was estimated from gas analysis, and an additional safety margin was applied. VOC wt% was assumed to be 4% in calculation rather than as shown on Gas Analysis Spreadsheet.

HAP content was estimated from gas analysis, and an additional safety margin was applied. HAP wt% was assumed to be 0.3% in calculation rather than as shown on Gas Analysis Spreadsheet.

Methane content was estimated from gas analysis, and an additional safety margin was applied. Methane wt% was assumed to be 97% in calculation rather than as shown on Gas Analysis Spreadsheet.

$CO_2$ content was estimated from gas analysis, and an additional safety margin was applied. $CO_2$ wt% was assumed to be 5% in calculation rather than as shown on Gas Analysis Spreadsheet.

[4] $CO_2e$ is calculated using the GWPs in the Table B-2f.

## EMISSION CALCULATIONS

*Table B-2f. Potential to Emit - Greenhouse Gases*

| Unit Description | Hours of Operation | Rating | BSFC | Max Heat Rate (HHV) | Annual Heat Input (HHV) | GHG Emissions [1] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | $CO_2$ | | $CH_4$ | | $N_2O$ | | $CO_2e$ [2] |
| | (hr/yr) | (hp) | (Btu/hp-hr) | (MMBtu/hr) | (MMBtu/yr) | (kg/MMBtu) | (tpy) | (kg/MMBtu) | (tpy) | (kg/MMBtu) | (tpy) | (tpy) |
| Natural Gas Fired Turbine - GE / M3002-RA (A-1, A-2, or A-3) | 8,760 | 4,976 | 10,442 | 51.96 | 455,164 | 53.06 | 26,621 | 1.00E-03 | 0.50 | 1.00E-04 | 0.050 | 26,649 |
| 4976 - Natural Gas Fired Turbine (GE / M3002-RA) | 8,760 | 4,976 | 10,442 | 51.96 | 455,164 | 53.06 | 26,621 | 1.00E-03 | 0.50 | 1.00E-04 | 0.050 | 26,649 |
| Emergency Generator | 500 | | | 7.86 | 3,929 | 53.06 | 230 | 1.00E-03 | 0.00 | 1.00E-04 | 0.000 | 230 |
| Fugitives | | | | | | | 1.59 | | 30.77 | | | 771 |
| **Total** | | | | **111.78** | **914,257** | | **53,474** | | **31.78** | | **0.10** | **54,299** |

[1] Emissions of $CO_2$ and $CH_4$ and $N_2O$ per 40 CFR 98 Subpart C Tables C-1 and C-2.

[2] $CO_2e$ based on multiplying $CO_2$ and $CH_4$ and $N_2O$ by the Global Warming Potentials contained in 40 CFR 98 Subpart A as follows:

| | |
|---|---|
| $CO_2$ | 1 |
| $CH_4$ | 25 |
| $N_2O$ | 298 |

## EMISSION CALCULATIONS

*Table B-2g. Potential to Emit - Gas Analysis*

| Component | VOC or HAP ? | Molecular Weight (lb/lb-mol) | Density [1] (lb/scf) | Mole Percent (%) | Molecular Weight x Mole Percent (lb/lb-mol) | Weight Percent [2] (%) | Weight of Component per Volume of Gas [3] (lb/scf) |
|---|---|---|---|---|---|---|---|
| Nitrogen | No | 28.01 | 0.07 | 1.57% | 0.44 | 2.63% | 1.13E-03 |
| Carbon Dioxide | No | 44.01 | 0.11 | 0.11% | 0.05 | 0.28% | 1.20E-04 |
| Methane | No | 16.04 | 0.04 | 94.83% | 15.21 | 90.67% | 3.88E-02 |
| Ethane | No | 30.07 | 0.08 | 3.29% | 0.99 | 5.89% | 2.52E-03 |
| Propane | VOC | 44.10 | 0.11 | 0.18% | 0.078 | 0.46% | 1.99E-04 |
| i-Butane | VOC | 58.12 | 0.15 | 0.006% | 0.0034 | 0.020% | 8.75E-06 |
| n-Butane | VOC | 58.12 | 0.15 | 0.011% | 0.0062 | 0.037% | 1.58E-05 |
| Pentane | VOC | 72.15 | 0.18 | 0.0018% | 0.0013 | 0.008% | 3.31E-06 |
| Hexane | VOC/HAP | 86.18 | 0.22 | 0.0002% | 0.0002 | 0.001% | 4.40E-07 |
| | | | **Total** | **100%** | **16.78** | **100%** | **0.043** |

[1] Calculated using the Ideal Gas Law.

[2] Calculated as the individual component's (Molecular Weight x Mole Percent), divided by the total (Molecular Weight x Mole Percent).

[3] Calculated as the density times the mole percent.

| | | |
|---|---|---|
| **VOC Content** | 0.00023 lb/scf | 0.53% VOC wt. % |
| **HAP Content** | 0.00000 lb/scf | 0.00% HAP wt. % |
| **$CO_2$ Content** | 0.00012 lb/scf | 0.28% $CO_2$ wt. % |
| **$CH_4$ Content** | 0.03883 lb/scf | 90.67% $CH_4$ wt. % |

## EMISSION CALCULATIONS

*Table B-3a. Site-Wide Projected Actual Emissions - Post Project*

| Pollutant | Estimated Projected Actual Emissions (tpy) | | | | Estimated Projected Actual Emissions (tpy) |
|---|---|---|---|---|---|
| | A-1, A-2, or A-3 | A-1, A-2, or A-3 | Emergency Generator [1] | Fugitives [1] | |
| NOx | 118.26 | 118.26 | 1.11 | - | 238 |
| CO | 57.59 | 57.59 | 2.22 | - | 117 |
| VOC [1] | 0.48 | 0.48 | 0.55 | 1.27 | 2.78 |
| $SO_2$ [1] | 0.77 | 0.77 | 0.0012 | - | 1.55 |
| $PM/PM_{10}/PM_{2.5}$ [1] | 1.50 | 1.50 | 0.09 | - | 3.10 |
| $CO_2e$ [1] | 26,649 | 26,649 | 230 | 771 | 54,299 |

[1] PAE conservatively assumed equal to PTE.

# EMISSION CALCULATIONS

***Table B-3b.i. Projected Actual Emissions - Turbines - Unit Details***

| | | |
|---|---|---|
| **Unit** | A-1, A-2, or A-3 | |
| **Make & Model** | GE / M3002-RA | |
| **Type** | Natural Gas Fired Turbine | |
| **Rating** [1] | 4,976 | hp |
| **BSFC** | 10,442 | Btu/hp-hr |
| **Heat Input** | 51.96 | MMBtu/hr |
| **Annual Operating Hours** | 8,760 | hours |

[1] Site horsepower at 80 deg F.

***Table B-3b.ii. Projected Actual Emissions - Turbines - Emissions - Criteria Pollutants***

| Pollutant | Emission Factor | | Basis | Emission Rate | |
|---|---|---|---|---|---|
| | Value | Units | | (lb/hr) | (tpy) |
| $NO_x$ | 27.00 | lb/hr | Email from Weiwen Daly on October 31, 2019 | 27.00 | 118.26 |
| CO | 13.15 | lb/hr | Source test data. Maximum measured CO emissions (lb/scf) with a 10% safety factor and maximum fuel rate (scfh) with a 10% safety factor. | 13.15 | 57.59 |
| VOC | 0.0021 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for stationary gas turbines | 0.11 | 0.48 |
| $SO_2$ | 0.0034 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for stationary gas turbines | 0.18 | 0.77 |
| PM | 0.0066 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for stationary gas turbines | 0.34 | 1.50 |
| $PM_{10}$ | 0.0066 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for stationary gas turbines | 0.34 | 1.50 |
| $PM_{2.5}$ | 0.0066 | lb/MMBtu | AP-42 Section 3.1, dated April 2000, for stationary gas turbines | 0.34 | 1.50 |

## EMISSION CALCULATIONS

*Table B-4a. Baseline Actual Emissions - Site-Wide*

| Year | Annual Emissions (tpy) [1] | | | | Rolling 24-Month Average Emissions (tpy) | | | |
|---|---|---|---|---|---|---|---|---|
| | NOx | CO | $SO_2$ | GHG | NOx | CO | $SO_2$ | GHG |
| 2010 | 2.21 | 0.79 | 0.01 | 848 | - | - | - | - |
| 2011 | 0.17 | 0.05 | 0.00 | 61 | 1.19 | 0.42 | 0.01 | 455 |
| 2012 | 5.76 | 1.35 | 0.02 | 1,310 | 2.97 | 0.70 | 0.01 | 686 |
| 2013 | 4.20 | 1.34 | 0.02 | 1,310 | 4.98 | 1.35 | 0.02 | 1,310 |
| 2014 | 0.00 | 0.00 | 0.00 | 0 | 2.10 | 0.67 | 0.01 | 655 |
| 2015 | 0.00 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0.00 | 0 |
| 2016 | 0.00 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0.00 | 0 |
| 2017 | 0.00 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0.00 | 0 |
| 2018 | 0.00 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0.00 | 0 |
| 2019 | 0.00 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0.00 | 0 |
| **Representative 24-Month Average in Last 10 Years** | | | | | **4.98** | **1.35** | **0.02** | **1,310** |

[1] Pursuant to Table 3 of Air Quality Operating Permit #425, July 8, 2015.

# APPENDIX C. $NO_X$ EMISSION FACTOR MEMORANDUM

elpaso Natural Gas

April 28, 2011 **via email on April 28, 2011 at 10:15 a.m.**

Ms. Anna Martin
Pima County Department of Environmental Quality
33 N. Stone Avenue
Suite 700
Tucson, AZ 85701-7370

Subject : Opportunity to Correct – Tracking #PC1104-014 – El Paso Natural Gas Company's Vail Compressor Station – PDEQ Permit # 425

Dear Ms. Martin:

El Paso Natural Gas Company ( EPNG ) received an email on April 13, 2011 with an Opportunity to Correct letter.

During the permit renewal process, PDEQ indicated "The potential emissions for the facility shall be taken as those calculated from using the performance test data ( dated April 22, 2003 ), including a modest 10 % safety factor to represent maximum operating conditions." EPNG understands the need for a revised NOx emission rate since the January 2011 emissions test NOx rate was higher than the rate calculated by PDEQ.

We reviewed our COMET database for units similar to Vail Station GE Frame III units within the El Paso system. Figure 1 shows NOx pounds per hour versus with fuel flow. The red line on Figure 1 is the highest historical fuel flow for a similar unit. Figure 2 shows the scatter of fuel flow for similar units from 2002 to 2010. Boundary lines were added to Figure 1 since PDEQ requested a "not to exceed" estimate. At the highest fuel rate ( red line ), the highest NOx lb/hr rate is about 37.5 lb/hr NOx. With a 10 % safety factor, the estimated rate is approximately 41 lbs/hr. Therefore, the new estimated NOx pounds per hour rate for the Vail units is 41 lbs/hr.

If you have questions or comments, please contact me at ( 520 ) 663 - 4222 or you can send an e-mail to Anu.Pundari@elpaso.com.

Sincerely,

Anu Pundari

Anu Pundari
Pipelines West Environment Department

**Figure 1 – GE Frame III Emissions Data**

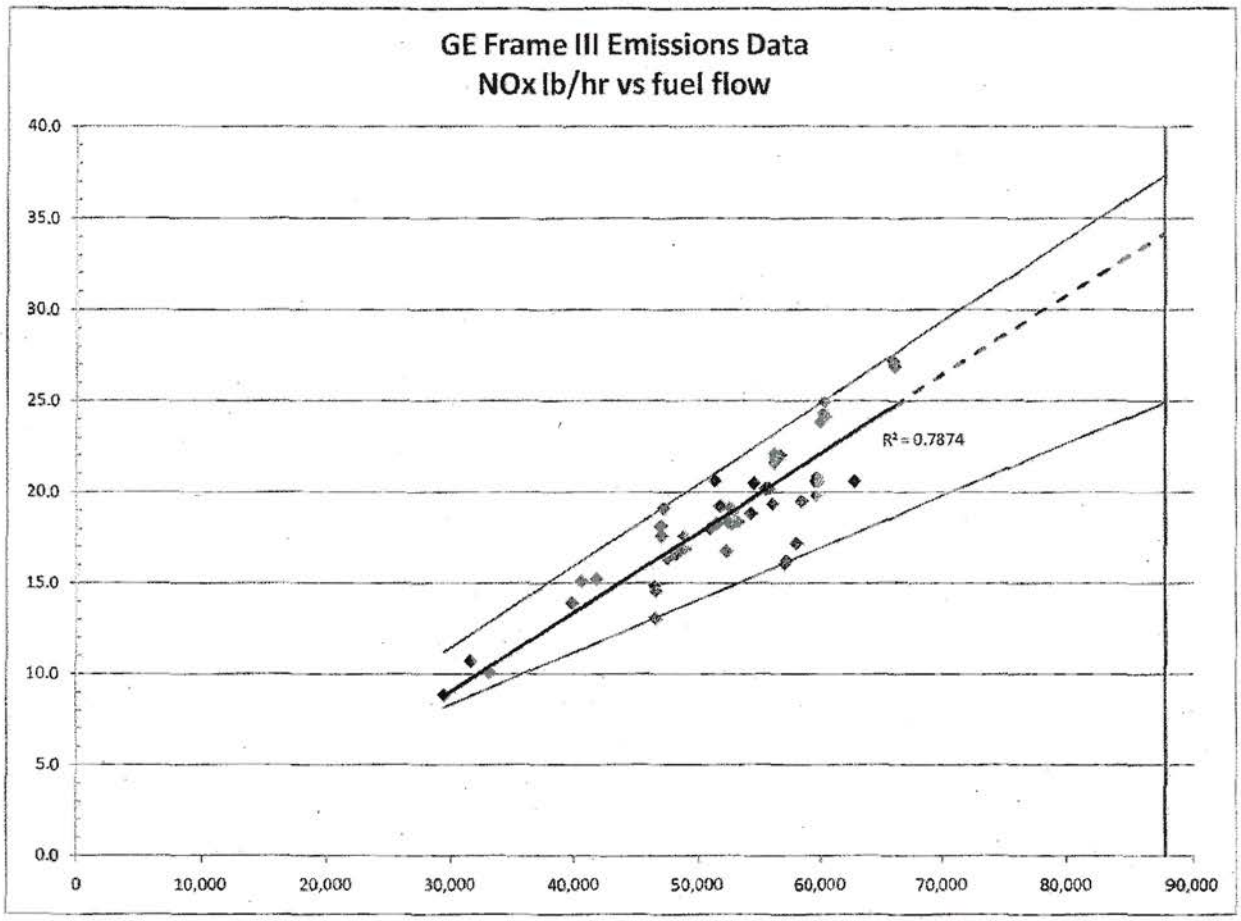
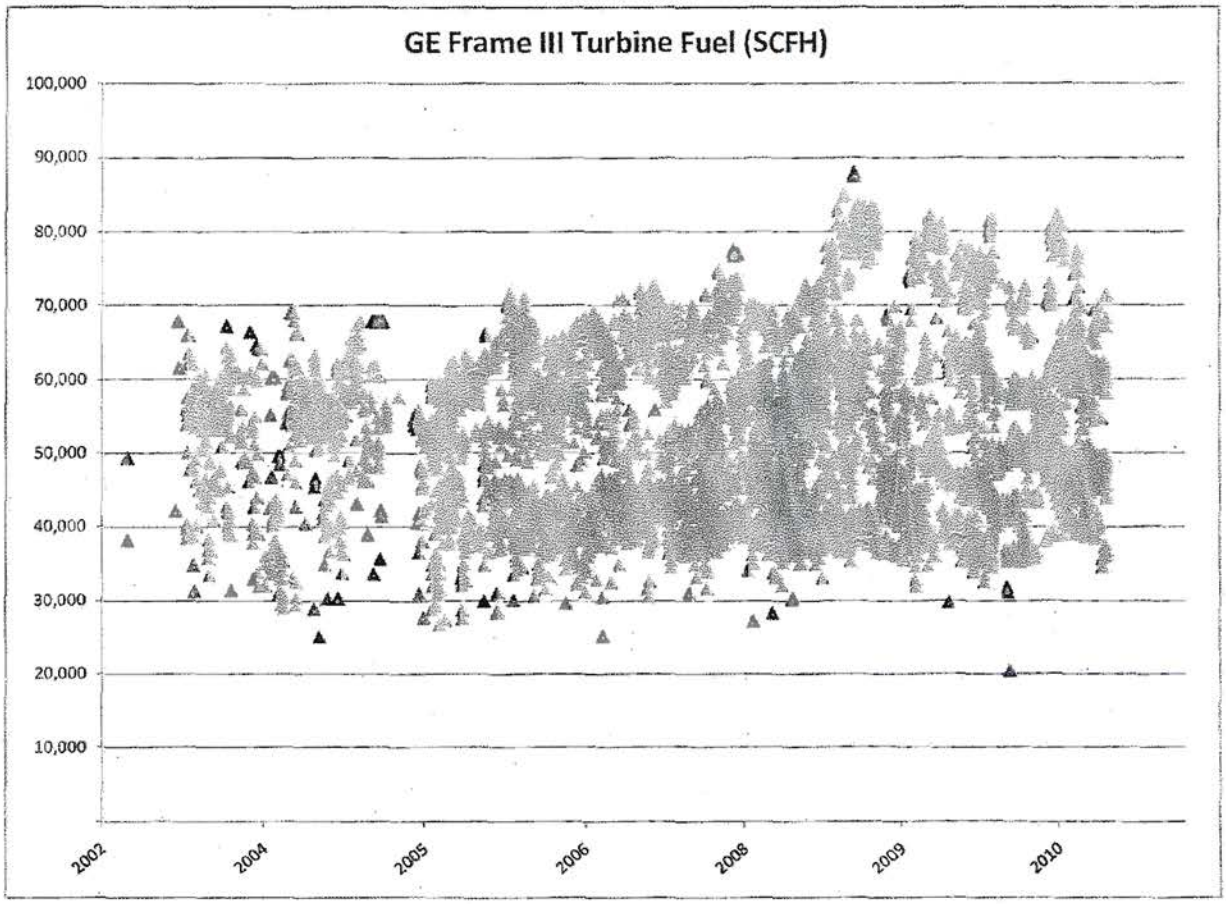


**Figure 2 – Scatter of Fuel Flow**



**CERTIFICATION OF TRUTH, ACCURACY, AND COMPLETENESS**

17.12.160(H) – Certification of Truth, Accuracy and Completeness. Any application form, report, or compliance certification pursuant to this Chapter shall contain certification by a responsible official of truth, accuracy, and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the documents are true, accurate, and complete.

By my signature I, (Name) Donald G. Cantrell, hereby certify that based on information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete.

Signature of Responsible Official of Organization: Don Cantrell

Title: Operations Manager Date: 04-27-2011

# APPENDIX D. HISTORIC CO TEST DATA

*Table D-1. Historic CO Source Test Data*

| Emission Unit ID | Test | | Fuel Flow | CO Emissions | | Max CO Emissions |
|---|---|---|---|---|---|---|
| | Date | Run | (scfh) | (lb/hr) | (lb/scf) | (lb/hr) |
| A-1 | 2/1/2011 | 1 | 66,134 | 4.35 | 6.58E-05 | |
| A-1 | 2/1/2011 | 2 | 66,134 | 4.49 | 6.79E-05 | |
| A-1 | 2/1/2011 | 3 | 66,006 | 4.57 | 6.92E-05 | |
| A-2 | 2/1/2011 | 1 | 53,208 | 8.71 | 1.64E-04 | |
| A-2 | 2/1/2011 | 2 | 52,716 | 8.55 | 1.62E-04 | |
| A-2 | 2/1/2011 | 3 | 52,469 | 8.62 | 1.64E-04 | |
| A-3 | 2/1/2011 | 1 | 52,361 | 6.32 | 1.21E-04 | |
| A-3 | 2/1/2011 | 2 | 51,484 | 7.02 | 1.36E-04 | |
| A-3 | 2/1/2011 | 3 | 50,975 | 7.05 | 1.38E-04 | |
| ***Maximum*** | | | **66,134** | | **1.64E-04** | **10.87** |
| ***Maximum + 10% Safety Factor*** | | | **72,747** | | **1.81E-04** | **13.15** |

# APPENDIX E. ESD AND BLOWDOWN EMISSIONS

# EMISSION CALCULATIONS

***Table C-1a. Potential to Emit - SSM - Details***

| Emission Unit ID | Event | Volume Vented per Event [1] (Mscf/event) | Annual Events [1] (event/yr) | Annual Volume Vented (Mscf/yr) |
|---|---|---|---|---|
| A-1 | Unit Blowdown | 24 | 72 | 1,728 |
| A-2 | Unit Blowdown | 24 | 72 | 1,728 |
| A-3 | Unit Blowdown | 24 | 72 | 1,728 |
| Station | Blowdown | 289 | 6 | 1,733 |
| Station | Pipeline Pigging | 10 | 8 | 80 |
| **Total** | | | | **6,997** |

[1] Facility estimates.

***Table C-1b. Potential to Emit - SSM - Emissions***

| Pollutant | Content (lb/scf) | Emissions [1, 2] (tpy) |
|---|---|---|
| VOC | 0.00023 | 0.80 |
| HAP | 0.00000 | 0.002 |
| $CO_2$ | 0.00012 | 0.42 |
| $CH_4$ | 0.03883 | 136 |
| GHG | - | 3,397 |

[1] The $CO_2$ and $CH_4$ emission factors are from Table B-2g (weight of component per volume of gas).

[2] GHG Tons = SSM $CO_2$ Emissions + (SSM $CH_4$ Emissions x GWP of 25 )

# APPENDIX F. APPLICABLE REQUIREMENTS

Per PDEQ's Completeness Checklist for Class I sources, this appendix identifies all potentially applicable federal and county requirements and their applicability to the facility. Regulations can include NSPS, NESHAP, and Pima County Air Quality Regulations. The methods used for determining the compliance status with each applicable requirement are set forth in the table, supplemented by process knowledge, intermittent observation of the facility by EPNG employees, review of records and permit conditions, employee training and establishment of procedures to ensure the maintenance of required records.

| Requirement | Description | Applicability | | Compliance Determination |
|---|---|---|---|---|
| | | Yes | No | |
| 40 CFR Part 60, Subpart A and PDEQ 17.16.490 (A)(1) | Standards of performance for new stationary sources (NSPS) - General Provisions | X | | Applicable – The facility will operate an emergency generator set subject to the rule. |
| 40 CFR Part 60, Subpart Db and PDEQ 17.16.490 (A)(4) | Standards of performance for new stationary sources (NSPS) - Industrial-Commercial-Institutional Steam Generating Units | | X | There are no steam generating units at the facility. |
| 40 CFR Part 60, Subpart Dc and PDEQ 17.16.490 (A)(5) | Standards of performance for new stationary sources (NSPS) - Small Industrial-Commercial-Institutional Steam Generating Units. | | X | There are no steam generating units at the facility. |
| 40 CFR Part 60, Subpart GG and PDEQ 17.16.490 (A)(43) | Standards of performance for new stationary sources (NSPS) - Standards of Performance for Stationary Gas Turbines | | X | The GE units pre date and have not triggered NSPS. |
| 40 CFR Part 60, Subpart K and PDEQ 17.16.490 (A)(17) | Standards of performance for new stationary sources (NSPS) - Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978 | | X | This rule applies to storage vessels for petroleum liquids with a storage capacity greater than 40,000 gallons.<br>Not applicable – There are no petroleum liquids storage tanks in excess of 40,000 gallons in storage capacity. |
| 40 CFR Part 60, Subpart Ka and PDEQ 17.16.490 (A)(18) | Standards of performance for new stationary sources (NSPS) - Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced after May 18, 1978, and Prior to July 23, 1984. | | X | This rule applies to storage vessels for petroleum liquids with a storage capacity greater than 40,000 gallons.<br>Not applicable – There are no petroleum liquids storage tanks in excess of 40,000 gallons in storage capacity. |
| 40 CFR Part 60, Subpart Kb and | Standards of performance for new stationary sources (NSPS) - Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum | | X | This rule applies to storage vessels with a capacity greater than or |

| Requirement | Description | Applicability | | Compliance Determination |
|---|---|---|---|---|
| | | Yes | No | |
| PDEQ 17.16.490 (A)(19) | Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984 | | | equal to 75 cubic meters (19,813 gallons).<br>Not applicable – There were no volatile organic liquid storage vessels for which Construction, Reconstruction, Modification Commenced after July 23, 1984 AND capacity greater than 19,813 gallons. |
| 40 CFR Part 60, Subpart KKK and PDEQ 17.16.490 (A)(68) | Standards of performance for new stationary sources (NSPS) - Standards of Performance for Equipment Leaks of VOC From Onshore Natural Gas Processing Plants for Which Construction, Reconstruction, or Modification Commenced After January 20, 1984, and on or Before August 23, 2011 | | X | This rule applies to compressors and other equipment at onshore natural gas processing facilities.<br>Not applicable – The station is not a site which engages in the extraction of natural gas liquids from field gas, fractionation of mixed natural gas liquids to natural gas products, or both. |
| 40 CFR Part 60, Subpart LLL and PDEQ 17.16.490 (A)(69) | Standards of performance for new stationary sources (NSPS) - Emission Limiting Standards - Standards of Performance for SO2 Emissions from Onshore Natural Gas Processing for Which Construction, Reconstruction, or Modification Commenced After January 20, 1984, and on or Before August 23, 2011 | | X | This rule applies to sweetening units and sulfur recovery units at onshore natural gas processing facilities.<br>Not applicable – The station does not perform sweetening or sulfur recovery at the site. |
| 40 CFR Part 60, Subpart JJJJ and PDEQ 17.16.490 (A)(84) | Standards of performance for new stationary sources (NSPS) - Stationary Spark Ignition Internal Combustion Engines | X | | Applicable – The facility will operate an emergency generator set subject to the rule. |
| 40 CFR Part 82 Subpart A | Protection of Stratospheric Ozone - Production and Consumption Controls | | X | The source does produce, transform, destroy, import or export a controlled substance or import or export a controlled product. |
| 40 CFR Part 82 Subpart B | Protection of Stratospheric Ozone - Servicing of Motor Vehicle Air Conditioners | | X | The source does not perform service on a motor vehicle when this service involves the refrigerant in the motor vehicle air conditioner. |
| 40 CFR Part 82 Subpart D | Protection of Stratospheric Ozone - Federal Procurement | | X | The source does not produce ozone depleting substances. |
| 40 CFR Part 82 Subpart E | Protection of Stratospheric Ozone - The Labeling of Products Using Ozone-Depleting Substances | | X | The source does not produce ozone depleting substances. |
| 40 CFR Part 82 Subpart G | Protection of Stratospheric Ozone - Significant New Alternatives Policy Program | | X | The source is not proposing significant new uses. |

| Requirement | Description | Applicability | | Compliance Determination |
|---|---|---|---|---|
| | | Yes | No | |
| 40 CFR Part 82 Subpart C and PDEQ 17.16.710 | Protection of Stratospheric Ozone - Ban on Nonessential Products Containing Class I Substances and Ban on Nonessential Products Containing or Manufactured with Class II Substances | X | | Procedures in place to ensure that nonessential Class I and Class II products are not used |
| 40 CFR Part 82 Subpart F | Protection of Stratospheric Ozone - Recycling and Emissions Reduction | X | | Facility-wide machinery containing ozone depleting substances Procedures in place to ensure only certified technicians for disposal, maintenance, service and repair of refrigeration equipment are used; compliance determined by review of records required to be completed by employees if regulated activities occur |
| PDEQ 17.16.490 (B), (C), and (D) | (Removed) | | X | |
| PDEQ 17.16.500 | Emission Limiting Standards - Standards of performance for fossil-fuel fired steam generators | | X | No Fossil-fuel fired steam generators of more than 73 megawatts heat input rate |
| PDEQ 17.16.510 | Emission Limiting Standards - Standards of performance for incinerators | | X | There is no Incinerator at the facility. |
| PDEQ 17.16.520.1. | Emission Limiting Standards - Standards of performance for storage vessels for petroleum liquids | | X | Determined exempt by PDEQ; Not included by PDEQ as an applicable requirement in the permit at the request of the applicant. Not applicable by prior PDEQ determination; Original Title V Permit requested an exemption from this requirement. |
| PDEQ 17.16.520.2. & 3. | Emission Limiting Standards - Standards of performance for storage vessels for petroleum liquids | | X | No dock loading facilities or pumps and compressors which handle VOCs are present at the source |
| 40 CFR Part 61 Subparts A and PDEQ 17.16.530.A.1. | National Emissions Standards for Hazardous Air Pollutants (NESHAP) - General Provisions | X | | General administrative provisions for sources or activities subject to Part 61, if applicable. Procedures in place to ensure compliance with general administrative provisions if subject to a relevant standard. |
| 40 CFR Part 61 Subparts M and PDEQ 17.16.530.A.8. | National Emissions Standards for Hazardous Air Pollutants (NESHAP) – National Emission Standards for Asbestos | X | | Facility-wide demolition and renovation activities Procedures in place to ensure that EPNG will comply with all standards |

| Requirement | Description | Applicability | | Compliance Determination |
|---|---|---|---|---|
| | | Yes | No | |
| | | | | for asbestos containing material demolition or renovation activities by obtaining required activity permits for any asbestos renovation or demolition activities pursuant to 40 CFR Part 61, Subpart M; review of records required to be completed by employees if regulated activities occur |
| 40 CFR Part 63 Subpart A and PDEQ 17.16.530.B.1. | National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Source Categories – General Provisions | X | | The emergency generator is subject to NESHAP Subpart ZZZZ. |
| 40 CFR Part 63 Subpart Q and PDEQ 17.16.530.B.13. | National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Source Categories – Industrial Process Cooling Towers | | X | The source does not use chromium-based water treatment chemicals |
| 40 CFR Part 63 Subpart HH and PDEQ 17.16.530.B.26. | National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Source Categories – Oil and Natural Gas Production Facilities | | X | The source is not an oil and natural gas production facility |
| 40 CFR Part 63 Subpart HHH and PDEQ 17.16.530.B.46. | National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Source Categories – Natural Gas Transmission and Storage Facilities | | X | The source is not a major source for HAPs. |
| 40 CFR Part 63 Subpart YYYY and PDEQ 17.16.530.B.83. | National Emission Standards for Hazardous Air Pollutants (NESHAP) for Stationary Combustion Turbines | | X | Not applicable – The turbines are not being modified as part of the project. |
| 40 CFR Part 63 Subpart ZZZZ and PDEQ 17.16.530.B.84. | National Emission Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines | X | | Pursuant to 40 CFR §63.6590(c)(1), the requirements of NESHAP Subpart ZZZZ can be met by meeting the requirements of NSPS Subpart JJJJ. Therefore, no further requirements apply to the emergency generator set under NESHAP Subpart ZZZZ. |
| PDEQ 17.16.645 | (Removed) | | X | |
| PDEQ 17.16.650 | (Repealed) | | X | |
| PDEQ 17.16.655 | (Repealed) | | X | |
| PDEQ 17.16.660 | (Repealed) | | X | |
| PDEQ 17.16.665 | (Repealed) | | X | |
| PDEQ 17.16.670 | (Repealed) | | X | |
| PDEQ 17.16.675 | (Repealed) | | X | |
| PDEQ 17.16.680(A) and (B) | (Repealed) | | X | |
| PDEQ 17.16.680(C) to (F) | (Repealed) | | X | |

| Requirement | Description | Applicability | | Compliance Determination |
|---|---|---|---|---|
| | | Yes | No | |
| PDEQ 17.16.685 | (Repealed) | | X | |
| PDEQ 17.16.690 | (Removed) | | X | |
| PDEQ 17.16.700 | (Removed) | | X | |
| PDEQ 17.04 | General Provisions | X | | General administrative provisions Procedures in place to ensure that necessary permits are obtained |
| PDEQ 17.08 | Ambient Air Quality Standards | X | | General administrative provisions Attainment with Ambient Air Quality Standards is determined by PDEQ. |
| PDEQ 17.11.010 | General Provisions For Permits - Statutory Authority | X | | General administrative provisions No action required by facility |
| PDEQ 17.11.020 | General Provisions For Permits - Planning, Constructing, or Operating Without a Permit | X | | General administrative provisions Procedures in place to ensure that necessary permits are obtained; EPNG is in compliance with permits and permit provisions. |
| PDEQ 17.11.140 | General Provisions For Permits - Sampling, Testing, and Analysis Requirements | X | | General administrative provisions Requirement to test or analyze if requested |
| PDEQ 17.12.180 | Individual Permits And Permit Revisions For Class I Permits - Affirmative Defenses for Excess Emissions Due to Malfunctions, Startup, and Shutdown | X | | General administrative provisions Procedures in place to avoid excess emissions due to malfunctions, startup and shutdown |
| PDEQ 17.12.170 | Individual Permits And Permit Revisions For Class I Permits - Excess Emissions Reporting Requirements for Class I Permits | X | | General administrative provisions Procedures in place for reporting excess emissions, if they occur. |
| PDEQ 17.11.160 | General Provisions For Permits - Test Methods and Procedures | X | | General administrative provisions Procedures in place to ensure applicable test methods and procedures are used if required |
| PDEQ 17.11.210 | General Provisions For Permits - Performance Tests | X | | General administrative provisions Procedures in place to ensure applicable performance tests are conducted if applicable |
| PDEQ 17.11.200 | General Provisions For Permits - Existing Source Emission Monitoring | | X | The source is not a listed source category |
| PDEQ 17.11.170 | General Provisions For Permits - Quality Assurance | X | | General administrative provisions Quality assurance procedures are followed in accordance with the Arizona Testing Manual. |
| PDEQ 17.11.060 | General Provisions For Permits - Permit Display or Posting | X | | General administrative provisions Copy of permit maintained at site |
| PDEQ 17.11.030 | General Provisions For Permits - Notice by Building Permit Agencies | | X | The source is not an agency of the County or political subdivision of the County |
| PDEQ 17.12.090 | (Removed) | | X | |

| Requirement | Description | Applicability | | Compliance Determination |
|---|---|---|---|---|
| | | Yes | No | |
| PDEQ 17.11.100 | General Provisions For Permits - Permits for State Delegated Emission Sources | | X | PDEQ already has jurisdiction of the source. |
| PDEQ 17.12.020 | Individual Permits and Permit Revisions For Class I Permits - Grant or Denial of Applications for Class I Permits | X | | General administrative provisions No action required by facility |
| PDEQ 17.12.030 | Individual Permits and Permit Revisions For Class I Permits - Appeals of Permit Actions for Class I Permits | X | | General administrative provisions No action required by facility |
| PDEQ 17.11.040 | General Provisions For Permits - Assistance to Small Business | X | | General administrative provisions No action required by facility |
| PDEQ 17.11.090 | General Provisions For Permits - Applicability—Classes of Permits | X | | General administrative provisions Procedures in place to ensure that necessary permits are obtained; EPNG is in compliance with permits and permit provisions. |
| PDEQ 17.11.050 | General Provisions For Permits - Transition from Installation and Operating Permit Program to Unitary Permit Program | X | | General administrative provisions No action required by facility |
| PDEQ 17.12.010 | Individual Permits and Permit Revisions For Class I Permits - Permit Application Processing Procedures for Class I Permits | X | | General administrative provisions Submittal of this permit application satisfies Class I permit application procedures |
| PDEQ 17.13.010 | Individual and General Permits and Permit Revisions for Class II and Class III Permits - Application Processing Procedures for Class II and Class III Permits | | X | General administrative provisions No action required by facility; not a Class II or Class III permit |
| PDEQ 17.11.070 | General Provisions For Permits - Public Records—Confidentiality | X | | General administrative provisions No action required by facility |
| PDEQ 17.12.040 | Individual Permits and Permit Revisions For Class I Permits - Permit Contents for Class I Permits | X | | General administrative provisions Submittal of this permit application satisfies Class I permit application procedures |
| PDEQ 17.13.020 | Individual and General Permits and Permit Revisions for Class II and Class III Permits - Permit Contents for Class II and Class III Permits | | X | General administrative provisions No action required by facility; not a Class II or Class III permit |
| PDEQ 17.11.190 | General Provisions For Permits - Permits Containing Synthetic Emission Limitations and Standards | | X | General administrative provisions No action required by facility; no synthetic emission limits or standards proposed |
| PDEQ 17.12.050 | Individual Permits and Permit Revisions For Class I Permits - Establishment of an Emissions Cap for Class I Permits | X | | General administrative provisions No action required by facility, no emissions cap requested |
| PDEQ 17.12.060 | Individual Permits and Permit Revisions For Class I Permits - Review by the EPA and Affected States for Class I Permits | X | | General administrative provisions Applicant will provide required materials if applicable |
| PDEQ 17.11.180 | General Provisions For Permits - Emission Standards and Limitations | X | | General administrative provisions No action required by facility |

| Requirement | Description | Applicability | | Compliance Determination |
|---|---|---|---|---|
| | | Yes | No | |
| PDEQ 17.12.080 | Individual Permits and Permit Revisions For Class I Permits - Compliance Plan—Certification for Class I Permits | X | | General administrative provisions Review of records |
| PDEQ 17.12.090 | Individual Permits and Permit Revisions For Class I Permits - Facility Changes Allowed Without Permit Revisions for Class I Permits | X | | General administrative provisions Procedures in place to ensure changes permissible under 17.12.090 are made pursuant to this Section. |
| PDEQ 17.13.100 | Individual and General Permits and Permit Revisions for Class II and Class III Permits - Facility changes that require a permit revision for Class II or Class III permits | | X | General administrative provisions No action required by facility; not a Class II or Class III permit |
| PDEQ 17.13.110 | Individual and General Permits and Permit Revisions for Class II and Class III Permits - Procedures for Certain Changes that Do Not Require a Permit Revision for Class II or Class III Permits | | X | General administrative provisions No action required by facility; not a Class II or Class III permit |
| PDEQ 17.12.100 | Individual Permits and Permit Revisions For Class I Permits - Administrative Amendments for Class I Permits | X | | General administrative provisions Procedures in place to ensure changes qualifying for an Administrative Permit Amendments are made pursuant to 17.12.100 |
| PDEQ 17.13.050 | Individual and General Permits and Permit Revisions for Class II and Class III Permits - Annual Summary of Amendments for Class II or Class III Permits | | X | General administrative provisions No action required by facility; not a Class II or Class III permit |
| PDEQ 17.12.110 | Individual Permits and Permit Revisions For Class I Permits - Minor Permit Revisions for Class I Permits | X | | General administrative provisions Procedures in place to ensure changes qualifying for a Minor Permit Revision are made pursuant to 17.12.110 |
| PDEQ 17.12.120 | Individual Permits and Permit Revisions For Class I Permits - Significant Permit Revisions for Class I Permits | X | | General administrative provisions Procedures in place to ensure changes qualifying for a Significant Permit Revision are made pursuant to 17.12.120. |
| PDEQ 17.12.130 | Individual Permits and Permit Revisions For Class I Permits - Reopening, Revocation, Reissuance, or Termination for Class I Permits | X | | General administrative provisions No action required by facility |
| PDEQ 17.13.060 | Individual and General Permits and Permit Revisions for Class II and Class III Permits - Voluntary Termination of a Permit for Class II and Class III Permits | | X | General administrative provisions No action required by facility; not a Class II or Class III permit; and no voluntary termination of permit is requested |
| PDEQ 17.12.140 | Individual Permits and Permit Revisions For Class I Permits - Permit Renewal and Expiration for Class I Permits | X | | General administrative provisions Procedures in place to ensure permit renewal is made pursuant to 17.12.140. |

| Requirement | Description | Applicability | | Compliance Determination |
|---|---|---|---|---|
| | | Yes | No | |
| PDEQ 17.12.150 | Individual Permits and Permit Revisions For Class I Permits - Transfers for Class I Permits | X | | General administrative provisions<br>No action required by facility; no permit transfer is requested |
| PDEQ 17.11.110 | General Provisions For Permits - Portable Sources | X | | Facility –wide portable sources<br>Procedures in place to ensure that portable source permit will be obtained, if required, and PDEQ is notified 10 days before transfer of any such portable source to another location |
| PDEQ 17.11.080 | General Provisions For Permits - Permit Shield | X | | General administrative provisions<br>No action required by facility |
| PDEQ 17.12.160 | Individual Permits and Permit Revisions For Class I Permits - Annual Emissions Inventory Questionnaire for Class I Permits | X | | General administrative provisions<br>Procedures in place to ensure that emissions inventory questionnaire is prepared; review of records |
| PDEQ 17.11.130 | General Provisions For Permits - Permits Containing the Terms and Conditions of Federal Delayed Compliance Orders (DCO) or Consent Decrees | X | | General administrative provisions<br>No action required by facility |
| PDEQ 17.12.190 | Individual Permits and Permit Revisions For Class I Permits - Public Participation for Class I Permits | X | | General administrative provisions<br>No action required by facility |
| PDEQ 17.12.200 | Individual Permits and Permit Revisions For Class I Permits - Public Notification for Class I Permits | X | | General administrative provisions<br>No action required by facility |
| PDEQ 17.11.120 | General Provisions For Permits - Material Permit Condition | X | | General administrative provisions<br>No action required by facility |
| PDEQ 17.11.150 | General Provisions For Permits - Stack Height Limitation | X | | General administrative provisions<br>(County enforceable only)<br>No action required by facility |
| PDEQ 17.12.070 | Individual Permits and Permit Revisions For Class I Permits - Acid Rain | | X | The source is not an Acid rain source |
| PDEQ 17.13.090 | Individual and General Permits and Permit Revisions for Class II and Class III Permits - General Permit Enforcement | | X | Source is not under a General Permit and not a Class II or Class III permit |
| PDEQ 17.12.380 | (Removed) | | X | |
| PDEQ 17.13.080 | Individual and General Permits and Permit Revisions for Class II and Class III Permits - Application for Coverage Under General Permit | | X | Source is not under a General Permit<br>No action required by facility; not a Class II or Class III permit |
| PDEQ 17.13.250 | Individual and General Permits and Permit Revisions for Class II and Class III Permits - Fees Related to General Permits | | X | Source is not under a General Permit<br>No action required by facility; not a Class II or Class III permit |
| PDEQ 17.12.410 | (Removed) | | X | |
| PDEQ 17.12.420 | (Removed) | | X | |
| PDEQ 17.12.430 | (Removed) | | X | |
| PDEQ 17.12.440 | (Removed) | | X | |
| PDEQ 17.12.450 | (Removed) | | X | |

| Requirement | Description | Applicability | | Compliance Determination |
|---|---|---|---|---|
| | | Yes | No | |
| PDEQ 17.12.460 | (Removed) | | X | |
| PDEQ 17.14.010 | Activity Permits - Definitions | X | | General administrative provisions No action required by facility |
| PDEQ 17.14.040 | Activity Permits - Fugitive Dust Activity Permits | X | | Applicable, EPNG operates pursuant to PDEQ fugitive dust activity permit. |
| PDEQ 17.14.060 | Activity Permits - Asbestos NESHAP Activity Permits | X | | Applicable for NESHAP activities as per 17.14.060. Procedures in place to ensure that necessary permits are obtained if NESHAP activities are conducted. |
| PDEQ 17.14.080 | Activity Permits - Open Burning Permits | X | | Procedures in place to ensure that only permitted burning is conducted; review of records required to be completed by employees if regulated activities occur |
| PDEQ 17.12.210 | Individual Permits and Permit Revisions For Class I Permits - General Provisions | X | | General administrative provisions No action required by facility |
| PDEQ 17.12.220 | Individual Permits and Permit Revisions For Class I Permits - Fees Related to Class I Permits | X | | General administrative provisions Procedures in place to ensure that applicable fees paid; review of fee invoices. |
| PDEQ 17.13.240 | Individual and General Permits and Permit Revisions for Class II and Class III Permits - Fees Related to Class II and Class III Permits | | X | No action required by facility; not a Class II or Class III permit |
| PDEQ 17.12.525 | (Removed) | | X | |
| PDEQ 17.14.090 | Activity Permits - Open Burning Permit Fees | X | | General administrative provisions Procedures in place to ensure that applicable fees paid; review of fee invoices. |
| PDEQ 17.14.050 | Activity Permits - Fugitive Dust Activity Permit Fees | X | | General administrative provisions Procedures in place to ensure that applicable fees paid; review of fee invoices. |
| PDEQ 17.12.545 | (Removed) | | X | |
| PDEQ 17.12.550 | (Removed) | | X | |
| PDEQ 17.12.560 | (Removed) | | X | |
| PDEQ 17.12.570 | (Removed) | | X | |
| PDEQ 17.12.580 | (Removed) | | X | |
| PDEQ 17.12.590 | (Removed) | | X | |
| PDEQ 17.12.600 | (Removed) | | X | |
| PDEQ 17.12.610 | (Removed) | | X | |
| PDEQ 17.14.030 | Activity Permits - Refund of Overpayment of Permit Fees | X | | General administrative provisions No action required by facility |
| PDEQ 17.12.630 | (Removed) | | X | |

| Requirement | Description | Applicability | | Compliance Determination |
|---|---|---|---|---|
| | | Yes | No | |
| PDEQ 17.12.640 | (Removed) | | X | |
| PDEQ 17.12.650 | (Removed) | | X | |
| PDEQ 17.16.010 | Emission Limiting Standards - Local Rules and Standards—Applicability of More Than One Standard | X | | General administrative provisions<br>No action required by facility |
| PDEQ 17.16.020 | Emission Limiting Standards - Noncompliance With Applicable Standards | X | | General administrative provisions<br>Facility will comply by complying with permit conditions |
| PDEQ 17.16.030 | Emission Limiting Standards - Odor Limiting Standards | X | | General administrative provisions<br>Facility will comply by complying with permit conditions |
| PDEQ 17.16.040 | Emission Limiting Standards - Standards and Applicability (Includes NESHAP) | X | | Facility wide demolition and renovation activities<br>Procedures in place to ensure that EPNG will comply with all standards for asbestos containing material demolition or renovation activities by obtaining required activity permits for any asbestos renovation or demolition activities pursuant to 40 CFR Part 61, Subpart M; review of records required to be completed by employees if regulated activities occur |
| PDEQ 17.16.050 | Emission Limiting Standards - Visibility Limiting Standard | X | | Procedures in place to ensure that reasonable precautions are taken to prevent excessive amounts of particulate matter from becoming airborne; records of date, type of activity performed, and control measures used; review of records required to be completed by employees if regulated activities occur. |
| PDEQ 17.16.055 | Emission Limiting Standards - General | X | | General Definitions<br>No action required by facility |
| PDEQ 17.16.060 | Emission Limiting Standards - Fugitive Dust Producing Activities | X | | Procedures in place to ensure that reasonable precautions are taken to prevent excessive amounts of particulate matter from becoming airborne; records of date, type of activity performed, and control measures used; review of records required to be completed by employees if regulated activities occur |
| PDEQ 17.16.070 | Emission Limiting Standards - Fugitive Dust Emissions Standards for Motor Vehicle Operation | | X | The station is not a vacant lot, or an urban or suburban open area. |

| Requirement | Description | Applicability | | Compliance Determination |
|---|---|---|---|---|
| | | Yes | No | |
| | | | | The station is fenced to bar public access to the facility. |
| PDEQ 17.16.080 | Emission Limiting Standards - Vacant Lots and Open Spaces | X | | Procedures in place to ensure that reasonable precautions are taken to prevent excessive amounts of particulate matter from becoming airborne; records of date, type of activity performed, and control measures used; review of records required to be completed by employees if regulated activities occur |
| PDEQ 17.16.090 | Emission Limiting Standards - Roads and Streets | X | | Procedures in place to ensure that reasonable precautions are taken to prevent excessive amounts of particulate matter from becoming airborne; records of date, type of activity performed, and control measures used; review of records required to be completed by employees if regulated activities occur |
| PDEQ 17.16.100 | Emission Limiting Standards - Particulate Materials | X | | Procedures in place to ensure that reasonable precautions are taken to prevent excessive amounts of particulate matter from becoming airborne; records of date, type of activity performed, and control measures used; review of records required to be completed by employees if regulated activities occur. |
| PDEQ 17.16.110 | Emission Limiting Standards - Storage Piles | X | | Procedures in place to ensure that reasonable precautions are taken to prevent excessive amounts of particulate matter from becoming airborne; records of date, type of activity performed, and control measures used; review of records required to be completed by employees if regulated activities occur. |
| PDEQ 17.16.120 | Emission Limiting Standards - Mineral Tailings | | X | Facility is not a mine |
| PDEQ 17.16.130 | Emission Limiting Standards - Applicability | X | | General administrative provisions Facility will comply by complying with permit conditions and will take |

| Requirement | Description | Applicability | | Compliance Determination |
|---|---|---|---|---|
| | | Yes | No | |
| | | | | steps to minimize fugitive dust emitted at the facility |
| PDEQ 17.16.140 | Emission Limiting Standards - Compilation of Mass Rates and Concentrations | X | | General administrative provisions Facility will comply by complying with permit conditions |
| PDEQ 17.16.150 | Emission Limiting Standards - Hazardous Waste, Hazardous Waste Fuel, Used Oil, and Used Oil Fuel Burning Equipment | | X | Not applicable to natural gas compressor station facility |
| PDEQ 17.16.160 | Emission Limiting Standards - Standards of Performance for Fossil-Fuel Fired Steam Generators and General Fuel Burning Equipment | | X | Source is not an installation in which fuel is burned for primary purpose of producing power, steam, hot water, hot air or other liquids, gases or solids and there are no fossil fired steam generating units or general fuel burning equipment which are greater than or equal to 73 megawatts capacity. |
| PDEQ 17.16.165 | Emission Limiting Standards - Standards of Performance for Fossil-Fuel Fired Industrial and Commercial Equipment | | X | Source does not have in the aggregate greater than 500,000 BTU per hour fuel burning equipment for the primary purpose of producing heat, hot water, or steam.<br>The source has one space heater with input BTU rating of 180,000 BTU/hr and one water heater with 32,000 BTU/hr rating. |
| PDEQ 17.16.170 | Emission Limiting Standards - Incinerators | | X | Not applicable to natural gas compressor station facility |
| PDEQ 17.16.180 | Emission Limiting Standards - Standards of Performance for Existing Hospital/Medical/ Infectious Waste Incinerators | | X | Not applicable to natural gas compressor station facility |
| PDEQ 17.16.190 | Emission Limiting Standards - Standards of Performance for Nitric Acid Plants | | X | Not applicable to natural gas compressor station facility |
| PDEQ 17.16.200 | Emission Limiting Standards - Standards of Performance for Sulfuric Acid Plants | | X | Not applicable to natural gas compressor station facility |
| PDEQ 17.16.210 | Emission Limiting Standards - Standards of Performance for Asphalt Concrete Plants | | X | Not applicable to natural gas compressor station facility |
| PDEQ 17.16.220 | (Removed) | | X | |
| PDEQ 17.16.230(A), (C), and (D) | Emission Limiting Standards - Standards of Performance for Storage Vessels for Petroleum Liquids | | X | no petroleum liquid storage vessel with a capacity greater than 40,000 gallons are present at the source having a vapor pressure of 1.5 pounds per square inch absolute or greater during actual storage conditions; no dock loading conducted at the source; and no |

| Requirement | Description | Applicability | | Compliance Determination |
|---|---|---|---|---|
| | | Yes | No | |
| | | | | pumps and compressors that handle VOCs are present at the source. |
| PDEQ 17.16.230(B) and (E) | Emission Limiting Standards - Standards of Performance for Storage Vessels for Petroleum Liquids | X | | Determined exempt by PDEQ. Not included by PDEQ as an applicable requirement in the permit at the request of the applicant.<br>PDEQ prior determination that EPNG is exempt from the provision. Original Title V application requested an exemption from the provision since the solvents and lube oils used at EPNG facilities have vapor pressures less than items listed in 17.04.340, definition 109b and 109c. |
| PDEQ 17.16.240 | Emission Limiting Standards - Standards of Performance for Secondary Lead Smelters | | X | Not applicable to natural gas compressor station facility |
| PDEQ 17.16.250 | Emission Limiting Standards - Standards of Performance for Secondary Brass and Bronze Ingot Production Plants | | X | Not applicable to natural gas compressor station facility |
| PDEQ 17.16.260 | Emission Limiting Standards - Standards of Performance for Iron and Steel Plants | | X | Not applicable to natural gas compressor station facility |
| PDEQ 17.16.270 | Emission Limiting Standards - Standards of Performance for Sewage Treatment Plants | | X | Not applicable to natural gas compressor station facility |
| PDEQ 17.16.280 | (Removed) | | X | |
| PDEQ 17.16.290 | (Removed) | | X | |
| PDEQ 17.16.300 | (Removed) | | X | |
| PDEQ 17.16.310 | Emission Limiting Standards - Standards of Performance for Coal Preparation Plants | | X | Not applicable to natural gas compressor station facility |
| PDEQ 17.16.320 | Emission Limiting Standards - Standards of Performance for Steel Plants—Electric Arc Furnaces (EAF) | | X | Not applicable to natural gas compressor station facility |
| PDEQ 17.16.330 | (Removed) | | X | |
| PDEQ 17.16.340(A), (B), (C), (D), and (E) | Emission Limiting Standards - Standards of Performance for Stationary Rotating Machinery | X | | Stationary gas turbines or internal combustion engines<br>Knowledge of natural gas fuel combustion and intermittent observation (as approved by prior PDEQ determination); The turbines burn only pipeline quality natural gas that contain negligible particulate emissions. |
| PDEQ 17.16.340(F), (G), (H), and (K) | Emission Limiting Standards - Standards of Performance for Stationary Rotating Machinery | | X | No stationary rotating machinery at the source burns low sulfur oil or high sulfur oil |
| PDEQ 17.16.340(I) and (J) | Emission Limiting Standards - Standards of Performance for Stationary Rotating Machinery | | X | Determined exempt by PDEQ; Not included as an applicable |

| Requirement | Description | Applicability | | Compliance Determination |
|---|---|---|---|---|
| | | Yes | No | |
| | | | | requirement in the permit at the request of the applicant.<br>By prior PDEQ determination, PDEQ granted exemption from the provisions to record daily the sulfur content and lower heating value of the fuel and to report instances where the sulfur exceeds 0.8 % since facility burns only pipeline quality natural gas. The Federal Energy Regulatory Commission (FERC) tariffs restrict the amount of sulfur in natural gas. The FERC tariff is well below 0.8 % sulfur. |
| PDEQ 17.16.350 | Emission Limiting Standards - Standards of Performance for Lime Manufacturing Plants | | X | Not applicable to natural gas compressor station facility |
| PDEQ 17.16.360 | Emission Limiting Standards - Standards of Performance for Nonferrous Metals Industry Sources | | X | Not applicable to natural gas compressor station facility |
| PDEQ 17.16.370 | Emission Limiting Standards - Standards of Performance for Gravel or Crushed Stone Processing Plants | | X | Not applicable to natural gas compressor station facility |
| PDEQ 17.16.380 | Emission Limiting Standards - Standards of Performance for Concrete Batch Plants | | X | Not applicable to natural gas compressor station facility |
| PDEQ 17.16.390 | Emission Limiting Standards - Standards of Performance for Existing Municipal Solid Waste Landfills | | X | Not applicable to natural gas compressor station facility |
| PDEQ 17.16.400(A) | Emission Limiting Standards - Organic Solvents and Other Organic Materials | X | | Procedures in place to ensure measures are taken to control evaporation, leakage or other discharge of VOCs into the environment. |
| PDEQ 17.16.400(B) | Emission Limiting Standards - Organic Solvents and Other Organic Materials | | X | Source does not have any dry-cleaning equipment |
| PDEQ 17.16.400(C) | Emission Limiting Standards - Organic Solvents and Other Organic Materials | X | | Spray painting operations (County enforceable only)<br>Procedures in place to ensure that organic solvent emissions are minimized if certain spray-painting operations occur; records of date, duration of project, control measures used, and MSDS of paints; review of records required to be completed by employees as per current permit requirements |
| PDEQ 17.16.410 | Emission Limiting Standards - Standards of Performance for Cotton Gins | | X | Not applicable to natural gas compressor station facility |

| Requirement | Description | Applicability | | Compliance Determination |
|---|---|---|---|---|
| | | Yes | No | |
| PDEQ 17.16.420 | Emission Limiting Standards - Standards of Performance for Ammonium Sulfide Manufacturing Plants | | X | Not applicable to natural gas compressor station facility |
| PDEQ 17.16.430 | Emission Limiting Standards - Standards of Performance for Unclassified Sources | | X | Since the source is subject to standards of performance under Article 4, it is not considered an unclassified source |
| PDEQ 17.16.440 | (Removed) | | X | |
| PDEQ 17.16.450 | Emission Limiting Standards - Off-Road Machinery | X | | Facility wide off-road machinery stationed at the facility only<br>Keep maintenance records of any off-road machinery stationed at the facility; maintenance of sources prevents smoke in excess of 40% opacity; check for visible emissions as necessary |
| PDEQ 17.16.460 | Emission Limiting Standards - Heater-Planer Units | | X | Source does not operate any heater-planer for the purpose of reconstructing asphalt pavements |
| PDEQ 17.16.470 | Emission Limiting Standards - Roadway and Site Cleaning Machinery | X | | Facility-wide roadway and site cleaning<br>Keep maintenance records of any off-road machinery stationed at the facility; maintenance of sources prevents smoke in excess of 40 % opacity; check for visible emissions as necessary |
| PDEQ 17.16.480 | Emission Limiting Standards - Asphalt or Tar Kettles | | X | There are no asphalt or tar kettles stationed at the facility |
| PDEQ 17.16.490 | Emission Limiting Standards - Standards of Performance for New Stationary Sources (NSPS) | X | | Facility is subject to NSPS for its emergency generator set |
| PDEQ 17.16.520 | Emission Limiting Standards - Standards of Performance for Storage Vessels for Petroleum Liquids | | X | |
| PDEQ 17.16.530 | Emission Limiting Standards - National Emissions Standards for Hazardous Air Pollutants (NESHAP) | X | | Pursuant to 40 CFR §63.6590(c)(1), the requirements of NESHAP Subpart ZZZZ can be met by meeting the requirements of NSPS Subpart JJJJ. Therefore, no further requirements apply to the emergency generator set under NESHAP Subpart ZZZZ. |
| PDEQ 17.16.540 | (Removed) | | X | |
| PDEQ 17.16.550 | Emission Limiting Standards - General | | X | General Administrative Provisions Not applicable until a new major source is constructed or a major modification at the facility. |

| Requirement | Description | Applicability | | Compliance Determination |
|---|---|---|---|---|
| | | Yes | No | |
| PDEQ 17.16.560 | Emission Limiting Standards - Permits for Sources Located in Nonattainment Areas | | X | General Administrative Provisions Not applicable as facility is in an attainment area. |
| PDEQ 17.16.570 | Emission Limiting Standards - Offset and Net Air Quality Benefit Standards | | X | General Administrative Provisions Not applicable as facility is in an attainment area. |
| PDEQ 17.16.580 | Emission Limiting Standards - Special Rule for Sources of VOC or Oxides of Nitrogen in Ozone Nonattainment Areas Classified as Serious or Severe | | X | General Administrative Provisions Not applicable as facility is in an attainment area. |
| PDEQ 17.16.590 | Emission Limiting Standards - Permit Requirements for Sources Located in Attainment and Unclassifiable Areas | X | | General Administrative Provisions PSD requirements are addressed in this application. |
| PDEQ 17.16.600 | Emission Limiting Standards - Air Quality Impact Analysis and Monitoring Requirements | X | | General Administrative Provisions Air quality impacts requirements are addressed in this application. |
| PDEQ 17.16.610 | Emission Limiting Standards - Innovative Control Technology | | X | General Administrative Provisions Not applicable to this application. |
| PDEQ 17.16.620 | Emission Limiting Standards - Air Quality Models | X | | General Administrative Provisions Air quality impacts requirements are addressed in this application. |
| PDEQ 17.16.630 | Emission Limiting Standards - Visibility Protection | X | | General Administrative Provisions Air quality impacts requirements are addressed in this application. |
| PDEQ 17.16.640 | Emission Limiting Standards - Special Rule for Non-Operating Sources of Sulfur Dioxide in Sulfur Dioxide Nonattainment Areas | | X | General Administrative Provisions Not applicable as facility is in an attainment area. |
| PDEQ 17.16.680 | (Repealed) | | X | |
| PDEQ 17.16.710 | Emission Limiting Standards - Sale and Use of Refrigerant Substitutes | X | | Procedures in place to ensure compliance with standard for refrigerant substitute use at the facility. |
| PDEQ 17.20.010 | Emission Source Testing and Monitoring - Source Sampling, Monitoring, and Testing | X | | General Administrative Provisions No action required by facility |
| PDEQ 17.20.020 | Emission Source Testing and Monitoring - Notification—Fees | X | | General Administrative Provisions No action required by facility |
| PDEQ 17.20.030 | Emission Source Testing and Monitoring - Waiver of Test Requirements | | X | Facility is not required to have continuous monitoring equipment |
| PDEQ 17.20.040 | Emission Source Testing and Monitoring - Concealment of Emissions | X | | General Administrative Provisions No action required by facility |
| PDEQ 17.20.050 | Emission Source Testing and Monitoring - Compliance Inspections | X | | General Administrative Provisions No action required by facility |
| PDEQ 17.20.060 | Emission Source Testing and Monitoring - Applicability of Methodology | X | | General Administrative Provisions No action required by facility |
| PDEQ 17.20.070 | Emission Source Testing and Monitoring - Testing Frequencies | X | | General Administrative Provisions No action required by facility |
| PDEQ 17.20.080 | Emission Source Testing and Monitoring - Sampling and Testing Facilities | X | | General Administrative Provisions No action required by facility |

| Requirement | Description | Applicability | | Compliance Determination |
|---|---|---|---|---|
| | | Yes | No | |
| PDEQ 17.20.090 | Emission Source Testing and Monitoring - Stack Sampling | X | | General Administrative Provisions No action required by facility |
| PDEQ 17.20.100 | Emission Source Testing and Monitoring - General Specifications | | X | Facility is not required to have continuous monitoring equipment |
| PDEQ 17.24.010 | Emission Source Recordkeeping and Reporting - Confidentiality of Trade Secrets, Sales Data, and Proprietary Information | X | | General Administrative Provisions No action required by facility |
| PDEQ 17.24.020 | Emission Source Recordkeeping and Reporting - Recordkeeping for Compliance Determinations | X | | General Administrative Provisions Facility is keeping the appropriate records. |
| PDEQ 17.24.030 | Emission Source Recordkeeping and Reporting - Recordkeeping for Emission Inventories | X | | General Administrative Provisions Facility is keeping the appropriate records. |
| PDEQ 17.24.040 | Emission Source Recordkeeping and Reporting - Reporting for Compliance Evaluations | X | | General Administrative Provisions Facility will comply with reporting requirements as applicable |
| PDEQ 17.24.050 | Emission Source Recordkeeping and Reporting - Reporting as a Permit Requirement | X | | General Administrative Provisions Facility will comply with reporting requirements as applicable |
| PDEQ 17.24.060 | Emission Source Recordkeeping and Reporting - Reporting for Emission Inventories | X | | General Administrative Provisions Facility will comply with reporting requirements as applicable |
| PDEQ 17.24.070 | Emission Source Recordkeeping and Reporting - Suppression—False Information | X | | General Administrative Provisions No action required by facility |
| PDEQ 17.28.010 | Violations and Conditional Orders - Violations and Order of Abatement | X | | General Administrative Provisions No action required by facility |
| PDEQ 17.28.020 | Violations and Conditional Orders - Production of Records | X | | General Administrative Provisions No action required by facility |
| PDEQ 17.28.030 | Violations and Conditional Orders - Injunctive Relief | X | | General Administrative Provisions No action required by facility |
| PDEQ 17.28.040 | Violations and Conditional Orders - Precedence of Actions | X | | General Administrative Provisions No action required by facility |
| PDEQ 17.28.050 | Violations and Conditional Orders - Preservation of Rights | X | | General Administrative Provisions No action required by facility |
| PDEQ 17.28.065 | (Removed) | | X | |
| PDEQ 17.28.070 | Violations and Conditional Orders - Civil Penalties | X | | General Administrative Provisions No action required by facility |
| PDEQ 17.28.080 | Violations and Conditional Orders - Criminal Penalties | X | | General Administrative Provisions No action required by facility |
| PDEQ 17.28.090 | Violations and Conditional Orders - Hearings on Orders of Abatement | X | | General Administrative Provisions No action required by facility |
| PDEQ 17.28.100 | Violations and Conditional Orders - Conditional Orders | X | | General Administrative Provisions No action required by facility |
| PDEQ 17.28.110 | Violations and Conditional Orders - Evasion of Basic Requirements | X | | General Administrative Provisions No action required by facility |

| Requirement | Description | Applicability | | Compliance Determination |
|---|---|---|---|---|
| | | Yes | No | |
| PDEQ 17.32.010 | Emergency Episodes and Public Awareness - State Jurisdiction | | X | Not applicable since source is not an agency |
| PDEQ 17.32.020 | Emergency Episodes and Public Awareness - Determination of Emergency Conditions | | X | Not applicable since source is not an agency |
| PDEQ 17.32.030 | Emergency Episodes and Public Awareness - Emergency Episode Reporting | | X | Not applicable since source is not an agency |
| PDEQ 17.32.040 | Emergency Episodes and Public Awareness - Enforcement Actions | | X | Not applicable since source is not an agency |
| PDEQ 17.32.050 | Emergency Episodes and Public Awareness - Continuous Monitoring of Ambient Air Pollution | | X | Not applicable since source is not an agency |
| PDEQ 17.32.060 | Emergency Episodes and Public Awareness - Reports to the Public | | X | Not applicable since source is not an agency |
| PDEQ 17.32.070 | Emergency Episodes and Public Awareness - General Information | | X | Not applicable since source is not an agency |
| PDEQ 17.32.080 | Emergency Episodes and Public Awareness - Public Participation in Rulemaking | | X | Not applicable since source is not an agency |
| PDEQ 17.40.010 to 17.40.091 | Travel Reduction Ordinance - Articles I - VII | | X | EPNG does not meet the definition of Major Employer |
| PDEQ 17.44.010-030 | Voluntary No-Drive Day Ordinance - Article I. General Provisions | X | | General Administrative Provisions No action required by facility |

# APPENDIX G. BACKGROUND DATA DETERMINATION DETAILS

Background concentrations for the modeling analysis are needed for $NO_2$. Section 8.3 of Appendix W of 40 CFR Part 51 discusses the requirements for obtaining "representative" background concentrations. Per Section 8.3.2.b of Appendix W, Recommendations for Isolated Single Sources, "The EPA recommends use of the most recent quality assured air quality monitoring data collected in the vicinity of the source to determine the background concentration for the averaging times of concern. In most cases, the EPA recommends using data from the monitor closest to and upwind of the project area. If several monitors are available, preference should be given to the monitor with characteristics that are most similar to the project area." Additionally, per US EPA guidance, in determining whether background data is representative, one must consider the quality and age of the data collected. Figure G-1 shows the location of the monitoring stations surrounding the Vail Compressor Station using EPA AirData Air Quality Monitors. Figure G-2 shows a wind rose using the 2014-2018 meteorological data for Tucson International Airport obtained from ADEQ's website. This meteorological station is the nearest National Weather Service station. The wind rose shows the majority of the wind blowing from the southeast to the northwest.

**Figure G-1. Location of Neighboring Monitoring Stations**

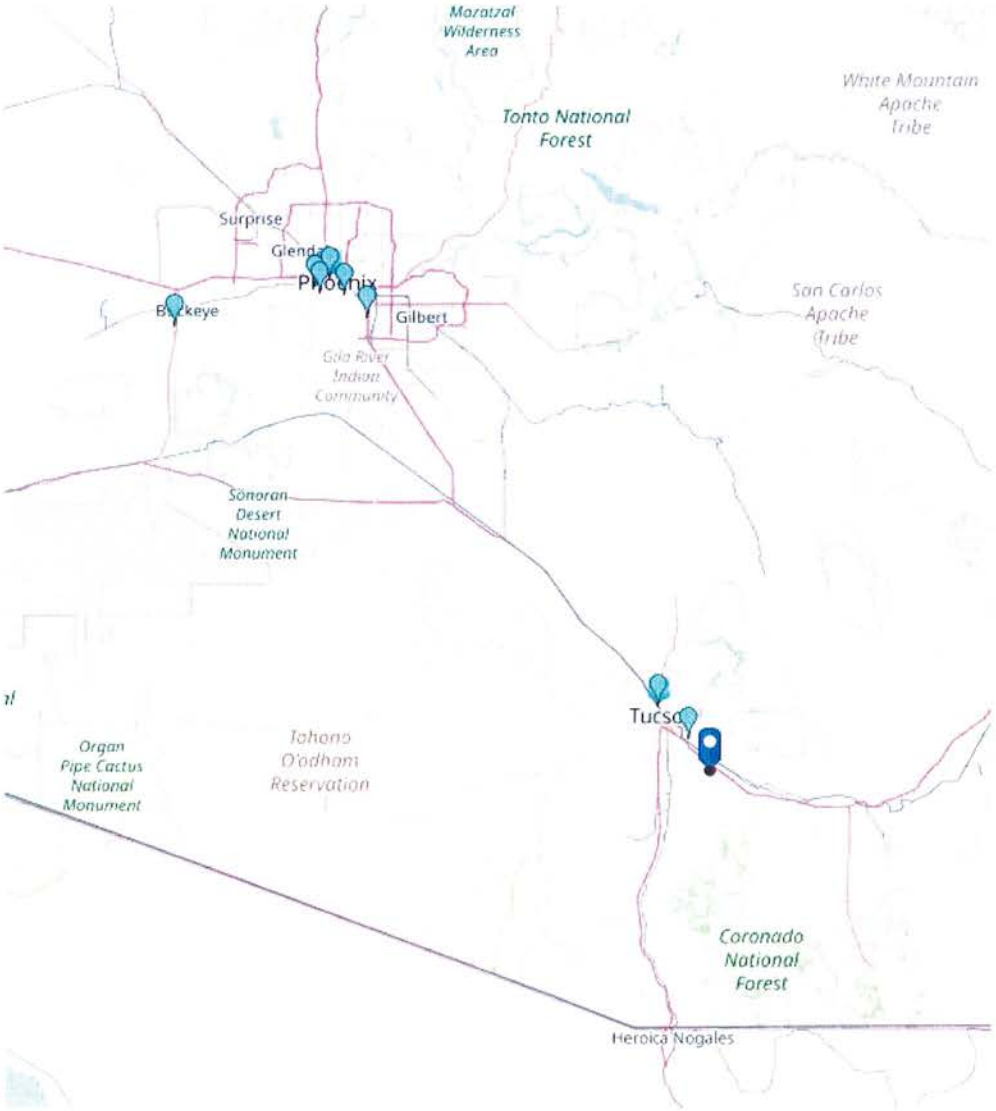
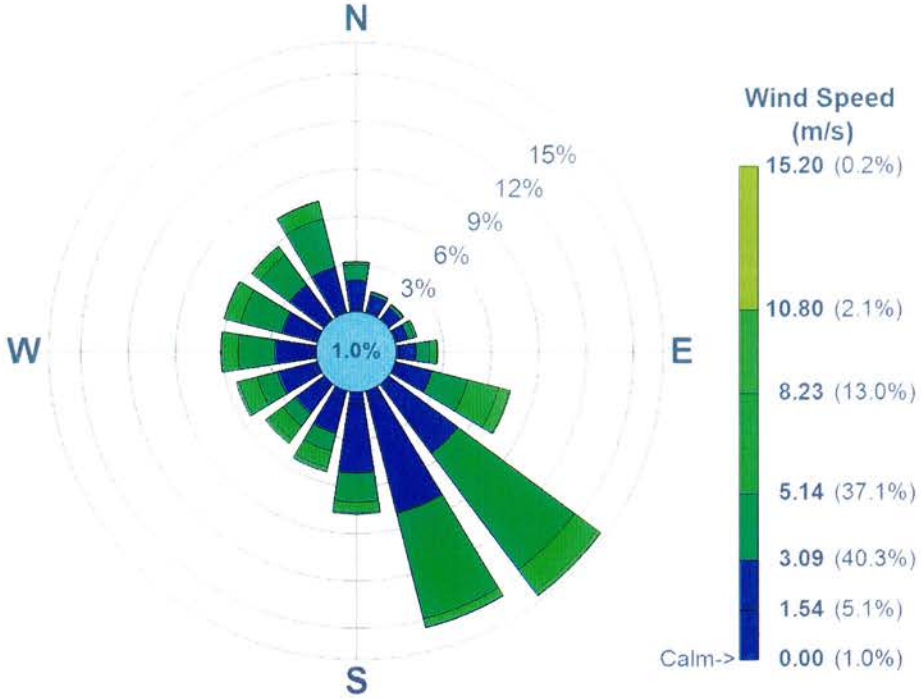


**Figure G-2. Tucson ADEQ 2014-2018 Meteorological Data Wind Rose**




Due to the scarcity of monitors with complete data from the most recent three years in unpopulated areas of Arizona, EPNG utilized the nearest, most representative monitoring station with data corresponding to the pollutant and averaging period in which the background data, excluding exceptional events, is more than complete according to the criteria contained in Table G-1. Background concentrations for $NO_2$ are selected based on the criteria contained in Table G-2.

**Table G-1. Background Concentration – Completeness Criteria**

| Pollutant | Averaging Period | Completeness (%) | Regulatory Reference |
|---|---|---|---|
| $NO_2$ | Annual | 75% | 40 CFR Part 50, Appendix S, Section 3.1(b) |
| | 1-hour | 75% | 40 CFR Part 50, Appendix S, Section 3.2(b) |

**Table G-2. Background Concentration – Selection Criteria**

| Pollutant | Averaging Period | Concentration Format | Average or Single | Number of Years Considered |
|---|---|---|---|---|
| $NO_2$ | Annual | Arithmetic Mean | Single | 1, most recent |
| | 1-hour | Annual 98th percentile daily max 1-hr values | Average | 3, consecutive |

Because the majority of the wind flow occurs in the southeast to northwest direction, monitoring stations to the southeast of the Vail Compressor Station will be considered first followed by any monitoring stations

northwest. Since there are no monitors to the southeast of the Vail Compressor Station, monitors to the northwest were evaluated.

A summary of the background data proposed is contained in Table G-3.[56] The monitoring station which is closest and lies northwest of the Vail Compressor Station (i.e., 22nd & Craycroft – EPA ID 04-019-1011) has the three most recent years of data. The data was then evaluated for completeness and a representative concentration was selected. Since the 22nd & Craycroft monitoring station collected data for the pollutant in question, the second closest monitor's data did not need to be examined. The following is an evaluation of the monitoring stations nearest the Vail Compressor Station that were considered as part of this analysis.

- 22nd & Craycroft (AQS ID 04-019-1011)
  - Distance to Vail Compressor Station = 10.3 miles
  - Location: Northwest of the Vail Compressor Station
  - Pollutants considered = $NO_2$
  - For $NO_2$
    - The data at this monitor is complete.
    - The elevation of this monitor is 789 meters while the elevation of the Vail Compressor Station is 899 meters.
    - This monitor is the closest $NO_2$ monitor northwest of the Vail Compressor Station with complete data and a similar elevation; therefore, the 22nd & Craycroft monitor was selected.
      - 1-hr Concentration: 70.2 $\mu g/m^3$

The remaining monitors are further from the Vail Compressor Station and have similar, residential surroundings; therefore, these monitors were determined to be less representative compared to the 22nd & Craycroft monitor.

[56] Background concentrations obtained from EPA's AirData Air Quality Monitors.

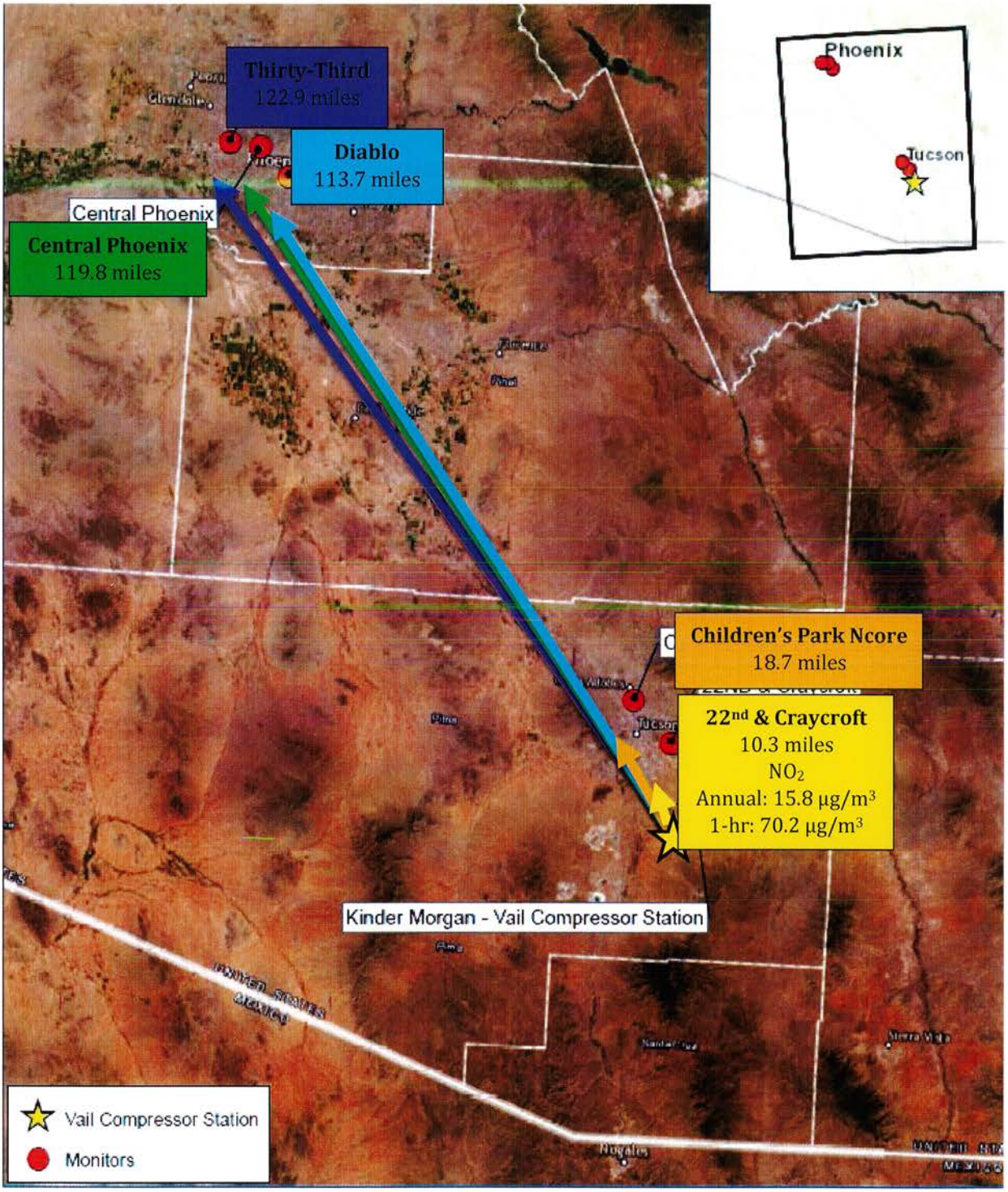
## Table G-3. Background Concentration Values

| Pollutant | Averaging Period | Site Name | Distance to the Vail Compressor Station (miles) | Year | Percent Complete [1] | | | Concentration Format | Concentration ($\mu g/m^3$) [1] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Actual Count | Max Count | % Complete | | Actual | NAAQS | Selected | Difference |
| $NO_2$ | 1-hr | 22nd & Craycroft | 10.3 | 2016 | 356 | 366 | 97 | 98th Percentile | 63.0 | 188 | 70.2 | 117.8 |
| | | | | 2017 | 365 | 365 | 100 | | 70.3 | | | |
| | | | | 2018 | 365 | 365 | 100 | | 77.5 | | | |

[1] Background concentrations obtained from EPA's AirData Air Quality Monitors.

Actual values are converted to $\mu g/m^3$.

**Figure G-3. Monitoring Station Evaluation**



# APPENDIX H. VISCREEN MODEL OUTPUT

Visual Effects Screening Analysis for
Source: EPNG
Class I Area: Saguaro West

*** Level-1 Screening ***

Input Emissions for

| | | |
|---|---|---|
| Particulates | 3.04 | TON/YR |
| NOx (as NO2) | 362.02 | TON/YR |
| Primary NO2 | 0.00 | TON/YR |
| Soot | 0.00 | TON/YR |
| Primary SO4 | 0.00 | TON/YR |

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

| | |
|---|---|
| Background Ozone: | 0.04 ppm |
| Background Visual Range: | 110.00 km |
| Source-Observer Distance: | 37.45 km |
| Min. Source-Class I Distance: | 37.45 km |
| Max. Source-Class I Distance: | 47.27 km |
| Plume-Source-Observer Angle: | 11.25 degrees |

Stability: 6
Wind Speed: 1.00 m/s

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

| | | | | | Delta E | | Contrast | |
|---|---|---|---|---|---|---|---|---|
| Backgrnd | Theta | Azi | Distance | Alpha | Crit | Plume | Crit | Plume |
| SKY | 10. | 120. | 43.1 | 49. | 2.00 | 1.827 | 0.05 | -0.007 |
| SKY | 140. | 120. | 43.1 | 49. | 2.00 | 0.904 | 0.05 | -0.008 |
| TERRAIN | 10. | 84. | 37.5 | 84. | 2.00 | 0.523 | 0.05 | 0.002 |
| TERRAIN | 140. | 84. | 37.5 | 84. | 2.00 | 0.263 | 0.05 | 0.001 |

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE Exceeded

| | | | | | Delta E | | Contrast | |
|---|---|---|---|---|---|---|---|---|
| Backgrnd | Theta | Azi | Distance | Alpha | Crit | Plume | Crit | Plume |
| SKY | 10. | 5. | 11.7 | 164. | 2.00 | 2.473* | 0.05 | -0.015 |
| SKY | 140. | 5. | 11.7 | 164. | 2.00 | 1.226 | 0.05 | -0.017 |
| TERRAIN | 10. | 5. | 11.7 | 164. | 2.00 | 1.606 | 0.05 | 0.010 |
| TERRAIN | 140. | 5. | 11.7 | 164. | 2.00 | 0.817 | 0.05 | 0.009 |

Visual Effects Screening Analysis for
Source: EPNG
Class I Area: Saguaro East

*** Level-1 Screening ***

Input Emissions for

| | | |
|---|---|---|
| Particulates | 3.04 | TON/YR |
| NOx (as NO2) | 362.02 | TON/YR |
| Primary NO2 | 0.00 | TON/YR |
| Soot | 0.00 | TON/YR |
| Primary SO4 | 0.00 | TON/YR |

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

| | |
|---|---|
| Background Ozone: | 0.04 ppm |
| Background Visual Range: | 110.00 km |
| Source-Observer Distance: | 11.60 km |
| Min. Source-Class I Distance: | 11.60 km |
| Max. Source-Class I Distance: | 34.95 km |
| Plume-Source-Observer Angle: | 11.25 degrees |
| Stability: | 6 |
| Wind Speed: | 1.00 m/s |

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE Exceeded

| | | | | | Delta E | | Contrast | |
|---|---|---|---|---|---|---|---|---|
| Backgrnd | Theta | Azi | Distance | Alpha | Crit | Plume | Crit | Plume |
| SKY | 10. | 155. | 20.6 | 14. | 2.00 | 6.910* | 0.05 | -0.026 |
| SKY | 140. | 155. | 20.6 | 14. | 2.00 | 3.425* | 0.05 | -0.030 |
| TERRAIN | 10. | 163. | 35.0 | 5. | 2.00 | 4.829* | 0.05 | 0.025 |
| TERRAIN | 140. | 163. | 35.0 | 5. | 2.00 | 2.455* | 0.05 | 0.023 |

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE Exceeded

| | | | | | Delta E | | Contrast | |
|---|---|---|---|---|---|---|---|---|
| Backgrnd | Theta | Azi | Distance | Alpha | Crit | Plume | Crit | Plume |
| SKY | 10. | 5. | 3.6 | 164. | 2.00 | 11.175* | 0.05 | -0.041 |
| SKY | 140. | 5. | 3.6 | 164. | 2.00 | 5.552* | 0.05 | -0.048 |
| TERRAIN | 10. | 5. | 3.6 | 164. | 2.00 | 7.139* | 0.05 | 0.018 |
| TERRAIN | 140. | 5. | 3.6 | 164. | 2.00 | 3.601* | 0.05 | 0.013 |

Visual Effects Screening Analysis for
Source: EPNG
Class I Area: Saguaro East

*** User-selected Screening Scenario Results ***

Input Emissions for

| | | |
|---|---|---|
| Particulates | 3.04 | TON/YR |
| NOx (as NO2) | 0.00 | TON/YR |
| Primary NO2 | 76.53 | TON/YR |
| Soot | 0.00 | TON/YR |
| Primary SO4 | 0.00 | TON/YR |

PARTICLE CHARACTERISTICS

| | Density | Diameter |
|---|---|---|
| Primary Part. | 2.5 | 6 |
| Soot | 2.0 | 1 |
| Sulfate | 1.5 | 4 |

Transport Scenario Specifications:

| | |
|---|---|
| Background Ozone: | 0.04 ppm |
| Background Visual Range: | 110.00 km |
| Source-Observer Distance: | 11.60 km |
| Min. Source-Class I Distance: | 11.60 km |
| Max. Source-Class I Distance: | 34.95 km |
| Plume-Source-Observer Angle: | 11.25 degrees |
| Stability: 6 | |
| Wind Speed: 2.00 m/s | |

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

| | | | | | Delta E | | Contrast | |
|---|---|---|---|---|---|---|---|---|
| Backgrnd | Theta | Azi | Distance | Alpha | Crit | Plume | Crit | Plume |
| SKY | 10. | 155. | 20.6 | 14. | 2.00 | 0.766 | 0.05 | -0.002 |
| SKY | 140. | 155. | 20.6 | 14. | 2.00 | 0.389 | 0.05 | -0.004 |
| TERRAIN | 10. | 163. | 35.0 | 5. | 2.00 | 0.573 | 0.05 | 0.004 |
| TERRAIN | 140. | 163. | 35.0 | 5. | 2.00 | 0.301 | 0.05 | 0.003 |

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE Exceeded

| | | | | | Delta E | | Contrast | |
|---|---|---|---|---|---|---|---|---|
| Backgrnd | Theta | Azi | Distance | Alpha | Crit | Plume | Crit | Plume |
| SKY | 10. | 1. | 1.0 | 168. | 2.00 | 3.441* | 0.05 | -0.009 |
| SKY | 140. | 1. | 1.0 | 168. | 2.00 | 1.744 | 0.05 | -0.017 |
| TERRAIN | 10. | 1. | 1.0 | 168. | 2.00 | 2.529* | 0.05 | 0.013 |
| TERRAIN | 140. | 1. | 1.0 | 168. | 2.00 | 1.288 | 0.05 | 0.007 |