TETRA TECH EC, INC.

California Energy Commission
DOCKETED
11-AFC-3
TN # 67295
SEP 25 2012

September 24, 2012

Mr. Eric Solorio
California Energy Commission
Docket No. 11-AFC-3
1516 9th St.
Sacramento, CA 95814

Cogentrix Quail Brush Generation Project - Docket Number 11-AFC-3, Revised Air Quality Analysis and Revised Health Risk Assessment for the Quail Brush Generation Project San Diego, California for the Quail Brush Power Project

Docket Clerk:

Pursuant to the provisions of Title 20, California Code of Regulation, and on behalf of Quail Brush Genco, LLC, a wholly owned subsidiary of Cogentrix Energy, LLC, Tetra Tech hereby submits the *Revised Air Quality Analysis and Revised Health Risk Assessment* for the Quail Brush Power Project (11-AFC-3). The Quail Brush Generation Project is a 100 megawatt natural gas fired electric generation peaking facility to be located in the City of San Diego, California. This document includes modifications to the initial Air Quality Analysis and Health Risk Assessment included in the AFC per revisions to the Project as described in *Applicant's Supplement 3 to the AFC* docketed on August 30, 2012 and responses to Intervenor Dorian Houser's Data Requests #24-26 regarding requested information relating to potential nitrogen deposition impacts to plants, animals and vernal pools.

If you have any questions regarding this submittal, please contact Rick Neff at (704) 525-3800 or me at (303) 980-3653.

Sincerely,

Constance E. Farmer

Constance E. Farmer
Project Manager/Tetra Tech

cc: Lori Ziebart, Cogentrix
John Collins, Cogentrix
Rick Neff, Cogentrix
Proof of Service List

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION
FOR THE *QUAIL BRUSH GENERATION PROJECT*

DOCKET NO. 11-AFC-03
PROOF OF SERVICE
(Revised 8/14/2012)

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DECLARATION OF SERVICE

I, Constance Farmer, declare that on September 24, 2012, I served and filed a copy of the *Revised Air Quality Analysis and Revised Health Risk Assessment* (11-AFC-03). This document is accompanied by the most recent Proof of Service list, located on the web page for this project at: [http://www.energy.ca.gov/sitingcases/quailbrush/index.html].

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit or Chief Counsel, as appropriate, in the following manner:

(Check all that Apply)
For service to all other parties:

☒ Served electronically to all e-mail addresses on the Proof of Service list;

☒ Served by delivering on this date, either personally, or for mailing with the U.S. Postal Service with first- class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "e-mail preferred."

AND

For filing with the Docket Unit at the Energy Commission:

☒ by sending an electronic copy to the e-mail address below (preferred method); ***OR***

☐ by depositing an original and 12 paper copies in the mail with the U.S. Postal Service with first class postage thereon fully prepaid, as follows:

CALIFORNIA ENERGY COMMISSION – DOCKET UNIT
Attn: Docket No. 11-AFC-3
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512 docket@energy.state.ca.us

OR, if filing a Petition for Reconsideration of Decision or Order pursuant to Title 20, § 1720:

☐ Served by delivering on this date one electronic copy by e-mail, and an original paper copy to the Chief Counsel at the following address, either personally, or for mailing with the U.S. Postal Service with first class postage thereon fully prepaid:

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I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Constance C. Farmer

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512
www.energy.ca.gov

TO: *All Parties* *Date: August 14*, 2012

RE: ***QUAIL BRUSH GENERATION PROJECT***
Proof of Service List
Docket No. 11-AFC-03

Attached is the ***newly revised*** Proof of Service List for the above-mentioned project, current as of August 14, 2012.

Note that the presumptions about e-mail only service of documents on the parties have changed. Formerly, you had to affirmatively indicate your willingness to accept e-mail only service. Now all parties are presumed to accept e-mail only service unless they specifically inform us that they wish to receive paper copies.

Pursuant to the "General Orders Regarding Electronic Document Formats, Filing and Service of Documents and Other Matters" adopted in this proceeding, until a party indicates to the Presiding Member or Hearing Adviser that it requires a hard copy, an e-mailed copy of all electronic documents of 5 megabytes maximum file size is sufficient for service in this proceeding. No hard copy of an e-mailed document need be provided. Where a party is designated on the Proof of Service List for this proceeding as "hard copy required" or similar words, parties shall deliver a paper copy of all written material they file in this proceeding in person or by first class mail, or other equivalent delivery service, with postage prepaid to the person so designated. Regardless whether a party has indicated a preference for hard copies, documents larger than 50 pages may alternatively be sent in the form of an electronic file recorded on a compact disk rather than as a paper copy, provided that the party is offered the opportunity to request a paper copy.

Unless otherwise specified in a regulation, all materials filed with the Commission must also be filed with the Docket Unit. (Cal. Code Regs., tit. 20, § 1209(d).) Some regulations require filing with the Commission's Chief Counsel instead of the Docket Unit. For example, Section 1720 requires a petition for reconsideration to be filed with the Chief Counsel and served on the parties. Service on the attorney representing Commission staff does not satisfy this requirement. This Proof of Service form is not appropriate for use when filing a document with the Chief Counsel under Title 20, sections 1231 (Complaint and Request for Investigation) or 2506 (Petition for

Inspection or Copying of Confidential Records). The Public Advisor can answer any questions related to filing under these sections.

New addition(s) to the Proof of Service are indicated in **bold font** and marked with an asterisk (*).

Use this newly revised list for all future filings and submittals. This Proof of Service List will also be available on the Commission's project web site at:

http://www.energy.ca.gov/sitingcases/quailbrush/index.html

Please review the information and contact me at maggie.read@energy.ca.gov or (916) 654-3893, if you would like to be removed from the Proof of Service or if there are any changes to your contact information.

Maggie Read
Hearing Adviser's Office

Revisions to 11-AFC-3

Quail Brush Power Project

Air Quality-Section 4.7

Public Health-Section 4.8

Appendices F.2, F.3, F.4, F.5

September 24, 2012

Replacement Pages for AFC Section 4.7

Revised Air Quality Impacts Analysis

Section 4.7.5

Table 4.7-11 Proposed BACT Summary for GHGs for the Proposed Power Plant

Pollutant	Process	Proposed BACT
Combustion CO_2e	Power Generation Engines	Efficient, lean-burn reciprocating engines. Use of natural gas fuel. Efficient design of auxiliary load-consuming equipment (fans, step-up transformer). Maintain engines per manufacturer's specifications. Perform engine tune-ups as specified by manufacturer's recommendations. Track engine run hours and fuel use.
Combustion CO_2e	Fire Pump Engine	Meet USEPA/ California Air Resources Board (CARB) Tier emissions standards for engine class and size. Use low sulfur diesel fuel. Tune engine according to manufacturer's specifications annually. Track engine run hours and fuel use.
Combustion CO_2e	Fuel Gas and Warm Start Heaters	Use of natural gas fuel. Maintain heater per manufacturer's specifications. Perform heater tune-ups as specified by manufacturer's recommendations. Track heater run hours and fuel use.
SF_6	Electrical Breakers	Utilize breakers with SF_6 fugitive leak rates less than or equal to 1% (by weight) per year.

Based on the above data, the proposed emissions levels for the new Wartsila 20V34SG-C2 engines, and ancillary processes, meet the BACT requirements of the SDAPCD and USEPA.

4.7.5 Air Quality Impact Analysis

This section describes the results, in both magnitude and spatial extent, of ground level concentrations resulting from emissions from the power plant. The maximum modeled concentrations were added to the maximum background concentrations to calculate a total impact.

This analysis represents a revision to the original analysis due to the following project changes which were instituted to address mitigations for visual impacts:

- Movement of the power block building to the south by approximately 150 feet, while maintaining the power block building elevation at 465 feet AMSL.
- Addition of the SDG&E utility switchyard on the northeast corner of the power block site.
- Clustering of the stacks (1 group of 6 and 1 group of 5) as opposed to the previous in-line arrangement.
- Reducing the stack heights to 70 feet above grade.

Potential air quality impacts were evaluated based on air quality dispersion modeling, as described herein. All input and output modeling files are contained on a CD-ROM disk provided to CEC Staff under separate cover. All modeling analyses were performed using the techniques and methods as discussed with the SDAPCD (De Siena 2011, USEPA 1985b, 1989, 1991).

4.7.5.1 Dispersion Modeling

The USEPA dispersion models used to quantify pollutant impacts on the surrounding environment based on the emission sources' operating parameters and their locations include the AERMOD modeling system (version 12060 with the associated receptor processing program AERMAP version 11103) for modeling Plant operational and construction impacts in both simple and complex terrain, the Building Profile Input Program for PRIME (BPIP-PRIME version 04274) for determining building dimensions for downwash calculations in AERMOD, the CTSCREEN model (version 94111) for determining 24-hour and annual PM impacts and annual NO_2 impacts in complex terrain, the SCREEN3 model (version 96043) for determining inversion breakup impacts, and the use of the California Health Risk Assessment models/protocols for determining toxic impacts, which includes the HARP On-Ramp program. AERMOD meteorological data were processed by SDAPCD using AERMET version 11059 and AERSURFACE. The USEPA dispersion models were used for the following:

- Comparison of operational and construction impacts to significant impact levels (SILs), ambient monitoring significance thresholds, California Ambient Air Quality Standards (CAAQS), National Ambient Air Quality Standards (NAAQS), and PSD Increments
- Cumulative impacts analyses with AERMOD/CTSCREEN in accordance with local/state/USEPA/ CEC requirements
- Toxics analyses using ARB algorithms as incorporated into state/CEC requirements
- Assessment of impacts to soil and vegetation
- Class II Visibility Impacts

4.7.5.2 Model Selection

A modeling protocol, which provides the choices of dispersion models, input meteorological data, and background air quality was previously provided to and approved for use by the SDAPCD and the CEC. The attached modeling assessments are based on the modeling protocol.

The AERMET pre-processed meteorological data was provided to the Applicant by the SDAPCD. Five years (2003–2007) of hourly data collected in Kearney Mesa (Overland Avenue monitoring station), combined with District-operated multi-level profiler data and National Weather Service (NWS) upper air measurements from Marine Corps Air Station Miramar, were input into AERMET for processing by the SDAPCD.

As part of the input requirements into AERMET and AERMOD, a land use classification must be made. The area surrounding the plant site, within 3 kilometers (km), can be characterized as rural, made up mostly of shrub lands and grasslands, based on review of land use/land cover data as well as recent aerial photo data. In accordance with the Auer land use classification methodology (USEPA's *Guideline on Air Quality Models*, 40 CFR Pt. 51, App. W), land use within the area circumscribed by a 3 km radius around the plant is greater than 50 percent rural.

Therefore, in the modeling analyses supporting the permitting of the plant, no urban coefficients were assigned.

AERMOD input data options are listed below:

- Final plume rise
- Stack tip downwash
- Ozone Limiting Method for NO_2
- Regulatory default option (calm and missing meteorological data processing)
- Elevated receptor terrain heights option

Use of these options follows the USEPA's Modeling Guideline (40 CFR Pt. 51, App. W), SDAPCD guidance, and/or sound scientific practice. An explanation of these options and the rationale for their selection is provided below.

Several other USEPA models and programs were used to quantify pollutant impacts on the surrounding environment based on the emission sources operating parameters and their locations. The additional models used were Building Profile Input Program for PRIME (BPIP-PRIME, current version 04274), the SCREEN3 (version 96043) dispersion model for fumigation impacts, the VISCREEN (version 1.01) visibility screening model for assessing Class I visibility impacts, and the HARP On-Ramp Preprocessor (Version 1.4D), which is used in the health risk assessment.

In addition to AERMOD, the CTSCREEN model was used to assess the $PM_{10/2.5}$ SILs and increment consumption and annual NO_2 SILs in the complex terrain surrounding the Project site. The CTSCREEN model, which is a screening mode of CTDMPLUS, is a refined point source Gaussian air quality model for use in all stability conditions for complex terrain applications. The use of refined modeling techniques to assess air quality impacts is summarized in USEPA's Modeling Guideline, 40 CFR Part 51, Appendix W. In particular, upon revising Appendix W to adopt AERMOD as the replacement for ISC3, EPA specifically retained CTDMPLUS and CTSCREEN as appropriate models for detailed complex terrain analysis (see Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions; Final Rule, 70 Fed. Reg. 68,218, 68,225-26 (Nov. 9, 2005). The refined modeling analyses consists of those analytical techniques that provide more detailed treatment of terrain, physical and chemical atmospheric processes, and can provide a more refined concentration estimates. As a result, they provide a more accurate estimate of source impact and the effectiveness of control strategies. These are referred to as refined techniques and models.

Complex terrain is defined as terrain with elevations above plume height, while intermediate terrain is defined as terrain with elevations between stack top and final plume rise height. Simple terrain is defined as terrain below stack height. Historically, a distinction has been made between simple, intermediate, and complex terrain because of the capability of different air quality dispersion models to effectively handle the simulation of the dispersion of pollutants in the different terrain regimes. Most of the models approved by the USEPA were originally developed either for use with simple or complex terrain. The most widely used model for simple terrain has been the ISCST3 model, which was replaced as the preferred model by AERMOD. Intermediate terrain is no longer a consideration in dispersion modeling.

In addition to the AERMOD model, the USEPA has approved the CTDMPLUS model for use in complex terrain modeling applications. *See id.*, 70 Fed. Reg. at 68,233. CTDMPLUS is a preferred/recommended USEPA dispersion model for terrain impacts and "provides greater resolution of concentrations about the contour of the hill feature than does AERMOD through a different plume-terrain interaction algorithm." *Id.* The challenge to using the CTDMPLUS model in many situations is the additional meteorological and terrain data that is required by the model. However, the USEPA developed a screening version of the CTDMPLUS model, called CTSCREEN. The CTSCREEN model is a refined point source Gaussian air quality model for use in all stability conditions for complex terrain applications.

CTDMPLUS in screening mode (CTSCREEN) serves several purposes in regulatory applications. When meteorological data are unavailable, "CTSCREEN can be used to obtain conservative [safely above those of refined models], yet realistic, worst-case estimates" of impacts from particular sources in complex terrain. *Id.* These estimates can be used to determine the necessity and value of obtaining on-site data for refined modeling or can simply provide conservative emission-limit estimates. In addition, CTSCREEN can be a valuable tool for designing meteorological and pollutant monitoring programs. It is important to note that CTSCREEN and the refined model, CTDMPLUS, are the same basic model. The primary difference in their make-up is in the way in which CTSCREEN obtains the meteorological conditions. For example, wind direction in CTSCREEN is calculated based on the source-terrain-dividing streamline geometry to ensure computation of the highest impacts that are likely to occur. The daytime mixed-layer heights are based on fractions of the terrain height. Other meteorological variables or parameters are chosen through a variety of possible combinations from a predetermined matrix of values.

As a result of the CTSCREEN model accounting for the dimensional nature of the plume and terrain interaction, the model requires digitized terrain of the nearby topographical features. The mathematical representation of terrain is accomplished by the terrain preprocessors, FITCON and HCRIT. CTSCREEN and CTDMPLUS are virtually the same air quality model, with the main difference between the two being the meteorological data used. The wind direction used in CTSCREEN is based on the source-terrain geometry, resulting in computation of the highest impacts likely to occur. Other meteorological variables are chosen from possible combinations from a set of predetermined values. CTSCREEN provides maximum concentration estimates that are similar to, but on the conservative side of, those that would be calculated from the CTDMPLUS model with a full year of on-site meteorological data.

CTSCREEN is appropriate for the following applications:

- Elevated point sources
- Terrain elevations above stack top
- Rural areas
- One hour to annual averaging time periods

Meteorological data used by the CTSCREEN model is internally derived by the model itself, but is similar to those 1-hour values used in the screening version of ISCST3. As well as calculating maximum 1-hour concentrations at all receptors, the CTSCREEN model is designed to provide conservative estimates of worst case 3-hour, 24-hour, and annual impacts. Scaling factors, as presented in Table 4.7-12, were used to convert calculated 1-hour concentrations to 3-hour, 24-hour, and annual estimates.

Table 4.7-12 Model Persistence Factors

Averaging Period	CTSCREEN Scaling Factor
1-hour	1.0
3-hour	0.7
8-hour	NA
24-hour	0.15
Annual	0.03

These models were used for the following:

- Comparison of impacts to significant impact levels and increments
- Compliance with state (CAAQS) and national (NAAQS) ambient air quality standards
- Calculation of health risk impacts

Federal 1-hour NO_2 NAAQS Modeling

USEPA recently established a new 1-hour NO_2 standard at a level of 100 parts per billion (ppb) (188 micrograms/meter^3 (µg/m^3)), based on the 3-year average of the annual 98th percentile of the daily maximum 1-hour concentrations in addition to the existing annual secondary standard (100 µg/m^3). USEPA has also established requirements for a NO_2 monitoring network that will include monitors at locations where maximum NO_2 concentrations are expected to occur, including within 50 meters (m) of major roadways, as well as monitors sited to measure the area-wide NO_2 concentrations that occur more broadly across communities.

To assess the Project's impacts on compliance with the Federal 1-hour NO_2 Standard, the methods summarized in USEPA guidance documents as well as the California Air Pollution Control Officers Association (CAPCOA) Guidance Document *Modeling Compliance of the Federal 1-hour NO_2 NAAQS* (CAPCOA, 2011) were used.

Specifically:

- Five-year averages of the modeled annual first high daily maximum 1-hour NO_2 impacts with the Ozone Limiting Method without background NO_2 were used for significant impact levels (SILs) for 1-hour NO_2.
- Ozone Limiting Method with recommended CAPCOA in stack NO_2/NO_x ratios based on the most recent updated data provided on the SDAPCD web site.
- Five-year averages of the modeled annual 98th percentile daily maximum 1-hour NO_2 impacts coupled with seasonal hour of day (3rd highest) NO_2 background data (used internally by AERMOD) for assessing compliance with the Federal 1-hour standard. (As

described later, concurrent hourly NO_2 background data provided by SDAPCD used internally by AERMOD for assessing compliance with the state 1-hour standard.)

- Background Ozone and NO_2 data from Overland Avenue (Kearney Mesa) monitoring station for five year period concurrent with meteorological data (2003-2007) processed and provided by SDAPCD.

The rationale for using the Ozone Limiting Method (OLM) was presented in the modeling protocol and is summarized below. Hourly O_3 data collected at Overland Avenue was used in the OLM analysis to calculate hourly NO_2 concentrations from hourly modeled NO_x concentrations. The five years of O_3 data used were for the same five years as the modeled meteorological data (2003-2007). The OLM is incorporated into the AERMOD program and involves an initial comparison of the estimated maximum NO_x concentration and the ambient O_3 concentration to determine which is the limiting factor in NO_2 formation. If the O_3 concentration is greater than the maximum NO_x concentration, total conversion is assumed. If the NO_x concentration is greater than the O_3 concentration, the formation of NO_2 is limited by the ambient O_3 concentration. In this case, the NO_2 concentration is set equal to the O_3 concentration plus a correction factor that accounts for in-stack and near-stack thermal conversion.

As summarized in the CAPCOA Guidelines as well as through the USEPA Policy Memorandum, the use of OLM was based on five selected criteria:

1. **The model has received a scientific peer review:**

   As noted in the USEPA's June 2010 guidance document, because AERMOD is the preferred model for dispersion for a wide range of applications, the alternative model demonstration for use of the Ozone Limiting Method/Plume Volume Molar Ratio Method (OLM/PVMRM) options within AERMOD focus on the treatment of NO_x chemistry within the model, and does not need to address basic dispersion algorithms within AERMOD. The chemistry for OLM has been peer-reviewed, as noted by the documents posted on the USEPA's Support Center for Regulatory Air Modeling web site. The posted documents include *Sensitivity Analysis of PVMRM and OLM in AERMOD* (MACTEC 2004) and *Evaluation of Bias in AERMOD-PVMRM* (MACTEC 2005). Both documents indicate that the models appear to perform as expected.

2. **The model can be demonstrated to be applicable to the problem on a theoretical basis:**

   As noted in the document entitled *Sensitivity Analysis of PVMRM and OLM In AERMOD* prepared by Roger W. Brode, "This report presents results of a sensitivity analysis of the PVMRM and OLM options for NO_x to NO_2 conversion in the AERMOD dispersion model. Several single source scenarios were examined as well as a multiple-source scenario. The average conversion ratios of NO_2/NO_x for the PVMRM option tend to be lower than for the OLM option and for the Tier 2 option or the Ambient Ratio Method which has a default value of 0.75 for the annual average. The sensitivity of the PVMRM and OLM options to emission rate, source parameters and modeling options appear to be reasonable and are as expected based on the formulations of the two methods. For a given NO_x emission rate and ambient O_3 concentration, the NO_2/NO_x conversion ratio for PVMRM is primarily controlled by the volume of the plume, whereas the conversion ratio for OLM is primarily controlled by the ground-level NO_x concentration.

Overall the PVMRM option appears to provide a more realistic treatment of the conversion of NO_x to NO_2 as a function of distance downwind from the source than OLM or the other NO_2 screening options (Hanrahan 1999a, 1999b). No anomalous behavior of the PVMRM or OLM options was identified as a result of these sensitivity tests."

Based on this report for both OLM/PVMRM appear to be applicable to the problem of NO_2 formation and as noted by the author provides a better estimation of the NO_2 impacts compared to other screening options (Tiers 1 and 2).

3. **The databases which are necessary to perform the analysis are available and adequate:**

The data needed to conduct an OLM run with hourly seasonal background NO_2 data are hourly meteorological data, hourly O_3 data, hourly NO_2 data, and in-stack NO_2/NO_x ratios. The hourly $O_3$and meteorological data exist for the same time period at the same Overland Avenue Monitoring Station, operated by the SDAPCD.

The Overland Avenue monitoring site is located on Overland Avenue in the County Operations Center, which is in the northern section of Kearny Mesa. The site collects and records NO_x/NO_2, Ozone, CO, PM_{10}, $PM_{2.5}$, along with surface meteorology which includes wind speed, wind direction, temperature and solar radiation. The SDAPCD considers this monitoring station as representative of where reactive photochemistry will occur most extensively.

The site is an urban/commercial area and is bounded by State Route 52 to the north, Interstate 805 to the west, and Interstate 15 to the east. Adjacent communities include Serra Mesa, Clairemont, and Tierrasanta. The air quality in this location is representative of a large part of the metropolitan portion of San Diego due to the diurnal onshore and offshore flow, which mixes the pollutants throughout the metropolitan region.

This monitoring station is located next to major transportation corridors and population centers, so it is able to provide representative concentration data for a significantly large area. The SDAPCD classifies the monitoring objective at this site as "Representative Concentration," which is defined to represent the air quality concentrations for a pollutant that is expected to be similar throughout a geographical area. Such monitoring stations may not always indicate the highest concentrations in the area, but review of Table 4.7-17 1-hour NO_2 data for Overland Avenue indicates that many of the high concentrations for 1-hour NO_2 have been recorded at Overland Avenue. Part of the reason for the relatively high NO_2 concentrations may be due to the location of the monitor with respect to SR 52. Based on prevailing wind direction, the Overland Avenue monitoring station appears to be directly impacted from SR 52 mobile source emissions.

For this Project, the use of the Overland Avenue monitoring station satisfies the Environmental Protection Agency's new requirements for the placement of NO_2 monitors near major roadways in urban areas in order to determine the highest concentrations in an area covered by a monitoring network. The new Federal 1-hour NO_2 standard requires that monitoring networks be designed to measure the expected highest concentrations. Each of the SDAPCD monitoring stations has unique objectives that are associated with a spatial scale for each site. These spatial scales are defined in 40 CFR Part 58, Appendix D. Additionally, the desired spatial scale of a monitoring site must conform to established criteria for the distance from roadways, based on traffic volumes as defined in 40 CFR Part 58, Appendix E. The goal in siting monitoring stations is to match the spatial scale with the desired monitoring objective.

The new Federal 1-hour NO_2 standard is focused on short-term peak concentrations, which may occur near roadways. As summarized in the 2009 San Diego Air Monitoring Network Plan (June 2010) and based on the last four years of 1-hour NO_2 monitoring data, the Overland Avenue monitoring objective appears to be population oriented (typical concentrations in areas of high population density in order to protect public health) and highest concentration (monitoring at locations expected to have the highest concentrations). Based on the major roadways that surround the monitoring station, the use of the Overland Avenue NO_2 monitoring data appears to satisfy the revised USEPA population and highest concentration oriented monitoring station requirements for the new 1-hour standard.

NO_2/NO_x ratios was determined from published data provided by the San Joaquin Valley SDAPCD and the NO_2/NO_x In-Stack Ratio (ISR) database. Based on the recommended ratios provided by the ISR Database, the following are proposed:

- Wartsila Natural Gas Fired Reciprocating Engines with post-combustion controls: 1.15 percent
- Natural Gas Fired Fuel Heaters: 10 percent
- Diesel Fired Firepump: 20 percent

4. Appropriate performance evaluations of the model have shown that the model is not biased toward underestimates:

As noted in *Evaluation of Bias in AERMOD-PVMRM* (MACTEC, 2005), which was prepared by Roger W. Brode, PVMRM has been judged to provide unbiased estimates based on criteria that are comparable to, or more rigorous than, evaluations performed for other dispersion models. At the present time no assessment of bias has been conducted for the OLM algorithm. It has been shown in the sensitivity analysis that OLM provides similar more conservative results than PVMRM. Therefore is it assumed that OLM would also provide an unbiased estimate of the modeled NO_2 concentrations.

5. **A protocol on methods and procedures to be followed has been established.**

The methods and procedures outlined in this protocol are proposed for implementation.

Based on the above selected criteria, OLM modeled NO_2 concentrations were combined with seasonal hour of the day NO_2 background in order to assess compliance with the 1-hour Federal NO_2 standard. Based on the CAPCOA guidance, the firepump was also included in the modeling to assess compliance with the Federal NO_2 standard.

California State 1-hour NO_2 Standard

In order to assess compliance with the California State Standard for 1-hour NO_2, OLM was used with concurrent hourly background NO_2 and O_3 data from Overland Avenue. The time frame for the background NO_2 and O_3 monitoring data matched the meteorology used to assess the total NO_2 concentrations. The first high modeled results at each receptor were used for comparisons with the 1-hour standard.

Annual NO_2 Standard

The annual average concentrations of NO_2 were computed following the revised USEPA guidance for computing these concentrations (August 9, 1995, Federal Register, 60 FR 40465). The annual average was calculated using the ambient ratio method (ARM) with the national default value of 0.75 for the annual average NO_2/NO_x ratio.

4.7.5.3 Good Engineering Practice Stack Height Analysis

Good engineering practice (GEP) stack height is calculated as the greater of 65 m (213 feet) or 27.4 m (90 feet) based on existing onsite structure dimensions. The design stack height of 70 feet is less than the formula GEP stack height of 90 feet, thus downwash effects were included in the modeling analysis by inputting building dimensions from BPIP-PRIME into AERMOD.

The USEPA-program BPIP-PRIME was used to generate the wind-direction-specific building dimensions. All necessary structures were included for analysis with BPIP-PRIME. The building location plan, located in Appendix F.2, shows the buildings included in the downwash analysis. (USEPA 1985d, 1985e)

4.7.5.4 Receptor Grid Selection and Coverage

Receptor and source base elevations were determined from the USGS National Elevation Dataset (NED) data in the GeoTIFF format at a horizontal resolution of 1/3 arc-second (approximate 10 meter spacing). Because of the format of the NED data, all coordinates (both sources and receptors) were referenced to UTM North American Datum 1983 (NAD83, Zone 11). Elevation locations in the NED dataset were interpolated by AERMAP to the UTM locations appropriate for the receptor grid spacings shown below.

Cartesian coordinate receptor grids are used to provide adequate spatial coverage surrounding the Project area for assessing ground-level pollution concentrations, to identify the extent of significant impacts, and to identify maximum impact locations. The receptor grids used in this analysis are as follows:

- 10-meter resolution grid along the Project fenceline.
- 20-meter resolution grid that extends outwards from the fenceline to 500 meters in all directions. This is referred to as the downwash grid.
- 50-meter resolution grid that extends outwards from the edge of the downwash grid to 1000 meters in all directions. This is referred to as the intermediate grid.
- 100-meter resolution grid that extends from the edge of the intermediate grid outwards in all directions to 2000 meters.
- 200-meter resolution grid that extends from the edge of the 100-meter grid outwards 5000 meters in all directions.
- 500-meter resolution grid that extends from the edge of the 200-meter grid outwards 10,000 meters in all directions. The 100-meter, 200-meter, and 500-meter grids are referred to as the coarse grid.
- 20-meter resolution around any location outside the 20-meter downwash grid where a maximum impact is modeled. These additional receptors are referred to as refined grids.

Concentrations within the plant fenceline will not be calculated. The coarse and fine receptor grid figure, located in Appendix F.2, displays the receptors grids used in the modeling assessment. A plant boundary figure is also presented in Appendix F.2.

4.7.5.5 Meteorological Data Selection

The proposed use of the five (5) years of SDAPCD supplied surface meteorological data collected at the Kearny Mesa monitoring location would satisfy the definition of on-site data. USEPA defines the term "on-site data" to mean data that would be representative of atmospheric dispersion conditions at the source and at locations where the source may have a significant impact on air quality. Specifically, the meteorological data requirement originates from the Clean Air Act (CAA) in Section 165(e)(1), which requires an analysis "of the ambient air quality at the proposed site and in areas which may be affected by emissions from such facility for each pollutant subject to regulation under [the Act] which will be emitted from such facility." This requirement and USEPA's guidance on the use of on-site monitoring data are also outlined in the *On-Site Meteorological Program Guidance for Regulatory Modeling Applications* (USEPA 1987). The representativeness of meteorological data is dependent upon: (a) the proximity of the meteorological monitoring site to the area under consideration; (b) the complexity of the topography of the area; (c) the exposure of the meteorological sensors; and (d) the period of time during which the data are collected (USEPA 1985c).

First, the meteorological monitoring site and proposed Project location are in close proximity (9.4 km), at approximately the same elevation and with similar topography surrounding each location. Second, the Kearny Mesa (Overland Avenue) monitoring site and proposed Project location are located roughly about the same distance and in the same orientation to significant terrain features that might influence wind flow patterns. There are two small-scale localized terrain features near the proposed Project site; Cowles and Fortuna Mountains which extend approximately 700 feet in height above both the monitoring and Project site base elevations.

These terrain features are part of the same large-scale terrain features in the area that are oriented in a northeast-southwest direction. Cowles and Fortuna Mountain are bisected with passes and canyons that run in the same northeast and southwest directions as the larger terrain features in the area. Based on the small size of the terrain, it is unlikely that either of these two features will influence the predominant meteorology in the Project area. Third, as discussed below, the surface characteristics roughness length, Bowen ratio, and albedo are relatively consistent throughout the area and are nearly identical between the Project site and the meteorological monitoring location.

Representativeness is defined in the document *Workshop on the Representativeness of Meteorological Observations* (Nappo et al. 1982) as "the extent to which a set of measurements taken in a space-time domain reflects the actual conditions in the same or different space-time domain taken on a scale appropriate for a specific application." Judgments of representativeness should be made only when sites are climatologically similar, as is the case with the meteorological monitoring site and the proposed Project location. In determining the representativeness of the meteorological data set for use in the dispersion models at the Project site, the consideration of the correlation of terrain features to prevailing meteorological conditions, as discussed earlier, would be nearly identical to both locations since the orientation and aspect of terrain at the proposed Project location correlates well with the prevailing wind fields as measured by and contained in the meteorological dataset. In other words, the same mesoscale and localized geographic and topographic features that influence wind flow patterns at the meteorological monitoring site also influence the wind flow patterns at the proposed Project site.

Surface characteristics were determined with AERSURFACE using Land Use/Land Cover (LULC) data in accordance with USEPA guidance documents (*AERMOD Implementation Guide,* 1/09/08; and *AERSURFACE User's Guide*, USEPA-454/B-08-001, 1/08) as described below. AERSURFACE uses USGS National Land Cover Data 1992 archives (NLCD92) to determine the midday albedo, daytime Bowen ratio, and surface roughness length representative of the surface meteorological station. ***Bowen ratio*** is based on a simple unweighted geometric mean, while ***albedo*** is based on a simple unweighted arithmetic mean for the 10x10-km-square area centered on the selected location (i.e., no direction or distance dependence for either parameter). ***Surface roughness length*** is based on an inverse distance-weighted geometric mean for upwind distances up to 1 km from the selected location. The circular surface roughness length area (1-km radius) can be divided into any number of sectors as appropriate (USEPA guidance recommends that no sector be less than 30° in width).

Running AERSURFACE at both the meteorological monitoring and proposed site locations produced almost identical results for both Bowen ratio and Albedo, based on the 10-km area around each location. There were some variations in land cover and roughness lengths between the two locations based on a 1-km radius, but both areas are mostly rural. Table 4.7-13 presents the AERSURFACE land use types within 1 km of the meteorological monitoring and Project locations. Based on the Auer land use classifications, both locations are classified as rural and there is good correlation of the rural characteristic land types between the two locations. Within the 1-km radius around the Kearny Mesa Monitoring Station, there is a 51.4 percent urban classification, but review of the photo aerial data suggests that most of this is due to the airport runways being classified as LULC category 23 (transportation). These areas, although including the paved runway surfaces, have low surface roughness lengths more closely comparable to rural categories than areas with commercial/industrial buildings/structures. Comparing the LULC data at the Project site to the meteorological monitoring site showed that the same general land use categories exist around the Project site and the meteorological monitoring site, with the both locations having over 75 percent associated with open, rural areas. Thus, the predominant land use in the area is made up of rural categories.

Table 4.7-13 AERSURFACE Land Cover Counts: Surface Roughness (1 km)

		Quail Brush Project Site			Kearny Mesa Monitoring Site		
	LULC Category	Count	%Rural	%Urban	Count	%Rural	%Urban
11	Open Water:	9	0.3%	-	0	-	-
12	Perennial Ice/Snow:	0	-	-	0	-	-
21	Low Intensity Residential:	29	0.8%	-	145	4.2%	-
22	High Intensity Residential:	11	-	0.3%	0	-	-
23	Commercial/Industrial/Trans:	9	-	0.3%	1794	-	51.4%
31	Bare Rock/Sand/Clay:	256	7.3%	-	201	5.8%	-
32	Quarries/Strip Mines/Gravel:	0	-	-	0	-	-
33	Transitional:	0	-	-	0	-	-
41	Deciduous Forest:	121	3.5%	-	7	0.2%	-
42	Evergreen Forest:	390	11.2%	-	51	1.5%	-
43	Mixed Forest:	90	2.6%	-	105	3.0%	-
51	Shrubland:	1904	54.5%	-	1085	31.1%	-
61	Orchards/Vineyard/Other:	0	-	-	0	-	-
71	Grasslands/Herbaceous:	665	19.0%	-	66	1.9%	-
81	Pasture/Hay:	0	-	-	3	0.1%	-
82	Row Crops:	0	-	-	4	0.1%	-
83	Small Grains:	2	0.1%	-	0	-	-
84	Fallow:	0	-	-	1	0.0%	-
85	Urban/Recreational Grasses:	1	0.0%	-	27	0.8%	-
91	Woody Wetlands:	1	0.0%	-	0	-	-
92	Emergent Herbaceous Wetlands:	5	0.1%	-	4	0.1%	-
	Total:	3493	99.4%	0.6%	3493	48.6%	51.4%

Comparing the AERSURFACE outputs in Table 4.7-14, using one 360 degree sector around each location, shows that the average surface characteristics by season are also very similar. For roughness length, the variations between the two sites are minimal. Roughness lengths are often categorized into classes between 0 (water) and 4 (urban). Open land areas, low vegetation areas, and agriculture are often assigned roughness lengths of 0.01 (class 1) to 0.16 (class 2). Thus, it is noted that there are no changes in classes between the two locations and the predominant land use activity in the Project and meteorological monitoring locations are associated with open or rural land uses.

Table 4.7-14 AERSURFACE Results/Inputs for Project and Meteorological Monitoring Locations

Parameter by Season (Month)	Quail Brush Project Site	Kearny Mesa Monitoring Site
Surface Roughness (meters)		
Winter (none)	-	-
Spring (Mar-Apr)	0.286	0.530
Summer (May-Sept)	0.322	0.540
Fall (Oct-Feb)	0.322	0.539
Albedo		
Winter (none)	-	-
Spring (Mar-Apr)	0.17	0.17
Summer (May-Sept)	0.17	0.17
Fall (Oct-Feb)	0.17	0.17
Bowen Ratio		
Winter (none)	-	-
Spring (Mar-Apr)	0.85	0.97
Summer (May-Sept)	0.81	0.95
Fall (Oct-Feb)	1.25	1.30
AERMOD Inputs		
Latitude/UTM-X(m)	32.851	32.83645
Longitude/UTM-Y(m)	-117.029	-117.12875
Datum	NAD83	NAD83
Source	Google Earth	Google Earth
Snow Cover	NO	NO
Arid Region	NO	NO
Airport Location	NO	NO
Surface Moisture	AVERAGE	AVERAGE
Surface Roughness Radius (km)	1.0	1.0
Number of Sectors	1 (0-360deg)	1 (0-360deg)

For these reasons, the Kearny Mesa meteorological data selected for the proposed Project are expected to satisfy the definition of representative meteorological data. Thus, it is our assessment that these meteorological data are identical to the dispersion conditions at the Project site and to the regional area. As noted above, these meteorological data have been processed by the SDAPCD using AERMET (Version 11059).

4.7.5.6 Background Air Quality

In 1970, the United States Congress instructed the USEPA to establish standards for air pollutants, which were of nationwide concern. This directive resulted from the concern of the effects of air pollutants on the health and welfare of the public. The resulting CAA set forth air quality standards to protect the health and welfare of the public. Two levels of standards were promulgated—primary standards and secondary standards. Primary national ambient air quality standards (NAAQS) are "those which, in the judgment of the administrator [of the USEPA], based on air quality criteria and allowing an adequate margin of safety, are requisite to protect the public health (state of general health of community or population)." The secondary NAAQS are "those which in the judgment of the administrator [of the USEPA], based on air quality criteria, are requisite to protect the public welfare and ecosystems associated with the presence of air pollutants in the ambient air." To date, NAAQS have been established for seven criteria pollutants as follows: SO_2, CO, O_3, NO_2, sub 10-micron particulate matter (PM_{10}), sub 2.5-micron particulate matter ($PM_{2.5}$), and lead.

The criteria pollutants are those that have been demonstrated historically to be widespread and have a potential to cause adverse health impacts. USEPA developed comprehensive documents detailing the basis of, or criteria for, the standards that limit the ambient concentrations of these pollutants. The State of California has also established AAQS that further limit the allowable concentrations of certain criteria pollutants. Review of the established air quality standards is undertaken by both USEPA and the State of California on a periodic basis. As a result of the periodic reviews, the standards have been updated, i.e., amended, and additions, and deletions, over the ensuing years to the present. Two basic elements comprise each Federal or state AAQS: (1) a numerical limit expressed as an allowable concentration, and (2) an averaging time which specifies the period over which the concentration value is to be measured. Table 4.7-15 presents the current Federal and state AAQS.

Table 4.7-15 State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards Concentration	National Standards Concentration
Ozone	1 hr	0.09 ppm (180 μg/m^3)	-
	8 hr	0.070 ppm (137 μg/m^3)	0.075 ppm (147 μg/m^3) (3-year average of annual 4th-highest daily maximum)
Carbon Monoxide	8 hr	9.0 ppm (10,000 μg/m^3)	9 ppm (10,000 μg/m^3)
	1 hr	20 ppm (23,000 μg/m^3)	35 ppm (40,000 μg/m^3)
Nitrogen dioxide	Annual Average	0.030 ppm (57 μg/m^3)	0.053 ppm (100 μg/m^3)
	1 hr	0.18 ppm (339 μg/m^3)	0.100 ppm (188 μg/m^3) (3-year average of 98th percentiles)
Sulfur dioxide	Annual Average	-	0.030 ppm (80 μg/m^3)*
	24 hr	0.04 ppm (105 μg/m^3)	0.14 ppm (365 μg/m^3)*
	3 hr	-	0.5 ppm (1,300 μg/m^3)
	1 hr	0.25 ppm (655 μg/m^3)	0.075 ppm (196 μg/m^3) (3-year average of 99th percentiles)
Respirable particulate matter (10 micron)	24 hr	50 μg/m^3	150 μg/m^3
	Annual Arithmetic Mean	20 μg/m^3	-
Fine particulate matter (2.5 micron)	Annual Arithmetic Mean	12 μg/m^3	15.0 μg/m^3 (3-year average)
	24 hr	-	35 μg/m^3 (3-year average of 98th percentiles)
Sulfates	24 hr	25 μg/m^3	-
Lead	30 day	1.5 μg/m^3	-
	Calendar Quarter	-	1.5 μg/m^3*
	Rolling 3-month	-	0.15 μg/m^3

Source: CARB ADAM website; table updated 6/7/12.

*Federal standards generally rescinded but, in the case of SO_2, PSD increments remain for these averaging times.

Brief descriptions of health effects for the main criteria pollutants are as follows:

Ozone—Ozone is a reactive pollutant that is not emitted directly into the atmosphere, but rather is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving precursor organic compounds (VOC) and NO_x. VOC and NO_x are, therefore, known as precursor compounds for O_3 Significant O_3 production generally requires O_3 precursors to be present in a stable atmosphere with strong sunlight for approximately three hours. Ozone is a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources of VOC and NO_x under the influence of wind and sunlight. Short-term exposure to O_3 can irritate the eyes and cause constriction of the airways. In addition to causing shortness of breath, O_3 can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.

Carbon Monoxide—Carbon monoxide is a non-reactive pollutant that is a product of incomplete combustion. Ambient carbon monoxide concentrations generally follow the spatial and temporal distributions of vehicular traffic and are also influenced by meteorological factors such as wind speed and atmospheric mixing. Under inversion conditions, carbon monoxide concentrations may be distributed more uniformly over an area out to some distance from vehicular sources. When inhaled at high concentrations, carbon monoxide combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease or anemia, as well as fetuses.

Particulate Matter (PM_{10} and $PM_{2.5}$)—PM_{10} consists of particulate matter that is 10 microns or less in diameter (a micron is 1 millionth of a meter), and fine particulate matter, $PM_{2.5}$, which consists of particulate matter 2.5 microns or less in diameter. Both PM_{10} and $PM_{2.5}$ represent fractions of particulate matter, which can be inhaled into the air passages and the lungs and can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, combustion, and atmospheric photochemical reactions. Some of these operations, such as demolition and construction activities, contribute to increases in local PM_{10} concentrations, while others, such as vehicular traffic, affect regional PM_{10} concentrations.

NAAQS for particulate matter were first established in 1971. The standards covered total suspended particulate matter (TSP), or particles that are 30 microns or smaller in diameter. In 1987, USEPA changed the standards from TSP to PM_{10} as the new indicator. The new standards were based on a comprehensive study of information on the health effects from inhaling particulate matter. In December 1994, the USEPA began a long review process to determine if the PM_{10} standards set in 1987 provide a reasonable margin of safety, and if a new standard should be established for finer particles.

Based on numerous epidemiological studies and other health- and engineering-related information, USEPA established new standards for $PM_{2.5}$ in 1997. Before establishing the new $PM_{2.5}$ standards, discussions were conducted with the Clean Air Scientific Advisory Committee (CASAC). CASAC is a group of nationally recognized experts in the fields related to air pollution, environmental health, and engineering. CASAC reviewed and commented on the information generated by USEPA regarding proposed particulate matter standards.

Subsequent to these discussions and reviews, USEPA established $PM_{2.5}$ standards of 35 $\mu g/m^3$, 24-hour average concentration, and 15 $\mu g/m^3$, annual average concentration. USEPA also confirmed the national PM_{10} standards of 150 $\mu g/m^3$, 24-hour average, as providing an adequate margin of safety for limiting exposure to larger particles. The annual standard of 50 $\mu g/m^3$ has been deleted by USEPA. The recommendations for new $PM_{2.5}$ standards and for maintaining the PM_{10} standards were released in a staff report that presents the conclusions of the USEPA and of the CASAC review committee.

Several studies that USEPA relied on for its staff report have shown an association between exposure to particulate matter, both PM_{10} and $PM_{2.5}$, and respiratory ailments or cardiovascular disease. Other studies have related particulate matter to increases in asthma attacks. In general, these studies have shown that short-term and long-term exposure to particulate matter can cause acute and chronic health effects. $PM_{2.5}$, which can penetrate deep into the lungs, causes more serious respiratory ailments.

Nitrogen Dioxide and Sulfur Dioxide—Nitrogen dioxide (NO_2) and SO_2 are two gaseous compounds within a larger group of compounds, NO_x and SO_x, respectively, which are products of the combustion of fuel. NO_x and SO_x emission sources can elevate local NO_2 and SO_2 concentrations, and both are regional precursor compounds to particulate matter. As described above, NO_x is also an O_3 precursor compound and can affect regional visibility. (Nitrogen dioxide is the "whiskey brown-colored" gas readily visible during periods of heavy air pollution.) Elevated concentrations of these compounds are associated with increased risk of acute and chronic respiratory disease.

SO_2 and NO_x emissions can be oxidized in the atmosphere to eventually form sulfates and nitrates, which contribute to acid rain. Large power plants with high emissions of these substances because of the use of coal or oil are subject to emissions reductions under the Phase I Acid Rain Program of Title IV of the 1990 CAA Amendments. Power plants, with individual equipment capacity of 25 MW or greater that use natural gas or other fuels with low sulfur content, are subject to the Phase II Program of Title IV. The Phase II program requires plants to install CEMS in accordance with the Code of Federal Regulations (40 CFR Part 75) and report annual emissions of SO_x and NO_x.

Lead—Gasoline-powered automobile engines used to be the major source of airborne lead in urban areas. Excessive exposure to lead concentrations can result in gastrointestinal disturbances, anemia, and kidney disease, and, in severe cases, neuromuscular and neurological dysfunction. The use of lead additives in motor vehicle fuel has been eliminated in California, and lead concentrations have declined substantially as a result.

Table 4.7-16 presents the current attainment and/or nonattainment designations for San Diego County (and the Project area).

Table 4.7-16 SDAPCD Attainment Status Listing

Pollutant	Federal Status	State Status
Ozone	Nonattainment*	Nonattainment
$PM_{10}/PM_{2.5}$	Attainment	Nonattainment
CO	Attainment	Attainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
Lead	Attainment	Attainment

Notes:

* Federal Ozone Status Ranking = "basic," but in June of 2011 the SDAPCD expects the ranking to be upgraded to "serious."

Air quality monitoring data from several sites surrounding the proposed Project site are summarized in Table 4.7-17. Data from these sites (primarily SD-Overland Avenue) were used to establish the background levels in Table 4.7-18, and were used in the air quality impact analyses that follow:

Table 4.7-17 Air Quality Summary for Most Recent 3 Years[1]

Pollutant	Site	Averaging Time	2009	2010	2011
Ozone, ppm	El Cajon	1 Hr Maximum	0.098	0.102	0.105
	Del Mar		0.097	0.085	0.091
	Escondido		0.093	0.105	0.098
	Alpine		0.119	0.105	0.114
	Overland		0.105	0.100	0.097
Ozone, ppm	El Cajon	8 Hr Maximum	0.082	0.078	0.086
	Del Mar		0.084	0.072	0.074
	Escondido		0.080	0.084	0.089
	Alpine		0.097	0.088	0.093
	Overland		0.082	0.073	0.086
PM10, ug/m3	El Cajon	24 Hr State Maximum	55	41	37
	Escondido		73	42	40
	Overland		50	33	47
PM10, ug/m3	El Cajon	24 Hr Fed 2nd High	46	36	35
	Escondido		47	35	31
	Overland		41	32	37
PM10, ug/m3	El Cajon	Annual Arithmetic Mean	25	21	19
	Escondido		25	21	19
	Overland		25	19	20
PM2.5, ug/m3	El Cajon	24 Hr Fed 98th Percentile	23	23	22
	Escondido		25	22	22
	Overland		22	16	16
PM2.5, ug/m3	El Cajon	Annual Arithmetic Mean	12.2	10.8	10.6
	Escondido		11.0	10.5	10.4
	Overland		10.5	8.7	9.0

Pollutant	Site	Averaging Time	2009	2010	2011
CO, ppm	Escondido	8 Hr State Maximum	3.4	2.5	2.3
CO, ppm	Escondido	1 Hr State Maximum	4.4	3.9	3.5
CO, ppm	Escondido	8 Hr Fed 2nd High	3.0	2.4	2.2
CO, ppm	Escondido	1 Hr Fed 2nd High	4.0	3.8	3.4
NO_2, ppm	El Cajon	1 Hr State Maximum	0.054	0.058	0.049
	Overland		0.060	0.073	0.073
	Escondido		0.073	0.064	0.062
	Alpine		0.056	0.052	0.040
NO_2, ppm	El Cajon	1 Hr Fed 98th Percentile	0.048	0.047	0.044
	Overland		0.055	0.056	0.051
	Escondido		0.057	0.053	0.049
	Alpine		0.036	0.037	0.030
NO_2, ppm	El Cajon	Annual Arithmetic Mean	0.014	0.013	0.012
	Overland		0.014	0.013	0.012
	Escondido		0.016	0.014	0.013
	Alpine		0.008	0.007	0.006
SO_2, ppm	Beardsley	Annual AM	0.001	0.000	-
	Beardsley	24 Hr State Maximum	0.006	0.002	0.003
	Beardsley	24 Hr Fed 2nd High	0.005	0.002	0.002
	Beardsley	1 Hr State Maximum	0.021	0.008	0.013
	Beardsley	1 Hr Fed 99th Percentile	0.014	0.007	0.008

Notes:

1 Data from USEPA AIRS, San Diego SDAPCD, CARB ADAM (CARB 2011b).
2 98th percentile is the correct value to be used for Federal standard.
3 (CARB 2009; CARB 2011b; SDAPCD 2007; 2009.)

Table 4.7-18 shows the background air quality values based upon the data presented in Table 4.7-17. The background values (primarily SD-Overland) represent the maximum, highest second-high, or 3-year average values (as appropriate for the AAQS) reported for the site during any single year of the most recent 3-year period (2009-2011). Appendix F.2 presents the background air quality data summaries.

Table 4.7-18 Estimated Background Air Quality Values

Pollutant and Averaging Time	Background Value
Ozone – 1 Hour	210 $\mu g/m^3$ (Max)
Ozone – 8 Hour	168.6 $\mu g/m^3$ (Max)

Pollutant and Averaging Time	Background Value
PM_{10} – 24 Hour State	50 $\mu g/m^3$ (Max)
PM_{10} – 24 Hour Federal	41 $\mu g/m^3$ (High Second-High)
PM_{10} – Annual	25 $\mu g/m^3$ (Max)
$PM_{2.5}$ – 24 Hour Federal	18 $\mu g/m^3$ (3-year Avg 98^{th}%)
$PM_{2.5}$ – Annual State	10.5 $\mu g/m^3$ (Max)
$PM_{2.5}$ – Annual Federal	9.4 $\mu g/m^3$ (3-year Avg)
CO – 1 Hour State & Federal	5039 $\mu g/m^3$ (Max)
CO – 8 Hour State & Federal	3894 $\mu g/m^3$ (Max)
NO_2 – 1 Hour Federal	101.6 $\mu g/m^3$ (3-year Avg 98^{th}%)
NO_2 – 1 Hour State	137.3 $\mu g/m^3$ (Max)
NO_2 – Annual	26.3 $\mu g/m^3$ (Max)
SO_2 – 1 Hour Federal	26.2 $\mu g/m^3$ (3-year Avg 99^{th}%)
SO_2 – 1 Hour State	55.1 $\mu g/m^3$ (Max)
SO_2 – 24 Hour Federal	13.1 $\mu g/m^3$ (High Second-High)
SO_2 – 24 Hour State	15.7 $\mu g/m^3$ (Max)
SO_2 – Annual	2.6 $\mu g/m^3$ (Max)

Table 4.7-19 summarizes the federal permitting criteria and applicable evaluation thresholds.

Table 4.7-19 Federal Program Evaluation Data

Regulated Pollutant	Major Source Thresholds, tpy		Averaging Time Period	Standard Form	NAAQS				PSD Increments, $\mu g/m^3$			Significant Emissions Increase	Significant Impact Levels	Monitoring *de minimis* Levels
					Primary		Secondary		Area Classifications					
	PSD	NAA			$\mu g/m^3$	ppb	$\mu g/m^3$	ppb	I	II	III		$\mu g/m^3$	$\mu g/m^3$
PM_{10}	250/100	100/70	24 hr	a	150	-	150	-	8	30	60	15	5	10
			Annual	-	-	-	-	-	4	17	34		1	-
$PM_{2.5}$	250/100	100	24 hr	c	35	-	35	-	2	9	18	10	1.2	4
			Annual	d	15.0	-	15.0	-	1	4	8		0.3	-
SO_2	250/100	100	1 hr	g	196	75	-	-	-	-	-	40	7.8*	-
			3 hr	e	-	-	1,300	500	25	512	700		25	-
			24 hr	k	365	140	-	-	5	91	182		5	13
			Annual	k	80	30	-	-	2	20	40		1	-
NO_2	250/100	100	1 hr	j	188	100	-	-	-	-	-	40	7.5	-
			Annual	f	100	53	100	53	2.5	25	50		1	14
Ozone	250/100	100/50/ 25/10	8 hr	h	147	75	147	75	-	-	-	40/25/ any	-	-
CO	250/100	100/50	1 hr	e	40,000	35,000	-	-	-	-	-	100	2,000	-
			8 hr	e	10,000	9,000	-	-	-	-	-		500	575
Lead	250/100	100	Rolling 3-month	i	0.15	-	0.15	-	-	-	-	0.6	-	0.1
TSP	250/100	-	-	n/a	-	-	-	-	-	-	-	25	-	-

Notes:

a. Not to be exceeded more than once per calendar year, averaged over three years (similar to high second-high)
b. N/A
c. 98^{th} percentile of daily 24-hour averages, 3-year average
d. Annual arithmetic mean (single or multiple monitors), 3-year average
e. Not to be exceeded more than once per calendar year, averaged over three years (similar to high second-high)
f. Annual arithmetic mean
g. 99^{th} percentile of 1-hour daily maxima, 3-year average
h. 3-year average of 4^{th} highest daily maximum 8-hr concentration
i. Maximum rolling 3-month arithmetic mean
j. 98^{th} percentile of 1-hour daily maxima, 3-year average
k. Standard was revoked on August 3, 2011

4.7.5.7 Engine Load Screening and Refined Impact Analysis

Facility sources, including the fuel gas heaters and emergency fire pump diesel engine, were modeled in the analysis for comparisons with Significant Impact Levels (SILs) and CAAQS/NAAQS, as necessary.

Operational characteristics of the engines, such as emission rate, exit velocity, and exit temperature vary by operating load and ambient temperature. These characteristics are shown in Appendix F.2. A screening modeling analysis, using AERMOD and five years of hourly meteorology (2003–2007) was performed for the 100 percent load condition in order to determine the ambient condition that will result in the highest modeled concentrations for averaging periods of 24 hours or less. The conditions were considered for five ambient temperature conditions: 35°F (a cold winter day), 64°F (annual average day), 70°F, 81°F (an average summer day), and 95°F (a hot summer day). The 64°F condition represents annual average conditions. As such, no screening analyses were performed for annual average concentrations, which were modeled in the refined impact analyses for the 64°F case at 100 percent load, which is the typical operating scenario.

The results of the initial screening analysis are listed in Appendix F.2. For the initial screening analysis, only 100% load conditions were considered as only one engine would be operated at loads less than 100% (i.e., 50% and 75% loads). The initial screening analysis shows that the worst-case ambient temperature condition is 95°F (Case O) for short-term SO_2 impacts and 70°F (Case I) for short-term CO, NO_x, and $PM_{10/2.5}$ impacts.

A second screening analysis was performed for 50 percent (%) and 75% load conditions at these two temperatures to determine which individual engine/stack at reduced loads produces the highest impact. These worst-case engines/stacks for 1-hour, 3-hour, 8-hour, and 24-hour averaging times at 70°F are (numbered from west to east) engine/stack 7, 11, 11, and 3, respectively, for 50% load Case G and engine/stack 9, 9, 3, and 4, respectively, for 75% load Case H (i.e., for pollutants other than SO_2). For SO_2 with worst-case ambient temperatures of 95°F, the worst-case engines/stacks for the same respective averaging times are engine/stack 7, 11, 11, and 3, respectively, for 50% load Case M and engine/stack 9, 9, 3, and 3, respectively, for 75% load Case N. Further "screening" was then accomplished in the refined analyses by modeling three facility configurations: 10 engines at 100% load and one engine at 50% load, 10 engines at 100% load and one engine at 75% load, and 11 engines at 100% load. The worst-case from these three refined analysis runs are reported in the stack parameter and impact tables of the permit application.

For the startup modeling analyses, all 11 engines were assumed to startup or shutdown simultaneously within the same hour. For longer averaging periods such as the 3-hour and 8-hour averaging times, multiple startups/shutdowns along with full load operation for all engines were modeled in order to calculate the worst-case impacts. Similarly, the firepump engine was assumed not to operate during the startup/shutdown hour, but was included in the modeling analyses for 3-hour and 8-hour averaging times. The worst-case facility configuration from the refined analyses for normal operating conditions (i.e., 10 engines at 100% load and one engine at 50% load, 10 engines at 100% load and one engine at 75% load, or 11 engines at 100% load) was modeled for all three startup/shutdown averaging times modeled (i.e., 1-hour, 3-hour, and 8-hour impacts). For 24-hour and annual averaging times, the startup and shutdown emissions were already included in the emissions modeled for normal operating conditions.

Detailed emission calculations for all averaging periods are included in Appendix F.1. The worst-case modeling input information for each pollutant and averaging period are shown in Table 4.7-20 for normal operating conditions and engine startup/shutdown conditions.

Table 4.7-20 Stack Parameters and Emission Rates for Refined AERMOD Modeling

Equipment/ Input Data	Stack Parameters				Emission Rates (g/s)[a]			
	Stack Height (meters)	Stack Diameter (meters)	Stack Temp. (deg K)	Exhaust Velocity meters per second (m/s)	NO_X	SO_2	CO	PM10/2.5
Averaging Period: 1-hour for Normal Operating Conditions								
Engines (each) – NO_X	21.336	1.2192	663.150	24.983	0.1661	n/a	n/a	n/a
Engines (each) – SO_2 10 Engines/1 Engine	21.336	1.2192	661.483/ 710.372	24.813/ 14.796	n/a	0.0323/ 0.0161	n/a	n/a
Engines (each) – CO 10 Engines/1 Engine	21.336	1.2192	663.150/ 713.150	24.983/ 14.771	n/a	n/a	0.1972/ 0.1884	n/a
Fire Pump Engine[b]	9.144	0.1016	833.150	43.077	0.1121	2.646E-4	0.04032	n/a
Fuel Gas Heater	9.144	0.5969	819.261	3.783	0.0243	3.024E-4	0.04536	n/a
Warm Start Heater	9.144	0.5969	819.261	3.783	0.0243	3.024E-4	0.04536	n/a
Averaging Period: 3 hours for Normal Operating Conditions								
Engines (each)	21.336	1.2192	661.483	24.813	n/a	0.0323	n/a	n/a
Fire Pump Engine	9.144	0.1016	833.150	43.077	n/a	8.820E-5	n/a	n/a
Fuel Gas Heater	9.144	0.5969	819.261	3.783	n/a	3.024E-4	n/a	n/a
Warm Start Heater	9.144	0.5969	819.261	3.783	n/a	3.024E-4	n/a	n/a
Averaging Period: 8 hours for Normal Operating Conditions								
Engines (each) 10 Engines/1 Engine	21.336	1.2192	663.150/ 713.150	24.983/ 14.771	n/a	n/a	0.1972/ 0.1884	n/a
Fire Pump Engine	9.144	0.1016	833.150	43.077	n/a	n/a	5.04E-3	n/a
Fuel Gas Heater	9.144	0.5969	819.261	3.783	n/a	n/a	0.04536	n/a
Warm Start Heater	9.144	0.5969	819.261	3.783	n/a	n/a	0.04536	n/a
Averaging Period: 24 hours for Normal Operating Conditions[c]								
Engines (each) – SO_2	21.336	1.2192	661.483	24.813	n/a	0.0324	n/a	n/a
Engines (each) – PM 10 Engines/1 Engine	21.336	1.2192	663.150/ 713.150	24.983/ 14.771	n/a	n/a	n/a	0.1810/ 0.1787
Fire Pump Engine	9.144	0.1016	833.150	43.077	n/a	1.1025E-5	n/a	1.575E-4
Fuel Gas Heater	9.144	0.5969	819.261	3.783	n/a	3.024E-4	n/a	3.528E-3
Warm Start Heater	9.144	0.5969	819.261	3.783	n/a	3.024E-4	n/a	3.528E-3
Averaging Period: Annual for Normal Operating Conditions[c]								
Engines (each)	21.336	1.2192	663.706	25.009	0.1147	0.0150	n/a	0.0862
Fire Pump Engine	9.144	0.1016	833.150	43.077	6.6567E-4	1.5707E-6	n/a	2.2438E-5

Equipment/ Input Data	Stack Parameters				Emission Rates (g/s)[a]			
	Stack Height (meters)	Stack Diameter (meters)	Stack Temp. (deg K)	Exhaust Velocity meters per second (m/s)	NO_X	SO_2	CO	PM10/2.5
Fuel Gas Heater	9.144	0.5969	819.261	3.783	0.0117	1.4609E-4	n/a	1.7044E-3
Warm Start Heater	9.144	0.5969	819.261	3.783	0.0137	1.7012E-4	n/a	1.9847E-3
Averaging Period: 1-hour for Engine Start-up/Shutdown Conditions								
Engines (each) –NO_X	21.336	1.2192	663.150	24.983	1.19574	n/a	n/a	n/a
Engines (each) – SO_2 10 Engines/1 Engine	21.336	1.2192	661.483/ 710.372	24.813/ 14.796	n/a	0.04284	n/a	n/a
Engines (each) – CO 10 Engines/1 Engine	21.336	1.2192	663.150 713.150	24.983 14.771	n/a	n/a	1.69344	n/a
Fuel Gas Heater	9.144	0.5969	819.261	3.783	0.0243	3.024E-4	0.04536	n/a
Warm Start Heater	9.144	0.5969	819.261	3.783	0.0243	3.024E-4	0.04536	n/a
Averaging Period: 3-hour for Engine Start-up/Shutdown Conditions								
Engines (each)	21.336	1.2192	661.483	24.813	n/a	0.03343	n/a	n/a
Fire Pump Engine	9.144	0.1016	833.150	43.077	n/a	8.820E-5	n/a	n/a
Fuel Gas Heater	9.144	0.5969	819.261	3.783	n/a	3.024E-4	n/a	n/a
Warm Start Heater	9.144	0.5969	819.261	3.783	n/a	3.024E-4	n/a	n/a
Averaging Period: 8 hours for Engine Start-up/Shutdown Conditions								
Engines (each) 10 Engines/1 Engine	21.336	1.2192	663.150 713.150	24.983 14.771	n/a	n/a	0.39989	n/a
Fire Pump Engine	9.144	0.1016	833.150	43.077	n/a	n/a	5.04E-3	n/a
Fuel Gas Heater	9.144	0.5969	819.261	3.783	n/a	n/a	0.04536	n/a
Warm Start Heater	9.144	0.5969	819.261	3.783	n/a	n/a	0.04536	n/a

Notes:

[a] Modeled emission rates based on estimated hours of operation (see Appendix F.1).

[b] Despite infrequent operations of firepump testing, the firepump engine was conservatively included in the 1-hour NO_2 modeling for NAAQS assessment based on CAPCOA guidance.

[c] 24-hour and annual averaging periods include startup/shutdown emissions, where applicable.

4.7.5.8 Normal Operations Impact Analysis

AERMOD was initially used in order to determine the magnitude and location of the maximum impacts for each pollutant and averaging period for comparison with the SILs. Table 4.7-21 summarizes maximum modeled concentrations for each criteria pollutant and associated averaging periods. In order to assess the significance of the modeled concentrations, the maximum first high concentrations were compared to the Class II PSD SILs. The SILs were exceeded for the following pollutants and averaging periods: 1-hour NO_2, 24 hour PM10 and PM2.5, annual $PM_{2.5}$, and 1-hour SO_2.

Based on the locations of some of the maximum impacts, CTSCREEN analyses as discussed later were performed for the following pollutants and averaging times:

- 24-hour PM10 and PM2.5 impacts (Federal/state standards, PSD Increments, and SILs)

- Annual PM10 and PM2.5 impacts (Federal/state standards, PSD Increments, and SILs)
- Annual NO_2 impacts (Federal/state standards, PSD Increments, and SILs)

In addition, several refined 20-meter resolution receptor grids were developed for AERMOD. The refined receptor grids were prepared for the following pollutants and averaging periods:

- 1-hour NO_2 startup and commissioning (Federal and state standards)
- 1-hour NO_2 base load operation (state standard)
- 24-hour and annual SO_2 (Federal and state standards)
- 8-hour CO base load operation, startup, and commissioning (Federal and state standards)

The results of the refined grid modeling are included with the regular receptor grid results in Tables 4.7-21 and 4.7-24. Commissioning impacts are delineated in the text below. Thus, comparisons with the appropriate SILs and state and Federal ambient air quality standards were all based on 20-meter receptor grids in order to calculate the maximum impact from the proposed Project.

The AERMOD results for the regular and refined grids indicate that the "Project-only" impacts for normal operating conditions are less than the Federal and state standards for all pollutants and averaging times. However, the $PM_{2.5}$ 24-hour concentration could exceed the available $PM_{2.5}$ increment and the annual PM2.5 and NO_2 impacts could exceed the SILs as modeled with AERMOD. Additionally, the Project-only 24-hour PM_{10} concentration exceeds the 24-hour SIL during periods of measured exceedances of the state standard, which could trigger PM offset requirements as per SDAPCD Rule 20.2. All of these modeled locations where concentrations were predicted in excess of the relevant increment, CAAQS or SILs were located in the complex terrain southwest of the Project site. To provide a more accurate estimate of the Project's potential impacts in these areas of complex terrain, the CTSCREEN model was used. The use of CTSCREEN and the results are discussed in more detail below. As is summarized, the results of the CTSCREEN modeling clearly demonstrate that the 24-hour PM2.5 increment will not be exceeded and that the 24-hour PM10 SIL during measured exceedances of the state standard will also not be exceeded. Table 4.7-21 presents the modeling results from both CTSCREEN and AERMOD. The concentrations in the table below represent the model that produced the maximum impact for that pollutant and averaging period, but that still demonstrated compliance with the CAAQS/NAAQS/SILs.

CTDMPLUS Terrain Feature Processing

CTDMPLUS requires construction of a mathematical representation of the complex terrain being analyzed. For each of the complex terrain regions to be modeled, the contours of the specific terrain feature of interest were digitized and used as input to the FITCON and HCRIT processing programs. The FITCON and HCRIT programs use the digitized data to develop continuous contours, complete the contours and extend the contours down to the stack base, fit a series of ellipses to these contour data, create polynomial equations that represent the fitted ellipses, and format the results so CTDMPLUS can use them. Contour data were based on 7.5-minute USGS topographic maps, and contour intervals of 100 feet or less as needed to accurately digitize the individual terrain features. Three primary terrain features were digitized as presented in Appendix F.2, Figure F.2-12.

The RECGEN receptor utility program was used to place model receptor locations on each terrain feature. Receptors were placed along the digitized contours.

CTSCREEN utilized the same PM2.5 24-hour stack parameters as determined from the engine load screening analysis.

CTSCREEN Results

CTSCREEN digitized terrain inputs were used to model the Project impacts at locations where AERMOD predicted possible exceedances of the 24-hour PM2.5 PSD Class II Increment, i.e., where the maximum second-highest concentrations predicted by AERMOD equaled or exceeded 9 $\mu g/m^3$. All these locations occurred along the flanks of the north and south peaks of Fortuna Mountain or the adjacent terrain feature south of Mission Canyon. All locations where AERMOD predicted possible NAAQS exceedances were plotted as shown in Appendix F.2, Figure F.2-12. This included all locations where the maximum second-highest modeled 24-hour $PM_{2.5}$ impact equaled or exceeded 9 $\mu g/m^3$. To more accurately predict the Project's actual impacts in this complex terrain, a more detailed modeling assessment was conducted using CTSCREEN, which is an EPA-approved preferred model for modeling analyses in complex terrain. *See* 40 CFR Part 51, App. W, Guideline on Air Quality Models, § 4.2.1.2. According to EPA's Modeling Guideline, "CTSCREEN can be used to obtain conservative, yet realistic, worst-case estimates for receptors located on terrain above stack height." *Id.*

The results from the CTSCREEN analyses show that maximum 24-hour PM2.5 impacts are actually 3.68 $\mu g/m^3$ in these complex terrain areas, much less than initially estimated by AERMOD. Therefore, the appropriate AERMOD 24-hour PM10/PM2.5 impacts outside the area remodeled with CTSCREEN were reported, as shown in Tables 4.7-21a-d.

In addition to 24-hour PM10/PM2.5 impacts, maximum annual PM10/PM2.5 impacts and annual NO_2 impacts were also predicted to occur on these same terrain features and exceed the applicable SILs. Therefore, annual averages for these pollutants were also modeled with CTSCREEN, and shown to be 0.35 $\mu g/m^3$ for PM10/PM2.5 and also 0.35 $\mu g/m^3$ for NO_2 (after applying the USEPA-default ARM factor of 75% to the modeled 0.47 $\mu g/m^3$ CTSCREEN impact for NO_x). These CTSCREEN impacts are much less than AERMOD impacts outside the area remodeled with CTSCREEN, which were reported as shown in Table 4.7-21a. Thus, the Project by itself will not cause exceedances of the 24-hour PM2.5 PSD Class II increment or have significant annual PM10 or NO_2 impacts. A comparison of the AERMOD and CTSCREEN results are summarized below (which show that the AERMOD maximum impacts outside the CTSCREEN area are controlling):

Table 4.7-21a Comparison of the AERMOD and CTSCREEN Results

Pollutant/Avg.Time/ Form of Standard	AERMOD Maxima Inside Area Remodeled w/ CTSCREEN (μg/m³)	CTSCREEN Maxima (μg/m³)	AERMOD Maxima Outside Area Remodeled w/ CTSCREEN (μg/m³)
PM10 24-hr Maximum (SIL)	17.09	3.68	10.91
PM 24-hr High 2nd High (Increment)	14.72	3.68	7.74
PM10 24-hr 6th High/5-years (AAQS)	13.79	3.68	6.90
PM2.5 24-hr 5-year Avg.Max (SIL)	14.24	3.68	7.86
PM2.5 24-hr 5-yr Avg.98th% (AAQS)	8.93	3.68	5.05
PM10 Annual Maximum (SIL/AAQS)	1.25	0.35	0.81
PM2.5 Annual 5-yr Avg. (SIL/AAQS)	0.88	0.35	0.70
NO_2 Annual Maximum (SIL/AAQS)	1.25	0.35	0.91

Annual NO_2 impacts includes USEPA-default ARM factor of 75%.

CAAQS Compliance Demonstration

While modeled facility impacts are all less than the CAAQS, current background concentrations for 24-hour PM10 already equal the CAAQS of 50 μg/m³. Adding the modeled facility impact of 10.91 μg/m³ gives a total (facility+background) impact of 60.9 μg/m³, which exceeds the CAAQS. Based on the results presented in Tables 4.7-21b-d and 4.7-24 (as well as data presented in Appendix F.2), no other exceedances of the CAAQS are expected to occur when adding background to modeled facility impacts. In this one instance where the background already equals the CAAQS, the Project by itself will not cause new exceedances of the 24-hour PM10 state standard as shown in the next section.

Table 4.7-21b Air Quality Impact Summary for Normal Operating Conditions - Standards

Pollutant	Avg. Period	Maximum Concentration (μg/m³)	Background (μg/m³)	Total (μg/m³)	Ambient Air Quality CAAQS/NAAQS	
					(μg/m³)	(μg/m³)
NO_2	1-hour Federal	-	-	153.7	-	188
	1-hour State	-	-	199.2	339	-
	Annual	0.91*	26.3	27.2	57	100
PM_{10}	24-hour Federal	6.9*	41	47.9	-	150
	24-hour State	10.9*	50	60.9	50	-
	Annual	0.81*	25	25.8	20	-
$PM_{2.5}$	24-hour	5.1*	18	23.1	-	35
	Annual	0.81*	10.5	11.3	12	15.0
CO	1-hour	131.2	5039	5170	23,000	40,000
	8-hour	40.9	3894	3935	10,000	10,000

Pollutant	Avg. Period	Maximum Concentration (µg/m³)	Background (µg/m³)	Total (µg/m³)	Ambient Air Quality CAAQS/NAAQS	
					(µg/m³)	(µg/m³)
SO_2	1-hour Federal	10.8	26.2	37.0	-	196
	1-hour State	20.1	55.1	75.2	655	-
	3-hour	9.6	55.1	64.7	-	1300
	24-hour	3.1	15.7	18.8	105	365
	Annual	0.22	2.6	2.8	-	80

Notes: 1-hour Federal NO_2 impact (facility+background) is 5-year average of 98th percentile impacts; 24-hour Federal PM10 impact is sixth-high impact over five-years of modeled meteorological data; 24-hour Federal PM2.5 facility impact is 5-year average of 98th percentile impacts; 1-hour Federal SO_2 facility impact is 5-year average of 99th percentile impacts; and remaining facility impacts are maximum impact for entire five year period. Annual NO_2 impact includes USEPA-default ARM factor of 75%. Background concentrations included by AERMOD for 1-hour NO_2 impacts.

* designates that maximum impacts were predicted by AERMOD for areas outside the complex terrain area remodeled with CTSCREEN (i.e., CTSCREEN had maximum impacts lower than these).

Table 4.7-21c Air Quality Impact Summary for Normal Operating Conditions - SILs

Pollutant	Avg. Period	Maximum Concentration (µg/m³)	Class II Significance Level (µg/m³)
NO_2	1-hour Federal	100.8	7.5
	1-hour State	118.6	-
	Annual	0.91*	1
PM_{10}	24-hour	10.91*	5
	Annual	0.81*	1
$PM_{2.5}$	24-hour	7.86*	1.2
	Annual	0.81*	0.3
CO	1-hour	131.2	2000
	8-hour	40.9	500
SO_2	1-hour	14.8	7.8
	3-hour	9.6	25
	24-hour	3.1	5
	Annual	0.22	1

Notes: 1-hour Federal NO_2 facility impact is 5-year average of annual 1-hour daily maximum impacts; 24-hour Federal PM2.5 facility impact is 5-year average of annual 24-hour maximum impacts; 1-hour Federal SO_2 facility impact is 5-year average of annual 1-hour daily maximum impacts; impacts; and remaining facility impacts are maximum impact for entire five year period. Annual NO_2 impact includes USEPA-default ARM factor of 75%. Background concentrations not included for 1-hour NO_2 SIL comparison.

* designates that maximum impacts were predicted by AERMOD for areas outside the complex terrain area remodeled with CTSCREEN (i.e., CTSCREEN had maximum impacts lower than these).

Table 4.7-21d Air Quality Impact Summary for Normal Operating Conditions – PSD Class II Increments

Pollutant	Avg. Period	Maximum Concentration (µg/m³)	Class II Increment (µg/m³)
NO_2	Annual	0.91*	25

Pollutant	Avg. Period	Maximum Concentration (μg/m³)	Class II Increment (μg/m³)
PM_{10}	24-hour	7.74*	30
	Annual	0.81*	17
$PM_{2.5}$	24-hour	7.74*	9
	Annual	0.81*	4
SO_2	3-hour	14.8	512
	24-hour	3.1	91
	Annual	0.22	20

Notes: 24-hour PM10 and PM2.5 facility impact are the maximum values of the second-highest value for each modeled year in the 5-year meteorological dataset (i.e., the high second-high). The remaining facility impacts are the maximum impact for entire five year period (i.e., the maximum annual impacts and the maximum SO2 short-term impacts) Annual NO_2 impact includes USEPA-default ARM factor of 75%.

* designates that maximum impacts were predicted by AERMOD for areas outside the complex terrain area remodeled with CTSCREEN (i.e., CTSCREEN had lower impacts than these).

Based on the above modeling results, emissions from the proposed Project will not affect the attainment status of the airshed or cause any new exceedances.

4.7.5.9 Commissioning Impacts Analysis – Power Cycle Engines

There are several scenarios that are possible during commissioning, which are expected to result in NO_x, CO, and VOC emissions that may be greater than during normal operations. (During commissioning, fuel related emissions such as SO_2 and PM10/2.5 are expected to be no greater than full load operations.) Typically, these commissioning activities occur prior to the installation of the abatement equipment, e.g., SCR and oxidation catalyst, while the engines are being tuned to achieve optimum performance. During engine tuning, NO_x, CO, and VOC emission control systems would not be functioning.

For the purposes of air quality modeling, NO_2 and CO impacts could be higher during commissioning than under other operating conditions already evaluated. Likewise, while undergoing equipment commissioning, although natural gas will be the sole fuel fired during commissioning, $PM_{10/2.5}$ impacts also could be higher during commissioning than under other operating conditions already evaluated.

The commissioning activities for each engine are expected to consist of several phases. Though precise emission values during the phases of commissioning cannot be provided, given the consideration for contingencies during shakedown, the emissions profile during expected commissioning-period operating loads are estimated as follows in Table 4.7-22. The engine manufacturer provided ppm values at 15 percent O_2, by volume dry, for a 20V34SG engine rated at 73 MMBtu/hr. These values were used to recalculate potential emissions for the 20V34SG-C2 engine rated at 80.18 MMBtu/hr. These revised commissioning emissions were modeled to determine their impacts.

Table 4.7-22 Commissioning Emissions Used for Modeling Analysis for Each Lean Burn Engine at Four Load Points[1]

Pollutant	100%	90%	75%	50%
NO_x	120 ppm 35.44 lbs/hr	120 ppm 31.90 lbs/hr	110 ppm 24.37 lbs/hr	100 ppm 14.77 lbs/hr
CO	260 ppm 46.74 lbs/hr	260 ppm 42.07 lbs/hr	300 ppm 40.45 lbs/hr	400 ppm 35.96 lbs/hr
$PM_{10/2.5}$	25 mg/Nm^3 3.86 lbs/hr	25 mg/Nm^3 3.47 lbs/hr	30 mg/Nm^3 3.47 lbs/hr	40 mg/Nm^3 3.09 lbs/hr

Notes:

1 Concentration emissions in ppm and mg/normal cubic meter (Nm^3) are based on 15 percent O_2, by volume, dry, as provided by engine manufacturer.

2 Hourly emission values were revised based on standard F-factor calculations. See Appendix F.1.

Each engine's commissioning period (prior to catalyst loading), is expected to consist of the following phases:

- **Initial load testing and checkout of an engine (typical for all 11 engines)** – Two to four operating days of unsynchronized operation, for approximately 2 to 4 hours per day, followed by approximately an average of 1 to 2 days per engine of low load checkout (low load checkout also is estimated at approximately 2 to 4 hours per day). The average operating load for this initial load testing is expected to be 5 to 10 percent, based on a range of 0 percent and 10 percent load.
- **Initial tuning** – Fifteen to thirty operating days of testing and tuning at various loads and up to full load per engine for not more than an average of 8 operating hours per day. The average operating load is expected to be 75 percent, based on a typical commissioning range of 50 percent and 100 percent load. Upon completion of this phase, the SCR and the oxidation catalyst will be loaded (about 50 to 80 operating hours after first fire of a given engine).
- **Final tuning** – Fifteen to thirty operating days of SCR and oxidation catalyst tuning and pre-witness testing performance verification at an average of not more than 10 to 12 hours per day. The average operating load is expected to be 75 percent, based on a range of 50 percent and 100 percent load.

During the commissioning period, multiple engines will be undergoing various phases of commissioning at the same time. Not all 11 engines will begin commissioning on the same day, however; typically, three engines will be tested concurrently. Although the final sequencing and schedule of commissioning for the 11 engines is not final, the following presents a general description of the worst-case scenario during commissioning for each pollutant:

- NO_x – Worst-case commissioning emissions occurs at 100 percent load
- CO – Worst-case commissioning emissions occurs at 100 percent load
- $PM_{10/2.5}$ – Worst-case commissioning emissions occurs at 100 percent load

The calculation methodology for commissioning emissions is presented in Appendix F.1

As discussed above and presented in Appendix F.1 (i.e., emission calculation methodology) and Appendix F.2 (i.e., air quality modeling support information), there are several potential scenarios under which NO_x, CO and PM_{10} impacts could be higher than under other operating conditions already evaluated.

Under these scenarios, the maximum emission impacts during commissioning with AERMOD modeling analysis, when added to background, are as follows:

NO_x emissions can be conservatively estimated to be 35.44 pounds per hour (lb/hr) per engine with three engines operating at 100 percent load. The maximum 1-hour NO_2 impact for comparison to the Federal AAQS (i.e., 5-year average of 98^{th} percentile concentrations with maximum seasonal NO_2 background data) during commissioning is 182.4 μg/m^3. The maximum 1-hour NO_2 impact for comparison to the state AAQS (i.e., maximum 1-hour impact with concurrent hourly NO_2 background data) during commissioning is 230.2 μg/m^3.

CO emissions can be conservatively estimated to be 46.74 lb/hr per engine with three engines operating at 100 percent load. The maximum 1-hour and 8-hour CO impacts during commissioning were calculated to be1225.1 μg/m^3 and 335.9 μg/m^3, respectively. With the maximum background 1-hour and 8-hour CO concentrations of 5,039 μg/m^3 and 3,894 μg/m^3 the maximum total impacts would be 6,264 μg/m^3 and 4,230 μg/m^3, respectively. These impacts are each below the state and Federal standards for CO.

$PM_{10/2.5}$ emissions can be conservatively estimated to be equivalent to 3.86 lb/hr per engine with up to three engines operating at 100 percent load. Modeling was not performed for $PM_{10/2.5}$ commissioning impacts as the worst-case commissioning event would only occur for up to 8 hours per day. Normalizing the 3.86 lb/hr per engine for three engines over 8 hours results in emissions that are less than 11 engines at full load for 24 hours. Thus, the maximum 24-hour $PM_{10/2.5}$ impact during commissioning would be less than base load.

4.7.5.10 Start-up and Shutdown Impacts Analysis

Start-up and shutdown activities typically affect emissions of NO_x and CO. (During startup, PM_{10}/$PM_{2.5}$, and SO_2 emissions are expected to be no greater than for full-load operations.) A separate modeling assessment for startup emissions is presented as the startup emissions by themselves are greater than the worst-case hourly emissions. Modeling was performed with AERMOD as discussed previously for 1-hour and 8-hour CO, 1- and 3-hour SO_2, and 1-hour NO_2 concentrations. CO and NO_x emissions for 1-hour averaging times were modeled for one cold startup period, assumed to occur for the entire hour. CO emissions for 8-hour averaging times were modeled assuming one cold startup and one warm startup during the 8-hour period. The $PM_{10/2.5}$ and SO_2 emissions for 24-hour averages already contain the startup/shutdown emissions for the worst-case day. It was assumed that both fuel heaters were operational during the engine startup. It was also assumed that all 11 engines would be simultaneously started during the same hour. The firepump would not be tested during the hour of startup of all eleven engines, but could be tested at other times during the same day. Therefore, for startup conditions, the firepump was not included in the 1-hour startup modeling analyses, but was included in the 3-hour and 8-hour startup/shutdown modeling analyses. The worst-case stack characteristics from the screening and refined analyses were modeled for startup/shutdown emissions. A permit condition will limit the testing to periods of non-startup. These emissions and stack characteristics are shown in Table 4.7-20 above. As noted above, the 24-hour and annual emissions modeled for normal facility operations earlier already include startup/shutdown emissions. The initial maximum startup/shutdown impacts for 1-hour NO_2 (both federal and state) and 8-hour CO occurred in the 50-meter intermediate grids. Thus, 20-meter resolution refined receptor grids were developed around the NO_2 and CO startup/shutdown maximum impact locations.

Table 4.7-23 presents a summary of the startup and shutdown emission estimates for the engines. Appendix F.1 presents more details with regards to startup/shutdown emissions and assumptions.

Table 4.7-23 Plant Startup/Shutdown Emission Rates for Each Engine for the QBGP

Scenario	NO_x	CO	VOC	$PM_{10/2.5}$	SOx
Cold Start, lb/event	8.82	12.57	6.614	1.54	0.137
Warm Start, lb/event	2.43	1.322	1.764	1.54	0.07
Shutdown, lb/event	0.2	0.31	0.34	0.35	0.05
Hourly Based Emissions Estimates for Startup and Shutdown Events					
Cold Start, lb/hr	9.48	13.35	7.41	2.23	0.27
Warm Start, lb/hr	3.42	2.50	2.95	2.57	0.26
Shutdown, lb/hr	1.33	1.65	1.70	1.53	0.27

Notes:

Estimates based on startup/shutdown data supplied by engine manufacturer.

Cold start sequence is 30 minutes, while a warm start sequence is 15 minutes or less. Time required for control systems to reach full abatement efficiency. The remaining part of the cold or warm startup hour would be at steady state, full control levels.

Shutdown is 8.5 minutes. The remaining part of the shutdown hour would be at steady state, full control levels.

Table 4.7-24 presents the results of the startup/shutdown modeling. CO concentrations due to startup/shutdown conditions are less than the Class II significance levels and modeled 1-hour NO_x impacts are less than the 1-hour state and Federal standards.

Table 4.7-24 Startup and Shutdown Modeling Results

Pollutant	Avg. Period	Maximum Concentration (µg/ m³)	Background (µg/ m³)	Total (µg/ m³)	Class II Significance Level (µg/ m³)	Ambient Air Quality CAAQS/NAAQS	
						(µg/ m³)	(µg/ m³)
NO_2[a]	1-hour Federal	-	-	182.3	7.5	-	188
	1-hour State	-	-	230.1	-	339	-
CO	1-hour	1125.5	5039	6164.5	2000	23,000	40,000
	8-hour	83.4	3894	3977.4	500	10,000	10,000
SO_2	1-hour	29.3	55.1	84.4	7.8	655	196
	3-hour	10.0	55.1	65.1	25	-	1300

Notes:

[a] Ozone Limiting Method (OLM) used for 1-hour NO_2 impacts, with Kearny Mesa NO_2 background included in the modeling results (USEPA-default 2008–2010 hourly-seasonal background used for 1-hour Federal NAAQS in accordance with USEPA guidance documents and SDAPCD-provided 2003–2007 hourly NO_2 concurrent with meteorological data used for 1-hour state CAAQS). Maximum 5-year average of the annual 98th percentile daily maximum 1-hour NO_2 concentrations used for comparison to the NAAQS and maximum 1-hour average for the entire 5-year period of meteorological data modeled used for comparison to the CAAQS. Maximum concentrations for the 5-year period also used for the CO and SO_2 comparisons.

Fumigation Analysis

Fumigation analyses with the USEPA Model SCREEN3 (version 96043) were conducted for inversion breakup conditions based on USEPA guidance given in *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised* (USEPA-454/R-92-019) (USEPA 1992b). The worst-case stack parameters identified in the AERMOD screening analysis for the engine stacks at 100% load conditions for 1-hour averaging times for NOx and CO (Case I) were modeled. Shoreline fumigation impacts were not assessed.

An inversion breakup fumigation impact was predicted to occur at 5,287 meters from the engine stacks. These results are predicted to occur by SCREEN3 for rural conditions of F stability and 2.5 m/s wind speeds at the stack release heights. No inversion breakup fumigation impacts are predicted by SCREEN3 for the short firepump engine and heater stacks. Since the site vicinity is rural in nature, there was no need to adjust fumigation impacts for urban dispersion conditions. One-hour averaging times were evaluated first (fumigation impacts are generally expected to occur for 90 minutes or less).

For total facility inversion breakup fumigation impacts, maximum SCREEN3 impacts under rural conditions for all SCREEN3 meteorological combinations were determined for the other sources at the inversion breakup distance. These impacts were combined with the fumigation impact as shown in the following table. These maximum 1-hour total fumigation impacts (engines, heaters, and firepump) are less than the total SCREEN3 maximum impacts predicted to occur under normal dispersion conditions for CO and NO_x. Since one-hour fumigation impacts are less than the maximum overall SCREEN3 one-hour impacts for these pollutants, no further analysis of additional short-term averaging times (3 hours, 8 hours, or 24 hours) is required as described in Section 4.5.3 of *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised* (USEPA-454/R-92-019) for CO and NO_x. It should be noted that the maximum 1-hour total fumigation impacts for all pollutants (NO_x, CO, and SO_2) are expected to be less than the maximum 1-hour AERMOD facility impacts as shown in Table 4.7-25, so the refined analysis impacts are conservative.

For the SO_2 impacts, where 1-hour fumigation impacts were greater than 1-hour SCREEN3 impacts, 3-hour and 24-hour fumigation impacts were calculated assuming 90-minutes of persistence of fumigation at the fumigation impact location (maximum SCREEN3 impacts under normal conditions at the fumigation impact location for the balance of the 3-hour or 24-hour period were assumed). The USEPA averaging time ratios of 0.9 and 0.4 were applied to SCREEN3 results for 3-hour and 24-hour averaging times, respectively, for the engines and heaters. Since the firepump only operates for 1-hour per day (at most and if at all), 1-hour firepump impacts were divided by 3 and 24 to obtain impacts for 3-hour and 24-hour averaging times, respectively. This gives 3-hour and 24-hour SO_2 fumigation inversion breakup impacts of 1.37 and 0.44 $\mu g/m^3$, respectively. These fumigation impacts are less than the comparable maximum 3-hour and 24-hour SCREEN3 impacts under normal dispersion conditions for SO_2 of 1.40 and 0.62 $\mu g/m^3$, respectively, at the engine maximum impact location. These impacts are also less than the maximum AERMOD refined modeling analysis results of 9.6 and 3.1 $\mu g/m^3$ for SO_2 for 3-hour and 24-hour averaging times, respectively.

Since the fumigation impacts are generally less than SCREEN3 maximum impacts under normal dispersion conditions and always less than the AERMOD refined modeling analysis maximum impacts, they were not reported elsewhere (used in any standards comparisons, etc.) in the application.

Table 4.7-25 Fumigation Impact Summary

Pollutant/ Averaging Time	Engine Impacts (µg/m3)	Heater Impacts (µg/m3)	Firepump Impacts (µg/m3)	Total Facility Impact (µg/m3)	Maximum AERMOD Impact (µg/m3)
Engine Inversion Breakup Location (5287 meters)					
NO2 1-hour	10.445	2.021	5.305	17.771	118.6[a]
CO 1-hour	12.400	3.773	1.908	18.081	131.2
SO2 1-hour	2.030	0.025	0.013	**2.068**	**20.1**
Engine SCREEN3 Max. Location/Normal Dispersion (878 meters)					
NO2 1-hour	7.480	6.770	22.689	36.939	118.6[a]
CO 1-hour	8.880	12.637	8.161	29.678	131.2
SO2 1-hour	1.453	0.084	0.054	1.591	20.1
Heaters SCREEN3 Max. Location/Normal Dispersion (66 meters)					
NO2 1-hour	0.022	54.626	207.609	262.257	118.6[a]
CO 1-hour	0.026	101.969	74.673	176.668	131.2
SO2 1-hour	0.004	0.680	0.490	1.174	20.1
Firepump Engine SCREEN3 Max. Location/Normal Dispersion (58 meters)					
NO2 1-hour	0.022	54.626	227.899	**282.547**	118.6[a]
CO 1-hour	0.026	101.969	81.971	**183.966**	131.2
SO2 1-hour	0.004	0.680	0.538	1.222	20.1

Notes:
[a] AERMOD NO_2 impact (rather than NO_X) based on Ozone Limiting Method (i.e., AERMOD NO_X impacts would be even higher than the AERMOD NO_2 impacts shown above).

4.7.5.11 Significant Impact Levels

PSD Source Impact Analysis. Under USEPA's PSD regulations, an applicant must conduct a "source impact analysis," which demonstrates that "allowable emission increases from the source in conjunction with all other applicable emissions increases or reductions (including secondary emissions), would not cause or contribute to air pollution in violation of: (1) Any NAAQS in any region; or (2) Any applicable maximum allowable increase over the baseline concentration in any area." 40 CFR § 52.21(k).

Subparagraph (1) is required to ensure that the source's emissions will not cause a violation of the NAAQS, which, in this case, consist of the 24-hour and annual PM_{10} and $PM_{2.5}$ standards and the 1-hour and annual NO_2 standards. Subparagraph (2) is the "increment consumption analysis," which ensures that, in those locations currently meeting the Federal NAAQS (i.e., those deemed "attainment" or "unclassifiable"), the concentration of a given pollutant cannot increase by an amount greater than the "maximum allowable increase" specified by the CAA and/or the PSD regulations for the particular pollutant.

USEPA has recently promulgated the final SILs and PSD increments for $PM_{2.5}$. USEPA has also recently proposed draft 1-hour NO_2 SILs but has not yet proposed a PSD increment.

Role of Significant Impact Levels. For purposes of the PSD program, USEPA has traditionally applied SILs as a *de minimis* value, which represents the offsite concentration predicted to result from a source's emissions that does not warrant additional analysis or mitigation.

If a source's modeled impact at any offsite location exceeds the relevant SIL, the source owner must then conduct a "multi-source" (or "cumulative") air quality analysis to determine whether or not the source's emissions will cause or contribute to a violation of the relevant NAAQS or applicable PSD increment. SILs have also been widely used in the PSD program as a screening tool for determining when a new major source or major modification that wishes to locate in an attainment or unclassifiable area must conduct a more extensive air quality analysis to demonstrate that it will not cause or contribute to a violation of the NAAQS or PSD increment in the attainment or unclassifiable area. The USEPA considers a source whose individual impact falls below a SIL to have a *de minimis* impact on air quality concentrations. Thus, a source that demonstrates its impact does not exceed a SIL at the relevant location is not required to conduct more extensive air quality analysis or modeling to demonstrate that its emissions, in combination with the emissions of other sources in the vicinity, will not cause or contribute to a violation of the NAAQS at that location.

The Class I and II SILs, increments, and NAAQS are presented in Table 4.7-19.

Based on the significant major source emission rates for NO_x, PM_{10}, and $PM_{2.5}$, the modeled concentrations of these pollutants exceeded the applicable Class II SILs for 1-hour NO_2, 24-hour PM_{10} and $PM_{2.5}$, and annual $PM_{2.5}$, thus triggering the requirements for a NAAQS and PSD increment analyses as appropriate. Figures F.2-9 through F.2-11 (Appendix F.2) present the areal extent of the SILs for 24-hour PM_{10} and 24-hour and annual $PM_{2.5}$. According to USEPA guidance, the impact area was established by taking the distance from the Project site to the farthest of these locations and then drawing a circle with that distance as its radius.

The 24-hour PM_{10} SIL radius is 5.2 km. The 24-hour $PM_{2.5}$ SIL radius is 11.7 km while the annual SIL radius is 4.5 km. The 1-hour NO_2 SIL radius is 16.4 km. The annual SILs for NO_2 and PM_{10} were not exceeded when complex terrain features with AERMOD impacts greater than the SILs were remodeled with CTSCREEN as described elsewhere. While the 1-hour SO_2 interim SIL was exceeded, the Project is not a major source for this pollutant, thus no NAAQS or increment analyses are required.

NAAQS Compliance Demonstration. To demonstrate that the emissions from the proposed Projects will not cause or contribute to a violation of the 24-hour $PM_{10/2.5}$ NAAQS, the annual $PM_{2.5}$ NAAQS, or the 1-hour NO_2 NAAQS, a multi-source cumulative modeling analysis will be conducted in accordance with USEPA requirements. This analysis will consider both the existing background concentrations, as established by ambient monitoring data,[1] and the contribution from additional sources, which might not be reflected by the monitoring data, but could interact with the facility's potential impacts. Both Appendix W and the *Draft NSR Workshop Manual* require that the cumulative impacts analysis include "nearby sources," which includes "[a]ll sources expected to cause a significant concentration gradient in the vicinity of the source or sources under consideration." Appendix W further instructs that the "impact of nearby sources should be examined at locations where interactions between the plume of the point source under consideration and those of nearby sources (plus natural background) can occur." Emphasizing that "[t]he number of sources is expected to be small except in unusual situations," Appendix W leaves identification of nearby sources to the "professional judgment" of the permitting agency.

If, after adding in the background concentration, the modeled contribution from the source and any other modeled sources, the result is less than the relevant NAAQS at all locations, then no violation would occur and the cumulative impacts analysis is complete. If a violation is predicted by the model, the source may still demonstrate that it does not "cause or contribute to" a violation of the NAAQS by demonstrating that its own contribution is lower than the SIL at the particular location and time of the modeled violation.[2] This is referred to as a culpability analysis.

The Applicant will work with the SDAPCD and USEPA Region 9 to develop a cumulative source inventory for NO_2 and $PM_{10/2.5}$ and to identify nearby sources whose contribution is not already reflected by the background monitoring data.

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1 *See Guideline on Air Quality Models*, 40 CFR Pt. 51, Appendix W (App. W), § 7.2.1.1.a. According to Appendix W, "[t]ypically, air quality data should be used to establish background concentrations in the vicinity of the source(s) under consideration." *Id.* § 8.2.1.b For comparison with the 24-hour PM2.5 NAAQS, the background concentration is based on the average of the 98^{th} percentile 24-hour values measured over the last 3 years of available data. *Id.*, § 10.1.c. For the annual $PM_{2.5}$ NAAQS, the background is established by the 3-year average of the annual averages.

3 *Draft NSR Workshop Manual*, Draft October 1990, at C.52: ("The source will not be considered to cause or contribute to the violation if its own impact is not significant at any violating receptor at the time of each predicted violation.")

4.7.5.12 SDAPCD Rule 20.2 AQIA for PM10

AERMOD and CTSCREEN were used to assess the Project's 24-hour PM10 concentrations for comparisons with the Rule 20.2 air quality impact assessment (AQIA) requirements. These methods were discussed with the SDAPCD.

Pursuant to SDAPCD Rule 20.2(d)(2), further analysis was performed with respect to the California 24-hour PM10 ambient air quality standards (AAQS). This rule requires that the Applicant demonstrate to the satisfaction of the Air Pollution Control Officer (APCO) through an AQIA that the Project will not cause additional exceedances of the CAAQS for PM10 anywhere the standard is already being exceeded. To perform this analysis for the Project, modeling was performed using the meteorology on specific days when monitored background PM10 concentrations equaled or exceeded the California standard of 50 $\mu g/m^3$. Three days were identified in the 5-year modeling period from 2003–2007 with background concentrations over 50 $\mu g/m^3$ – November 23, 2003; December 17, 2003; and October 21, 2007.

AERMOD modeling analyses of facility PM_{10} impacts for those three days showed a number of modeled receptors with impacts greater than the SDAPCD 24-hour significance level of 5 $\mu g/m^3$ on two of the three days modeled (i.e., the two days in 2003). This level is used to determine whether offsets are needed for the Project. The receptors with plant PM_{10} impacts equal to or greater than 5.0 $\mu g/m^3$ were plotted and are shown on Figure F.2-12. As can be seen, these impacts all occur in the complex terrain areas southwest of the plant site. These three complex terrain features were modeled in four CTSCREEN runs (North Fortuna Mountain Peak, South Fortuna Mountain Peak, the terrain feature south of Mission Gorge, and the terrain feature between Shepherd Canyon and Fortuna Mountain). The terrain where the 24-hour PM_{10} SILs were equaled or exceeded was digitized as described in Section 4.7.5.11.

The CTSCREEN contours for these features are shown on Figure F.2-12. CTSCREEN receptors were placed along each CTSCREEN contour above the engine stack release heights. The results of the CTSCREEN analyses demonstrate that maximum plant PM_{10} impact of 3.68 $\mu g/m^3$ in these complex terrain features, thus PM10 impacts during these two days are less than the 24-hour PM_{10} significance level. Thus, the Project will not contribute to violations of the CAAQS. The Projects annual modeled PM_{10} impacts are also less than the significance impact levels when this complex terrain area is modeled with CTSCREEN as described above. Thus, the requirements of SDAPCD Rule 20.2 are satisfied and no offsets are required.

4.7.5.13 Preconstruction Monitoring Data

USEPA's PSD regulations require an applicant to provide preconstruction monitoring data for purposes of use in the Source Impacts Analysis. However, a source is exempt from this requirement if its modeled impact in any area is less than pollutant-specific "significant monitoring concentrations" (SMC), as listed in Table 4.7-19.

Even if a source's potential impacts exceeds the corresponding SMC, and the Applicant must therefore provide preconstruction monitoring data as part of its Source Impact Analysis, this does not necessarily mean the Applicant must install and operate a new monitor at the Project site. Rather, according to USEPA guidance, an applicant may satisfy the preconstruction monitoring obligation in one of two ways: (i) Where existing ambient monitoring data is available from representative monitoring sites, the permitting agency may deem it acceptable for use in the Source Impacts Analysis; or (ii) where existing, representative data are not available, then the Applicant must obtain site-specific data.

As a general matter, the permitting agency has substantial discretion "to allow representative data submissions (as opposed to conducting new monitoring) on a case-by-case basis." In determining whether existing data are representative, USEPA guidance has emphasized consideration of three factors: monitor location, data quality, and use of most current data. The permitting agency also may approve use of data from a representative "regional" monitoring site for purposes of the NAAQS compliance demonstration.

A facility may, with the District's approval, rely on air quality monitoring data collected at District monitoring stations to satisfy the requirement for preconstruction monitoring even when the Project impact exceed the preconstruction significance levels. In such a case, in accordance with Section 2.4 of the USEPA PSD guideline, the last 3 years of ambient monitoring data may be used if they are representative of the area's air quality where the maximum impacts occur due to the proposed source.

The SDAPCD maintains air quality and meteorological monitoring stations throughout the entire air basin with sufficient resolution in order to adequately determine representative background concentrations for attainment/nonattainment determinations. Most monitored pollutants impact the air basin on a regional level, thus adding additional monitors in areas already served by existing monitoring stations does not provide any additional benefit. As such, the Applicant proposes that the existing monitoring data collected at the Overland Avenue site over the last three most recent years satisfies USEPA requirement for exemption of preconstruction monitoring. As such, no monitoring is proposed for this Project.

4.7.5.14 Class I Area Impacts

The closest Class I area is the Agua Tibia National Wilderness, located approximately 62 km north of the Project site. Additionally, San Jacinto Wilderness is located 103 km north-northeast of the Project site. To assess the potential for Class I increment consumption, which is a separate requirement from the air quality related value (AQRV) analysis, receptors were placed within the boundaries of Agua Tibia and are displayed in Figure F.2-13. Receptors were also placed within the boundaries of San Jacinto Wilderness and are displayed in Figure F.2-14 (USDAFS 2002).

The Agua Tibia modeled impacts are summarized in Table 4.7-26 and the San Jacinto modeled impacts are summarized in Table 4.7-27, which are then compared to the Class I significance levels. Like the Class II modeling analyses, an Ambient Ratio Method (ARM) factor of 75% was used to convert modeled annual NO_x concentrations to NO_2 impacts. The modeled concentrations of $PM_{2.5}$ at both Class I areas are less than the USEPA's Class I SILs for $PM_{2.5}$, which are 0.07 and 0.06 $\mu g/m^3$ (as a 24-hour and annual average concentration, respectively). Similarly, the PM_{10} and NO_2 impacts are also less than the Class I SILs. USEPA has stated that its decision to set the Class I SILs at 4 percent of the proposed Class I increments was based on its belief that, "where a proposed source contributes less than 4 percent to the Class I increment, concentrations are sufficiently low so as not to warrant a detailed analysis of the combined effects of the proposed source and all other increment-consuming emissions." *See* 72 Fed. Reg. at 54140. *Id.* In conclusion, the analysis demonstrates that no significant impacts on Class I areas are expected as a result of the Project.

Table 4.7-26 PM_{10}, $PM_{2.5}$, and NO_2 Class I SILs and Increments for the Agua Tibia National Wilderness Class I Area

Pollutant	Averaging Interval	Maximum Modeled Impact (μg/m^3)	Class I Significant Impact Level (μg/m^3)	Class I PSD Increment (μg/m^3)
PM_{10}	24-Hour	0.0161	0.3	8
	Annual	0.0008	0.2	4
$PM_{2.5}$	24-Hour	0.0161	0.07	2
	Annual	0.0008	0.06	1
NO_2	Annual	0.0008	0.1	2.5

Table 4.7-27 PM_{10}, $PM_{2.5}$, and NO_2 Class I SILs and Increments for the San Jacinto Wilderness Class I Area

Pollutant	Averaging Interval	Maximum Modeled Impact (μg/m^3)	Class I Significant Impact Level (μg/m^3)	Class I PSD Increment (μg/m^3)
PM_{10}	24-Hour	0.0080	0.3	8
	Annual	0.0004	0.2	4
$PM_{2.5}$	24-Hour	0.0080	0.07	2
	Annual	0.0004	0.06	1
NO_2	Annual	0.0005	0.1	2.5

4.7.5.15 PSD Increment Analysis

The PSD Source Impact Analysis also includes the "increment consumption analysis," which ensures that, in those locations currently meeting the Federal NAAQS (i.e., those deemed "attainment" or "unclassifiable"), the concentration of a given pollutant cannot increase by an amount greater than the "maximum allowable increase" specified by the CAA and/or the PSD regulations for the particular pollutant.

As described above, USEPA has recently promulgated final PSD increments for $PM_{2.5}$. The proposed Project will trigger the baseline date for $PM_{2.5}$. Thus, the application for the proposed Project could be deemed the first completed PSD application received after the trigger date and would, consequently, trigger both the minor source baseline date and major source baseline date. In light of this, the Project would not need to consider any other stationary sources for purposes of its increment consumption analysis, unless such sources had increased their emissions since the date when the application was complete.

Currently there is no promulgated 1-hour NO_2 increment.

Based on the results of the 24-hour PM_{10} SILs analysis, the Project will need to perform a multi-source PM_{10} increment consumption analysis that demonstrates that the available increment is not exceeded. The Applicant will work with the SDAPCD and USEPA Region 9 to develop an applicable increment source inventory. Increment consuming sources will be identified as those sources existing within the SIL, plus a 50-km screening area beyond the maximum extent of the SIL, as per USEPA Guidance.

The increment analysis will be submitted after the necessary consultations with the SDAPCD and USEPA. (It should be noted that a complete copy of the San Diego County California Emissions Inventory Data Acquisition System (CEIDARS) emissions inventory has been requested from CARB for support of this analysis.)

Based on the $PM_{2.5}$ baseline date, the "Project only" increment consumption analysis with AERMOD produced several receptor locations where the 24-hour $PM_{2.5}$ increment of 9 $\mu g/m^3$ was exceeded. Figure F.2-12 shows that these AERMOD receptors are located in complex terrain southwest of the facility as described in detail above. The CTSCREEN model was used as a refined terrain model, as per the Appendix W Guidelines, to assess these impact locations. The complex terrain areas were digitized and receptors placed as appropriate to determine maximum facility impacts in these complex terrain areas as described earlier.

Based on the CTSCREEN results, the maximum 24-hour $PM_{2.5}$ concentration from the Project was 3.68 $\mu g/m^3$. These CTSCREEN impacts are less than the maximum impacts predicted by AERMOD for areas outside the complex terrain area remodeled with CTSCREEN. Therefore, the maximum second-highest 24-hour PM2.5 AERMOD concentration of 7.74 $\mu g/m^3$ outside the CTSCREEN area is shown in Table 4.2-21. Because this modeled concentration from the Project is below the Class II 24-hour $PM_{2.5}$ increment (9 $\mu g/m^3$), the Project, by itself, will not cause or contribute to an exceedance of a PSD increment.[3]

4.7.5.16 AQRV Analysis

Two Class I areas are within 150 km of the proposed Project. Agua Tibia National Wilderness is located approximately 62 km north of the Project site. Additionally, San Jacinto Wilderness is located 103 km north east. Following the most recent FLAG Workshop procedures (June 2010), the use of the Screening Procedure (Q/D) to determine if the Project could opt (screen) out of an Air Quality Related Value (AQRV) assessment for visibility and deposition with CALPUFF was made. Following the screening procedures in FLAG, the emissions of NO_x, SO_x, $PM_{10/2.5}$, and H_2SO_4 (not emitted from the proposed plant) were summed after adjusting the emissions to reflect 8,760 hours of operation. The screening analysis is summarized below:

- $Q = sum(NO_x+PM_{10/2.5}+SOx+H_2SO_4)*(8760/4032) = 181.72$
- $D_{agua\ tibia} = 62$ km
- $D_{san\ jacinto} = 103$ km

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3 Note that, for the 24-hour NAAQS, Appendix W instructs that the highest, second-highest increase in estimated concentration must be less than or equal to the relevant increment. 40 CFR Pt. 51, App. W, § 10.2.3.3.a. Thus, comparison of the maximum modeled impact using CTSCREEN to the increment represents a conservative and protective approach.

- (Q/D) = 2.93 for Agua Tibia National Wilderness
- (Q/D) = 1.76 for San Jacinto Wilderness

If Q/D is less than 10, then no AQRV analysis is required. Based on the ratio of Q/D, both Class I areas are less than 10 and no further analysis of AQRV is required. The screening assessment does not apply to Class I increment or NAAQS, which was assessed above.

4.7.5.17 Deposition Analysis

A deposition analysis is not required pursuant to the AQRV analysis presented in Section 4.7.5.16.

4.7.5.18 Plume Blight Analysis

A plume blight analysis was conducted for surrounding Class II area for emissions from the proposed Project. The VISCREEN model (version 1.01) was used to conduct the plume blight analysis with a background visual range of 40 km, as recommended in the *Workbook for Plume Visual Impact Screening and Analysis* (EPA-450/4-88-015).

VISCREEN was developed to conduct visual effect evaluations of a plume as observed from a given vantage point located 10 km from the Project site. Emissions input into the model are assumed to create an infinitely long, straight plume, traveling toward the specified area. The model outputs the change in light extinction in terms of Delta E and contrast against both a terrain and sky background.

Table 4.7-28 contains the results of the Level 1 VISCREEN analysis for the surrounding Class II area. NO_x and PM emissions from the worst-case day were used for this analysis. SO_2 emissions are not required to be input because over the short distance and stable plume transport conditions typical of plume visual impact screening, secondary sulfate (SO_4) is not formed to a significant degree in plumes. Results of the VISCREEN analysis were compared to criteria provided in FLAG.

Table 4.7-28 Level 1 VISCREEN Analysis Results

Class II Area	Nearest Boarder	Furthest Boarder	Delta E				Contrast			
			Sky 10	Sky 140	Terrain 10	Terrain 140	Sky 10	Sky 140	Terrain 10	Terrain 140
Class II Visibility Analysis (inside Class II Area)	10	20	2.198	0.665	3.373	0.740	0.020	-0.018	0.039	0.027
Class II Visibility Analysis (outside Class II Area)	10	20	6.610	1.406	3.373	0.740	0.089	-0.056	0.133	0.093
Criteria[1]			2.00	2.00	2.00	2.00	0.05	0.05	0.05	0.05

Class II Area	Nearest Boarder	Furthest Boarder	Delta E				Contrast			
			Sky 10	Sky 140	Terrain 10	Terrain 140	Sky 10	Sky 140	Terrain 10	Terrain 140
Class II Visibility Analysis (inside Class II Area)	10	20	2.198	0.665	3.373	0.740	0.020	-0.018	0.039	0.027

Notes:

1 Criteria for Delta E and Contrast are the default criteria suggested by FLAG.

4.7.5.19 Soils and Vegetation

Impacts on soils, vegetation, and sensitive species were determined to be "insignificant" for the following reasons:

- No soils were identified in the Project area, which are recognized to have any known sensitivity to the types or amounts (ambient concentrations) of air pollutants expected to be emitted by the proposed plant. Soil classification was made using data from the National Resources Conservation Service (NRCS). The NRCS classified the soil on site as Diablo Clay (DaE), which makes up approximately 22 percent of the site, and Redding Cobbly Loam (RfF), which makes up the remaining 78 percent of the site. Project operations would not result in impacts to the soil from erosion or compaction. Routine vehicle traffic during Project operation would be limited to existing roads and plant operations areas, all of which will be paved. Impacts to soil resources from Project operational emissions would be less than significant. Support data for soils impacts can be found in Appendix J. In addition, Appendix K contains the geotechnical report for the Project site (including soils information).
- No vegetation or sensitive species were identified in the Project area, which are recognized to have any known sensitivity to the types or amounts (ambient concentrations) of air pollutants expected to be emitted by the proposed plant. Support data for biological and vegetation/soils impacts can be found in Sections 4.12 and 4.14, respectively. In addition, Appendix H contains support data for the analyses noted in the aforementioned sections.
- The plant emissions are expected to be in compliance with all applicable air quality rules and regulations.
- The plant impacts are not predicted to result in violations of existing air quality standards, nor will the emissions cause an exacerbation of an existing violation of any quality standard.

4.7.5.20 Growth Analysis

SDG&E provides electric service to approximately 1.3 million customers in San Diego County and the southern portion of Orange County. SDG&E also provides natural gas service to approximately 775,000 gas customers. The electric customer base comprises 89 percent residential and 11 percent commercial and industrial customers.

SDG&E's electric transmission network is comprised of 135 substations with 868 circuit miles of 69kV, 242 circuit miles of 138kV, 494 circuit miles of 230kV, and 283 miles of 500kV transmission lines. Local ("on system") generating resources are the Encina plant (connected into SDG&E's grid at 138kV and 230kV), Otay Mesa Energy Center, and the Palomar Energy Center (connected at 230kV) and a number of combustion turbine facilities located around the service area (connected at 69kV). Imported resources are received via the Miguel Substation as the delivery point for power flow on the Southwest Power Link, which is SDG&E's 500kV transmission line that runs from Arizona to San Diego along the United States/Mexico border, and via the SONGS 230kV switchyard (SDG&E 2011).

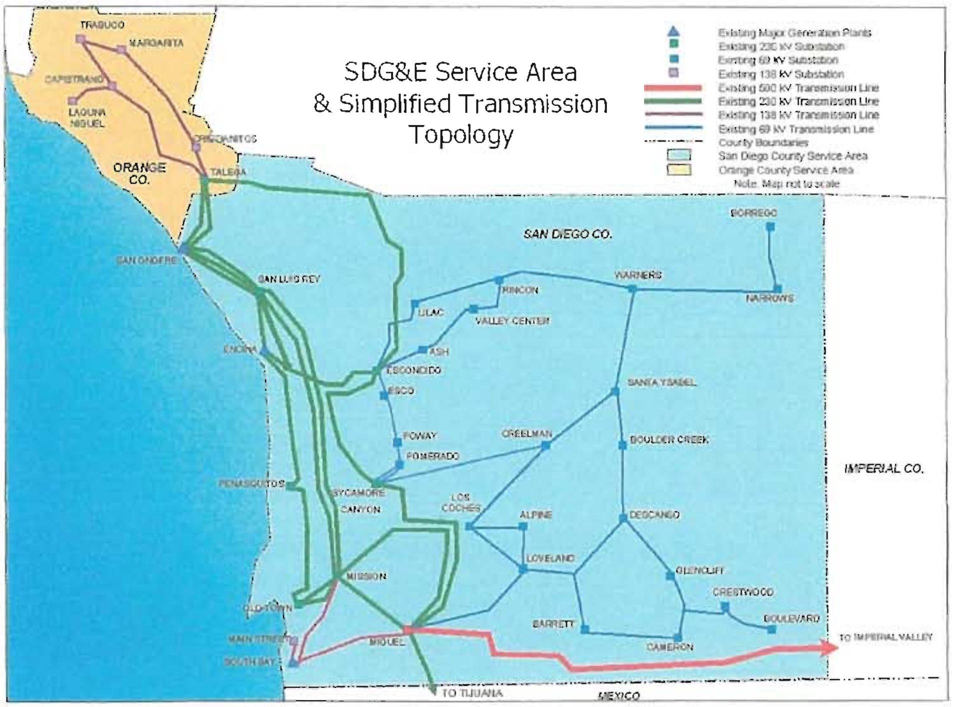
Figure 4.7-1 shows a simplified diagram of existing SDG&E's service area and the electric transmission topology in San Diego County and the southern portion of Orange County. Planned or approved transmission facilities for the future (if any) are not shown on this map.

The Project is being proposed and built in response to electricity demands within the SDG&E service area. These demands are clearly outlined in the *CEC-California Energy Demand 2008-2018 Staff Revised Forecast, CEC-200-2007-015-SF2, 11/07, Chapter 4,* which presents the historical and predicted electrical demands for the SDG&E service area (CEC 2007). Chapter 4 of the aforementioned report is present in Appendix F.10 (Miscellaneous Support Data). Based on the CEC demand analysis for future years, the Applicant concludes that the proposed Project is <u>not</u> a growth inducing project, but rather a response to both current and anticipated future electrical needs within the service area. In addition, the Applicant is not aware of any type of industrial or commercial facility that would be built in response to the construction or operation of the proposed Project.

Section 4.6 (Socioeconomic Analysis) presents data on the short- and long-term impacts of the proposed Project. Short-term impacts are related to construction activities which cover an approximate period of 18 months. Long-term impacts are associated with plant operations over the forecasted plant life of 30 years. More information on the electrical need and demand issues is presented in Section 2.5, Project Description.

Figure 4.7-1

SDG&E Service Area and Simplified Transmission Topology



4.7.6 Laws, Ordnances, Regulations, and Standards

Table 4.7-29 presents a summary of local, state, and federal LORS deemed applicable to the proposed modification.

Table 4.7-29 Applicable LORS for Air Quality

Regulation Citation	Compliance Strategy/Determination
Federal	
CAAA of 1990, 40 CFR 50	Plant operations will not cause violations of state or federal AAQS.
40 CFR 52.21	Project is subject to PSD due to GHG emissions under Tailoring Rule. Impact analysis demonstrates Project will not cause exceedance of NAAQS or increments; BACT analysis demonstrates Project will meet BACT for all PSD pollutants; PSD application has been filed with USEPA Region 9.
40 CFR 72-75	Title IV Acid Rain – requires Title IV permit and compliance with acid rain provisions. Each lean-burn engine at the plant is connected to a generator that is less than 25 MW. The engines combust clean fuels with sulfur contents less than or equal to 0.05 percent by weight, and the engines will commence commercial operations after 11-15-90. Engines are not subject to Title IV requirements per 40 CFR 72.7 definition of affected units. Title IV is not applicable to the plant. NO_x, CO, Opacity, and O2 CEMS will be installed, certified, operated, and maintained as required per SDAPCD rules and/or 40 CFR 60.

Regulation Citation	Compliance Strategy/Determination
40 CFR 60	Applicant will determine new source performance standard (NSPS) subpart applicability and comply with all emissions, monitoring, and reporting requirements. Potentially applicable subparts are: Subpart IIII, and Subpart JJJJ. Subpart IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. Plant fire pump engine (emergency fire pump) is a compression ignition engine. Engine will meet the USEPA Tier 3 requirements; engine also will meet State Air Toxics Control Measure (ATCM) requirements. Subpart JJJJ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines. Plant has lean-burn engines that are spark-ignited. Imposition of BACT as delineated in Appendix F.6 and compliance with the BACT emissions limits as stated in Table 4.7-10 will insure compliance with Subpart JJJJ.
40 CFR 70	Based on the current definitions in District Rule 1401 (a) and (b), the Applicant believes that the plant and emissions units are not currently subject to Title V for criteria pollutants or HAPs, but the plant will be subject to Title V based on GHG emissions, therefore a Title V application will be submitted within 12 months of the commencement of operations.
40 CFR 68	Applicant will evaluate substances and amounts stored, determine applicability, and comply with all program level requirements. Urea is the only identified substance potentially subject to RMP provisions at this time. See Sections 4.8 and 4.9.
40 CFR 63	Applicant will determine NESHAPs subpart applicability and comply with all emissions, monitoring, and reporting requirements. Subpart ZZZZ: National Emission Standards for HAPs for Stationary Reciprocating Internal Combustion Engines (RICE). Plant lean-burn engines are each greater than 500 hp. Plant is not a major source of HAPs; individual HAPs less than 10 tpy and total HAPs less than 25 tpy. An affected source that is a new or reconstructed stationary RICE located at an area source must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart JJJJ. No further requirements apply for such engines under this part. (§ 63.6590(c)). Subpart is not applicable.
State	
CHSC 44300 et seq. (AB 2588)	Applicant will determine applicability, and prepare inventory plans and reports as required. SDAPCD will determine submittal schedules.
CHSC 41700	SDAPCD Authority to Construct (ATC) will ensure that no public nuisance results from operation of plant.
Local SDAPCD Regulations	
Rule 10 and Rule 14 – Permits Required	This application and the enclosed district permit forms constitute compliance with these rules. See Appendix F.9.
Rule 11 – Exemptions from Permits	The proposed power cycle and fire pump engines are not exempt from the permitting requirements of Rules 10 and 14, but the proposed fuel gas and warm start heaters are exempt from District permitting requirements.
Rule 50 and Rule 50.1 – SDAPCD/NSPS/NESHAPs Visible Emissions	The proposed Project will comply with all applicable SDAPCD/NSPS/NESHAPs visible emissions limitations.
Rule 51 – Nuisance	The proposed Project is not expected to create any type of public nuisance.
Rule 52 – Particulate Matter	PM emissions from the combustion of natural gas in the proposed engines are not expected to exceed 0.10 grains per standard cubic feet (gr/scf). The proposed Project engines are exempt from this rule. See Appendix F.1.

Regulation Citation	Compliance Strategy/Determination
Rule 52.1 – NSPS/NESHAPs PM	The proposed Project will comply with all NSPS/NESHAPs PM limitations.
Rule 53 – Specific Air Contaminants	Applicable provisions in (d)(1) and (2) are complied with through the use of natural gas fuels. This rule does not apply to liquid fueled engines. See Table 4.7-2.
Rule 53.2 – NSPS/NESHAPs Specific Contaminants	The proposed Project will comply with all NSPS/NESHAPs specific contaminant limitations.
Rule 54 – Dust and Fumes	Not applicable to fuel combustion sources.
Rule 54.1 – NSPS/NESHAPs Dust and Fumes	The proposed Project will comply with all NSPS/NESHAPs dust and fume limitations.
Rule 55 – Fugitive Dust Control	The Applicant will comply with all provisions of this rule during construction and subsequent operations. See Appendix F.5.
Rule 60 - Circumvention	The Applicant is not proposing an action in this application which could be construed as circumvention.
Rule 62 – Sulfur Content of Fuels	Use of natural gas fuels will insure compliance with the rule limits. Use of liquid fuels meeting the sulfur requirements of this rule will insure compliance. See Tables 4.7-2 and 4.7-3.
Rule 62.1 – NSPS/NESHAPs Fuel Sulfur	Use of natural gas fuels will insure compliance with all applicable NSPS/NESHAPs rule limits. See Table 4.7-2.
Rule 68 – NO_x Limits/Fuel Burning	Use of natural gas fuels and BACT will insure compliance with all applicable NO_x limits. See Appendices F.1 and F.6.
Rule 68 and 68.1 – SDAPCD/NSPS/NESHAPs NO_x Limits	Use of natural gas fuels and BACT will insure compliance with all applicable SDAPCD/NSPS/NESHAPs rule NO_x limits. See Appendices F.1 and F.6.
Rule 69.4 – IC Engines RACT	The new IC engines will comply with all rule provisions and USEPA/CARB tier standards. Rule only applicable to NO_x from affected engines at major sources. Not applicable to emergency use engines such as the proposed fire pump engine.
Rule 69.4.1 – IC Engine BARCT	The new IC engines will comply with all rule provisions and USEPA/CARB tier standards. Not applicable to emergency use engines such as the proposed fire pump engine.
Rules 20.1-20.3 – NSR	This application and support documentation demonstrates compliance with all applicable requirements of SDAPCD's New Source Review (NSR) program.
Rule 20.5 – Power Plants	This application constitutes the equivalent of an application for Authority to Construct per Rule 20.5 and will trigger SDAPCD's commencement of Determination of Compliance (DoC) review process. Upon CEC's issuance of license and confirmation that Project is complying with conditions of license and DoC, SDAPCD will then issue Permit to Operate.
Rule 1200 – Toxics NSR	Plant risk pursuant to the HRA does not exceed any SDAPCD significance thresholds. See Section 4.8, and Appendix F.4.
Rule 1210 – HRA Public Notice	Plant risks are below the public notice threshold values. See Section 4.8 and Appendix F.4.
Regulation XIV – Title V	Based on the current definitions in District Rule 1401 (a) and (b), the Applicant believes that the plant and emissions units are not currently subject to Title V for criteria pollutants or HAPs, but the plant will be subject to Title V based on GHG emissions, therefore a Title V application will be submitted within 12 months of the commencement of operations.
Regulation XV - Conformity	Construction emissions are well below the conformity thresholds for nonattainment pollutants (and precursors). Plant operational emissions are exempt from a conformity determination due to applicability of NSR and PSD.

4.7.7 Agencies, Agency Contacts, and Jurisdiction

Table 4.7-30 presents data on the following: (1) air quality agencies that may or will exercise jurisdiction over air quality issues resulting from the proposed power plant, (2) the most appropriate agency contact for the proposed Project, (3) contact address and phone information, and (4) the agency involvement in required permits or approvals.

Table 4.7-30 Agencies, Contacts, Jurisdictional Involvement, and Required Permits for Air Quality

Agency	Contact	Phone	Email	Mailing Address	Jurisdictional Area	Permit Status
California Energy Commission	Eric Solorio, Project Manager	(916) 651-0966	Esolorio @energy.state.ca.us	1516 Ninth Street Sacramento, CA 95814	Primary reviewing and certification agency.	Will certify the proposed Project under the energy siting regulations and CEQA. Certification will contain a variety of conditions pertaining to emissions and operation.
California Energy Commission	Gerald R. Bemis, CEC Staff Analyst	(916) 654-4960	Gbemis @energy.state.ca.us	1516 Ninth Street Sacramento, CA 95814	Primary reviewing and certification agency.	Will certify the proposed Project under the energy siting regulations and CEQA. Certification will contain a variety of conditions pertaining to emissions and operation.
San Diego Air Pollution Control District	Tom Weeks, Chief, Engineering Division	(858) 586-2715	tom.weeks @sdcounty.ca.gov	10124 Old Grove Road. San Diego, CA 92131	Prepares Determination of Compliance (DoC) for CEC; upon CEC issuance of license and confirmation that Project compliance with license and DOC, issues SDAPCD Permit to Operate; primary air regulatory and enforcement agency.	DoC will be prepared subsequent to AFC submittal. Although AFC considered to be equivalent of application for Authority to Construct (ATC) per Rule 20.5, separate ATC application submitted to SDAPCD concurrent with AFC.
California Air Resources Board	Mike Tollstrup, Chief, Project Assessment Branch	(916) 322-6026	Mtollstr @arb.ca.gov	1001 I Street, 6th Floor Sacramento, CA 95814	Provides guidance on SDAPCD implementation of its stationary source permitting and enforcement program.	CARB staff may provide comments on applicable AFC sections affecting air quality and public health. CARB staff will also have opportunity to comment on preliminary DoC.

Agency	Contact	Phone	Email	Mailing Address	Jurisdictional Area	Permit Status
Environmental Protection Agency, Region IX	Gerardo Rios, Chief, Permits Section USEPA-Region 9	(415) 972-3974	rios.gerardo @epa.gov	75 Hawthorne Street San Francisco, CA 94105	Oversight of SDAPCD NSR permitting program and rules approved as part of California State Implementation Plan (SIP); PSD permitting authority.	USEPA Region 9 staff will receive a copy of the AFC and DoC. USEPA Region 9 will process and issue the required PSD permit.

4.7.8 Required Permits and Permitting Schedules

Although SDAPCD rules otherwise require an applicant to obtain an Authority to Construct prior to construction of any emissions source (*see* SDAPCD Rule 10(a)), State law provides that the CEC's issuance of license shall be in lieu of any permit or similar document required by any other state or local agency (Cal. Health & Saf. Code § 25500). Accordingly, SDAPCD Rule 20.5(d) provides that, for power plants subject to the CEC's jurisdiction, the Air Pollution Control Officer shall consider the AFC to be equivalent to an application for an Authority to Construct during the Determination of Compliance review, and shall apply all provisions of the District rules and regulations which apply to applications for an Authority to Construct. SDAPCD Rule 20.5(i) provides that, upon CEC's issuance of license and confirmation that the source complies with all license and Determination of Compliance conditions, the source shall be issued a Permit to Operate. In addition, a PSD application will be filed with USEPA Region 9 concurrent with submittal of the AFC to the CEC. The SDAPCD and PSD permit applications will consist of a complete copy of the AFC, required agency application forms, and any support analyses required as identified prior to submittal.

The San Diego SDAPCD permitting application forms are presented in Appendix F.9.

4.7.9 References

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Replacement Pages for Revised

AFC Public Health Section 4.8

Replacement Pages 4.8-9 through 4.8-11, and 4.8-13

4.8.2.5 Characterization of Risks from Toxic Air Pollutants

The excess lifetime cancer risk associated with concentrations in air estimated for the power plant MIR location is estimated to be 1.34 x 10^{-6} (1.34 per one million). Excess lifetime cancer risks less than 1 x 10^{-6} are unlikely to represent significant public health impacts that require additional controls of plant emissions. Risks higher than 1 x 10^{-6} may or may not be of concern, depending upon several factors. These include the conservatism of assumptions used in risk estimation, size of the potentially exposed population, and toxicity of the risk-driving chemicals. Health effects risk thresholds are listed on Table 4.8-7. Risks associated with pollutants potentially emitted from the plant are presented in Table 4.8-8. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in Appendix F.4. As described previously, human health risks associated with emissions from the proposed power plant are unlikely to be higher at any other location than at the location of the MIR. If there is no significant impact associated with concentrations in air at the MIR location, it is unlikely that there would be significant impacts in any other location in the vicinity of the plant.

The MIR location data is as follows: (Hotspots Analysis and Reporting Program [HARP] PMI Summary file)

- Receptor # : 4375
- UTM Coordinates: 495300mE, 3633800mN
- Type of Receptor: Grid (non-sensitive)

The noted receptor does not lie in an area that is precluded from being used as the MIR because it is possible that someone could be at or near the fence line. As such, the noted receptor was used as the basis for the upper bound health risks associated with the plant emissions.

Table 4.8-7 Health Effects Significant Threshold Levels

	Significance Thresholds	
Risk Category	**SDAPCD**	**State of California**
Cancer Risk per million	<= 1.0 without T-BACT <= 10.0 with T-BACT	<= 1.0 without T-BACT <= 10.0 with T-BACT
Acute Hazard Index	1.0	1.0
Chronic Hazard Index	1.0	1.0
Cancer Burden	1.0	1.0

Notes: T-BACT = best available control technology for air toxic compounds

Table 4.8-8 Project Health Risk Assessment Summary

Plant Total (All Processes)		
Risk Category	**Plant Values**	**Applicable Significance Threshold**
Cancer Risk (at MIR)	1.34E-06	<= 10.0 with T-BACT
Chronic Hazard Index (at MIR)	0.00938	1.0
Acute Hazard Index (at MIR)	0.0802	1.0
Acute Hazard Index (at Acute MIR)	0.164	1.0
Cancer Burden	0.0	1.0

Notes: No acute REL has been established for diesel PM.
Acute Hazard Index at the Acute MIR may differ from the Acute Hazard Index at the Cancer MIR.

Cancer risks potentially associated with plant emissions also were assessed in terms of cancer burden. Cancer burden is defined as the hypothetical upper-bound estimate of the additional number of cancer cases that could be associated with emissions from the Project. The commonly defined zone used to estimate cancer burden is the area within the isopleth surrounding the plant where receptors have a multi-pathway cancer risk equal to or greater than 1.0×10^{-6}. Cancer burden is a hypothetical upper-bound estimate of the additional number of cancer cases that could be associated with emissions from the plant. Cancer burden is calculated as the worst-case product of the 1.0×10^{-6} excess lifetime cancer risk and the number of individuals at that risk level. A worst-case estimate of cancer burden was calculated based on the following assumptions.

The 1.0×10^{-6} cancer risk was applied to all affected portions of identified census tracts within the radius area defined by the distance to the highest 1.0×10^{-6} concentration. A detailed listing and map of affected census tracts and population estimates are provided in Appendix F.4. Figures presented in Appendix F.4 show the 6-mile radius plot in relationship to the census tract locations and site. This procedure results in a conservatively high estimate of cancer burden. The calculated cancer burden for the Project is essentially zero.

As described previously, human health risks associated with emissions from the proposed power plant are unlikely to be higher at any other location than at the location of the MIR. Therefore, the risks for all of these individuals would be lower (and in most cases, substantially lower) than 1.34×10^{-6}. The estimated cancer burden was zero, indicating that emissions from the plant would not be associated with any increase in cancer cases in the previously defined population. In addition, the cancer burden is less than the Rule 1200 threshold value of 1.0. As stated previously, the methods used in this calculation considerably overstate the potential cancer burden, further suggesting that plant emissions are unlikely to represent a significant public health impact in terms of cancer risk.

The acute non-cancer hazard quotient associated with concentrations in air is shown in Table 4.8-8. The acute non-cancer hazard quotients for all target organs fall below 1.0. As described previously, a hazard quotient less than 1.0 is unlikely to represent significant impact to public health. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in Appendix F.4. As described previously, human health risks associated with emissions from the proposed plant are unlikely to be higher at any other location than at the location of the MIR. If there is no significant impact associated with concentrations in air at the MIR location, it is unlikely that there would be significant impacts in any other location in the vicinity of the plant.

Detailed risk and hazard values are provided in the HARP output presented in Health Risk Assessment CD (Appendix F.4).

The estimates of excess lifetime cancer risks and non-cancer risks associated with chronic or acute exposures fall below thresholds used for regulating emissions of toxic pollutants to the air. Historically, exposure to any level of a carcinogen has been considered to have a finite risk of inducing cancer. In other words, there is no threshold for carcinogenicity. Since risks at low levels of exposure cannot be quantified directly by either animal or epidemiological studies, mathematical models have estimated such risks by extrapolation from high to low doses. This modeling procedure is designed to provide a conservatively high estimate of cancer risks based on the most sensitive species of laboratory animal for extrapolation to humans (i.e., the assumption being that humans are as sensitive as the most sensitive animal species). Therefore, the true risk is not likely to be higher than risks estimated using unit risk factors and is most likely lower, and could even be zero.

An excess lifetime cancer risk of 1×10^{-6} is typically used as a screening threshold of significance for potential exposure to carcinogenic substances in air. The excess cancer risk level of 1×10^{-6}, which has historically been judged to be an acceptable risk, originates from efforts by the Food and Drug Administration to use quantitative risk assessment for regulating carcinogens in food additives in light of the zero tolerance provision of the Delany Amendment (Hutt 1985). The associated dose, known as a "virtually safe dose" has become a standard used by many policy makers and the lay public for evaluating cancer risks. However, a study of regulatory actions pertaining to carcinogens found that an acceptable risk level can often be determined on a case-by-case basis. This analysis of 132 regulatory decisions, found that regulatory action was not taken to control estimated risks below 1×10^{-6} (one-in-one million), which are called de minimis risks. De minimis risks are historically considered risks of no regulatory concern. Chemical exposures with risks above 4×10^{-3} (four-in-ten thousand), called de manifestis risks, were consistently regulated. De manifestis risks are typically risks of regulatory concern. The risks falling between these two extremes were regulated in some cases, but not in others (Travis et al 1987).

The estimated lifetime cancer risks to the maximally exposed individual located at the Project MIR are well below the 10×10^{-6} significance level (for sources equipped with T-BACT), and the aggregated cancer burden associated this risk level is less than 1.0 excess cancer case. In addition, the cancer burden is less than the Rule 1200 threshold value of 1.0. These risk estimates were calculated using assumptions that are highly health conservative. Evaluation of the risks associated with the power plant emissions should consider that the conservatism in the assumptions and methods used in risk estimation considerably overstate the risks from plant emissions. Based on the results of this risk assessment, there are no significant public health impacts anticipated from operational emissions of toxic pollutant to the air from the proposed power plant. A screening risk calculation for construction impacts, based upon emissions of diesel particulate, and the inhalation pathway is presented in Appendix F.4, Table F.4-8. (SCAQMD 2005).

standards established to protect public health, including the more sensitive members of the population.

4.8.3 Cumulative Impacts

The health risk assessment for the proposed Project indicates that the maximum cancer risk will be approximately 1.34 x 10^{-6} (or 1.34 in a million), versus a significance threshold of 10.0 x 10^{-6} (or 10 in one million) with T-BACT at the point of maximum exposure to air toxics from power plant emissions. This risk level is considered to be insignificant. Non-cancer chronic and acute effects will also be less than significant, i.e., Hazard Indices are less than 1. Risks below these cancer and non-cancer impact thresholds are considered de minimis. Therefore, the risk that impacts from the Project will result in a significant impact, in combination with impacts from other past, present, and reasonably foreseeable future projects, should also be very low. Existing projects are considered as air pollutant emitters in the background data that is used in health risk modeling for the air toxics risk assessment.

For the purpose of the public health cumulative analysis must also consider whether emissions from operation of the Project could potentially combine with emissions from past, present, and reasonably foreseeable projects to result in adverse health effects to the public. Cumulative impacts in the area of public health could occur if emission sources are close enough so that their plumes combine. Due to differences in emission source elevations, terrain features, wind direction, and other meteorological factors, it is unlikely that emission plumes from two or more facilities would combine unless they are located in very close proximity. Furthermore, dispersion of plumes tends to occur in parallel, preventing the mixing of plumes from separate locations. On the basis of numerous previous air dispersion modeling studies conducted by CEC staff to assess public health cumulative impacts, it has been shown repeatedly that unless two sources are within approximately 0.5 miles of each other, their cumulative health risks do not combine to turn an insignificant individual health risk into a significant one.

Only one AB2588 reporting source was noted within the 0.5 mile radius of the proposed site, i.e., the Sycamore Landfill. Toxics emitting sources at the landfill are primarily from the combustion of landfill gas in the small power plant (~4MW), the landfill gas flares, and fugitive evaporative emissions of organics from the landfill surface. Appendix F.4 contains a listing of the most recent emissions levels for the substances identified under AB2588. It is highly unlikely that these substances and the levels at which they are emitted from the landfill sources would combine with Project emissions to produce a cumulative health risk impact.

No other significant stationary sources of air toxic emissions were identified within this half-mile radius area, and as such, no cumulative impacts with respect to health impacts are expected to occur.

4.8.4 Mitigation Measures

4.8.4.1 Criteria Pollutants

Emissions of criteria pollutants will be minimized by applying BACT to the plant. BACT for the primary combustion sources (Wartsila engines, fuel gas heater, and warm start heaters) includes the combustion of natural gas.

Replacement Pages for AFC Appendix F.2

Revised Tables and Figures

APPENDIX F.2

Modeling Support Data

Tables presented in this Appendix are as follows:

In addition, this appendix contains the following figures:

Modeling input/output files are included in the enclosed CD's.

Table F.2.1 Building, Structure and Stack Dimensions

Structure ID	Height, ft (agl)	Length, ft.	Width, ft,	Diameter, ft.
Engine Hall	24 @ eave 29.58 @ crest	361	68.5	-
Urea Tank	22	-	-	13
Used Oil Tank	20	-	-	10
New Oil Tank	20	-	-	10
Potable Water Tank	20	-	-	10
Fire Water Tank	30	-	-	60
Maintenance Oil Tank	16	-	-	8
Radiator Set 1	18	85	43.75	-
Radiator Set 2	18	100	43.75	
SCR/CO Catalyst Housing	25	20	10	-
Stack Data				
Stack ID	**Height, ft (agl)**	**Diameter, ft.**	**~Temperature**	**~ACFM**
Wartsila Engines (11)	70	4	730-831	62400
Fuel Heater	30	2	1015	2243
Warm Start Heater	30	2	1015	2243
Fire Pump ICE	30	0.33	1040	740

Data derived from Figures F.2-2 and F.2-3.

Table F.2-2 Quail Brush AERMOD Engine Screening Results (w/ All 11 Engines) - CLUSTERED (6/5) STACK LOCATIONS AT NEW SITE LOCATION

Regular 20/50/100/200-meter Receptor Grids and 10m Fenceline Receptors - 465' (141.732m) Stack Base Elevation

70' Stack Heights

Case	A	B	C	D	E	Annual F	G	H	I	J	K	L	M	N	O	P
Load	50	75	100	50	75	100	50	75	100	50	75	100	50	75	100	100
Output kW	4646	6998	9341	4646	6998	9341	4646	6998	9341	4646	6998	9341	4646	6998	9184	9341
Ambient Temp, °F	35	35	35	64	64	64	70	70	70	81	81	81	95	95	95	95
Stack Exit Temp (deg.F)	831	822	741	825	816	735	824	815	734	822	813	732	819	810	731	730
Volumetric Flowrate ACFM	36,660	49,200	61,920	36,580	49,159	61,865	36,540	49,140	61,800	36,540	49,140	61,980	36,600	49,380	61,380	62,400
Stack Inside Diameter (ft)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Stack Height (m)	21.336	21.336	21.336	21.336	21.336	21.336	21.336	21.336	21.336	21.336	21.336	21.336	21.336	21.336	21.336	21.336
Stack Exit Temp (deg.K)	717.039	712.039	667.039	713.706	708.706	663.706	713.150	708.150	663.150	712.039	707.039	662.039	710.372	705.372	661.483	660.928
Stack Exit Velocity (m/s)	14.820	19.889	25.031	14.788	19.873	25.009	14.771	19.865	24.983	14.771	19.865	25.056	14.796	19.962	24.813	25.225
Stack Inside Diameter (m)	1.2192	1.2192	1.2192	1.2192	1.2192	1.2192	1.2192	1.2192	1.2192	1.2192	1.2192	1.2192	1.2192	1.2192	1.2192	1.2192
Normal Operations - Short-term Emissions (lb/hr/stack)																
NOx (lb/hr/engine)	0.922	1.111	1.318	0.922	1.111	1.318	0.922	1.111	1.318	0.922	1.111	1.318	0.922	1.111	1.296	1.318
CO (lb/hr/engine)	1.495	1.481	1.565	1.495	1.481	1.565	1.495	1.481	1.565	1.495	1.481	1.565	1.495	1.481	1.539	1.565
SO2 (lb/hr/engine)	0.128	0.192	0.256	0.128	0.192	0.256	0.128	0.192	0.256	0.128	0.192	0.256	0.128	0.192	0.256	0.256
PM10 (lb/hr/engine)	1.362	1.373	1.380	1.362	1.373	1.380	1.362	1.373	1.380	1.362	1.373	1.380	1.362	1.373	1.357	1.380
Normal Operations - Unitized Impacts (ug/m3 for 1.0 g/s/engine)																
1-Hr Unitized Conc (ug/m3)	1152.59067	797.05017	611.09401	1159.49474	801.60972	613.06405	1161.74899	802.74911	613.79036	1163.15729	804.00346	613.14046	1163.10109	800.40924	620.75061	610.91693
X(m)	497620.0	497640.0	497880.0	497620.0	497640.0	497880.0	497620.0	497640.0	497880.0	497620.0	497640.0	497880.0	497620.0	497640.0	497640.0	497880.0
Y(m)	3634940.0	3634960.0	3635100.0	3634940.0	3634960.0	3635100.0	3634940.0	3634960.0	3635100.0	3634940.0	3634960.0	3635100.0	3634940.0	3634960.0	3634960.0	3635100.0
Z(m)	207.9	209.8	222.9	207.9	209.8	222.9	207.9	209.8	222.9	207.9	209.8	222.9	207.9	209.8	209.8	222.9
YYMMDDHH	03081922	03081922	03081922	03081922	03081922	03081922	03081922	03081922	03081922	03081922	03081922	03081922	03081922	03081922	03081922	03081922
3-Hr Unitized Conc (ug/m3)	407.10657	334.47723	294.66608	408.70004	335.37925	295.63715	409.21955	335.60286	295.99600	409.54247	335.84482	295.66283	409.52666	335.11646	297.74697	294.52997
X(m)	497580.0	497880.0	497860.0	497580.0	497880.0	497860.0	497580.0	497880.0	497860.0	497580.0	497880.0	497860.0	497580.0	497880.0	497860.0	497860.0
Y(m)	3635260.0	3635120.0	3635140.0	3635260.0	3635120.0	3635140.0	3635260.0	3635120.0	3635140.0	3635260.0	3635120.0	3635140.0	3635260.0	3635120.0	3635140.0	3635140.0
Z(m)	211.7	231.8	236.2	211.7	231.8	236.2	211.7	231.8	236.2	211.7	231.8	236.2	211.7	231.8	236.2	236.2
YYMMDDHH	03090821	03032603	03032603	03090821	03032603	03032603	03090821	03032603	03032603	03090821	03032603	03032603	03090821	03032603	03032603	03032603
8-Hr Unitized Conc (ug/m3)	243.88769	221.24625	196.78974	244.03947	221.69440	197.43850	244.08764	221.80726	197.68576	244.11587	221.92783	197.44484	244.11171	221.54427	198.93133	196.65592
X(m)	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0
Y(m)	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0
Z(m)	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6
YYMMDDHH	04122608	04122608	04122608	04122608	04122608	04122608	04122608	04122608	04122608	04122608	04122608	04122608	04122608	04122608	04122608	04122608
24-Hr Unitized Conc (ug/m3)	114.07416	103.57225	92.18145	114.14346	103.78165	92.48529	114.16541	103.83434	92.60088	114.17829	103.89072	92.48883	114.17648	103.71247	93.18264	92.12106
X(m)	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0	495300.0
Y(m)	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0	3633800.0
Z(m)	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6
YYMMDDHH	04122624	04122624	04122624	04122624	04122624	04122624	04122624	04122624	04122624	04122624	04122624	04122624	04122624	04122624	04122624	04122624
Normal Operations - Short-term Screening Emissions (g/s/engine)																
NOx (g/s/engine)	0.1162	0.1400	0.1661	0.1162	0.1400	0.1661	0.1162	0.1400	0.1661	0.1162	0.1400	0.1661	0.1162	0.1400	0.1633	0.1661
CO (g/s/engine)	0.1884	0.1866	0.1972	0.1884	0.1866	0.1972	0.1884	0.1866	0.1972	0.1884	0.1866	0.1972	0.1884	0.1866	0.1939	0.1972
SO2 (g/s/engine)	0.0161	0.0242	0.0323	0.0161	0.0242	0.0323	0.0161	0.0242	0.0323	0.0161	0.0242	0.0323	0.0161	0.0242	0.0323	0.0323
PM10 (g/s/engine)	0.1716	0.1730	0.1739	0.1716	0.1730	0.1739	0.1716	0.1730	0.1739	0.1716	0.1730	0.1739	0.1716	0.1730	0.1710	0.1739
Normal Operations - Short-term Screening Impacts (ug/m3)																
1-Hour NOx (ug/m3)	133.931	111.587	101.503	134.733	112.225	101.830	134.995	112.385	101.951	135.159	112.560	101.843	135.152	112.057	101.369	101.473
1-Hour CO (ug/m3)	217.148	148.730	120.508	218.449	149.580	120.896	218.874	149.793	121.039	219.139	150.027	120.911	219.128	149.356	120.364	120.473
8-Hour CO (ug/m3)	45.948	41.285	38.807	45.977	41.368	38.935	45.986	41.389	38.984	45.991	41.412	38.936	45.991	41.340	38.573	38.781
1-Hour SO2 (ug/m3)	18.557	19.289	19.738	18.668	19.399	19.802	18.704	19.427	19.825	18.727	19.457	19.804	18.726	19.370	20.050	19.733
3-Hour SO2 (ug/m3)	6.554	8.094	9.518	6.580	8.116	9.549	6.588	8.122	9.561	6.594	8.127	9.550	6.593	8.110	9.617	9.513
24-Hour SO2 (ug/m3)	1.837	2.506	2.977	1.838	2.512	2.987	1.838	2.513	2.991	1.838	2.514	2.987	1.838	2.510	3.010	2.976
24-Hour PM10 (ug/m3)	19.575	17.918	16.030	19.587	17.954	16.083	19.5908	17.963	16.103	19.593	17.973	16.084	19.593	17.942	15.934	16.020
	Normal Ops - Annual Emissions (g/s/stack)						Startup/Shutdown Operations - Short-term Emissions (g/s/stack) - 100% Load									
				Unitized (g/s/eng)		1.0000	1-Hour NOx (g/s/eng)		1.19574							
				Annual NOx (g/s/eng)		0.1147	1-Hour CO (g/s/eng)		1.69344							
				Ambient Ratio Method		75%	1-Hour SO2 (g/s/eng)								0.04284	
				Annual SO2 (g/s/eng)		0.0150	3-Hour SO2 (g/s/eng)								0.03343	
				Annual PM (g/s/eng)		0.0862	8-Hour CO (g/s/eng)		0.39989							
	Normal Ops - Annual Screening Impacts (ug/m3)						Startup/Shutdown Operations - Short-term Screening Impacts (ug/m3) - 100% Load									
			14.50907	Unitized (ug/m3)		14.50907	1-Hour NOx (ug/m3)		733.934							
			495300.0	Annual NOx (ug/m3)		1.6642	1-Hour CO (ug/m3)		1039.417							
			3633800.0	Annual NO2 (ug/m3)		1.2481	1-Hour SO2 (ug/m3)								26.593	
			244.6	Annual SO2 (ug/m3)		0.2176	3-Hour SO2 (ug/m3)								9.954	
			06123124	Annual PM (ug/m3)		1.2507	8-Hour CO (ug/m3)		79.053							

Worst-Case Operating Scenarios are bolded.

Table F.2-3

Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		National Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone (O_3)	1 Hour	0.09 ppm (180 μg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 μg/m^3)		0.075 ppm (147 μg/m^3)		
Respirable Particulate Matter (PM10)	24 Hour	50 μg/m^3	Gravimetric or Beta Attenuation	150 μg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 μg/m^3		—		
Fine Particulate Matter (PM2.5)	24 Hour	—	—	35 μg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 μg/m^3	Gravimetric or Beta Attenuation	15 μg/m^3		
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[8]	1 Hour	0.18 ppm (339 μg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 μg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 μg/m3)		0.053 ppm (100 μg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[9]	1 Hour	0.25 ppm (655 μg/m^3)	Ultraviolet Fluorescence	75 ppb (196 μg/m^3)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 μg/m^3)	
	24 Hour	0.04 ppm (105 μg/m^3)		0.14 ppm (for certain areas)[9]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[9]	—	
Lead[10,11]	30 Day Average	1.5 μg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 μg/m^3 (for certain areas)[11]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 μg/m^3		
Visibility Reducing Particles[12]	8 Hour	See footnote 12	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 μg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 μg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[10]	24 Hour	0.01 ppm (26 μg/m^3)	Gas Chromatography			

See footnotes on next page ...

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.

8. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

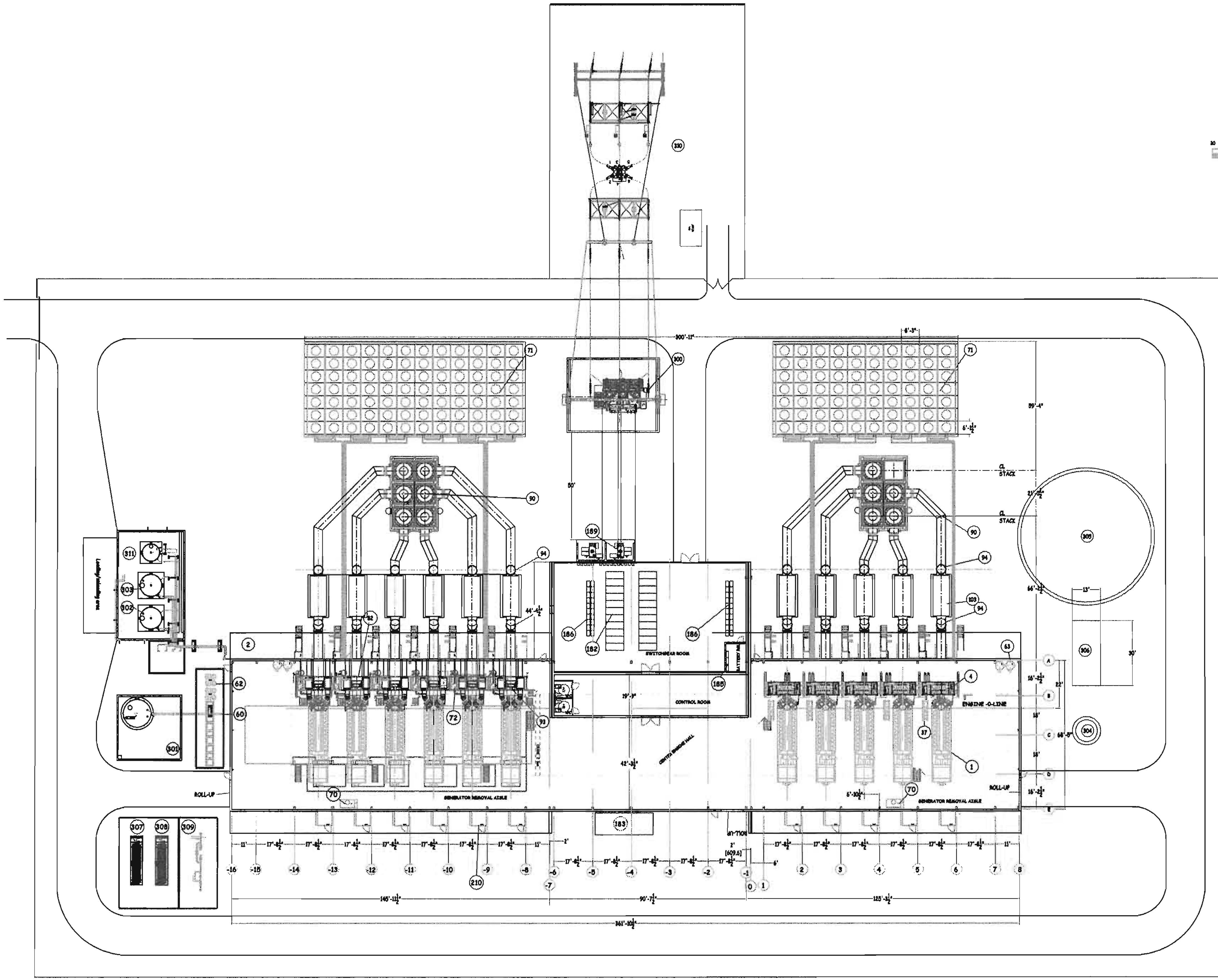
9. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

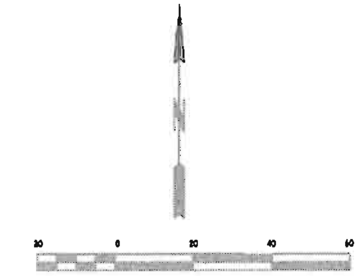
   Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

10. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

11. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

12. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.





ENGINE HALL & UTILITY BLOCK					
Item No	Pcs.	DESCRIPTION	DESCRIPTION Dia.	Ht.	Cap. (G)
1	11	Engine generator set			
2	1	Engine Hall	-	24'	
4	11	Auxiliary module including:			
		- HT thermostatic valve			
		- LT thermostatic valve			
		- Preheating unit			
37	11	Gas regulating unit			
60	2	Working air unit			
62	2	Starting air unit			
63	10	Starting air bottle 3m3/790 gal			
70	3	Maintenance water tank 4m3/1060gal			
71	2	Radiator Sets		18' H	
72	11	Expansion vessel (Jacket Water) 600l/160gal			
80	22	Charge air filter			
82	11	Charge air & exhaust gas module			
90	11	Exhaust gas Stack	4' Ø	70' H	
93	11	Exhaust gas ventilation unit			
94	22	Rupture disc			
103	11	DeNox (SCR)/Oxidation catalyst		25' H	
140	1	Oily water collecting pit			
182	-	MV Switchgear			
183	1	Neutral point cubicle			
185	4	DC-system			
186	-	LV switchgear			
189	2	Station transformer			
210	11	Ventilation unit (enginehall)			
300	1	Main Step-Up Transformer		30' H	
301	1	UreaTank	13' Ø	22' H	20,000
302	1	Used Oil Tank	10' Ø	20' H	10,000
303	1	New Oil Tank	10' Ø	20' H	10,000
304	1	Potable Water Tank	10' Ø	20' H	10,000
305	1	Fire Water Tank	60' Ø	30' H	600,000
306	1	Fire Water Pumphouse		11' H	
307	1	Warm Start Gas Heater		21' H	
308	1	Cold Start Gas Heater		21' H	
309	1	Natural Gas Metering Station		6' H	
310	1	Facility 230kV Switchyard		82' H Mast	
311	1	Maintenance Oil Tank	8' Ø	16' H	6,000

Figure F.2-1
Facility Plot Plan

Rev No	Revision	Date	Dwn	Chkd	Approved Chief Engr
A	Initial Issue				
B	Engineering Review and Comments 6/14/11				
C	3rd set of Radiators per Engines Added 7/11/11				
D	Revised back to 2 sets of Radiators 01/20/12				
E	Revised Exhaust Pipe Arrangement & Radiator Supply/Return 3/19/12				

Drawing Control				
Purpose	Approved By	Date	Released By	Date
For Information				
For Comment				
For Bid				
For Construction				

Engineering Review		
Disc	Engr	Date
Mech		
Elec		
Civil		
Arch		
I & C		
Dwn HPK	Chkd	SI
Reviewed By		
Mgr – Drafting & Design		

Cogentrix

Quail Brush
Master Layout Plan

App'd for Construction	Date 3/9/11	Work Order	Drawing No.	Rev
Chief Engineer	Scale		QB-SP-2	E

Figure F.2-2
Site Layout

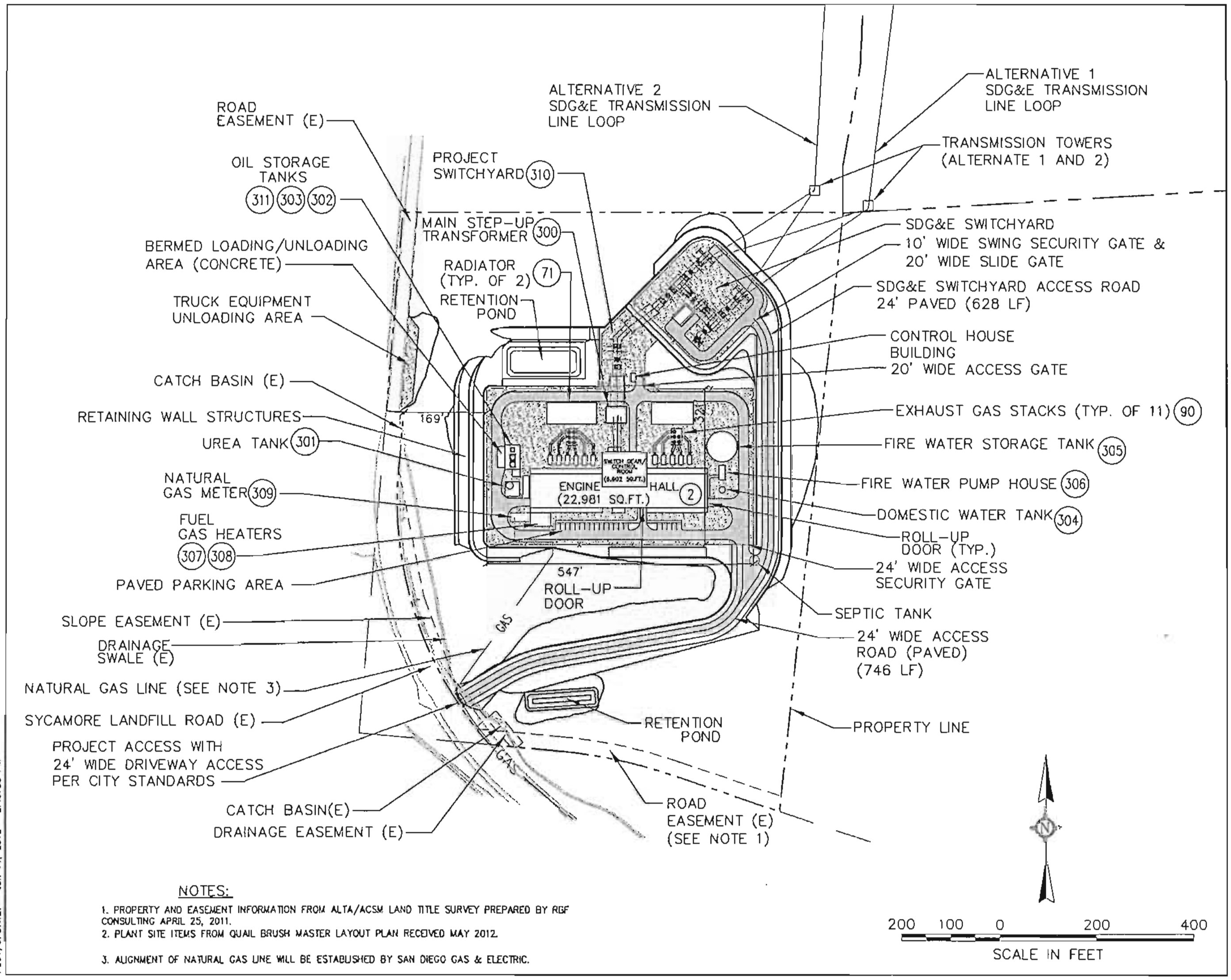


Figure F.2-4a
Kearny Mesa (Overland Avenue) Monitoring Station
Annual Wind Rose (2003-2007)

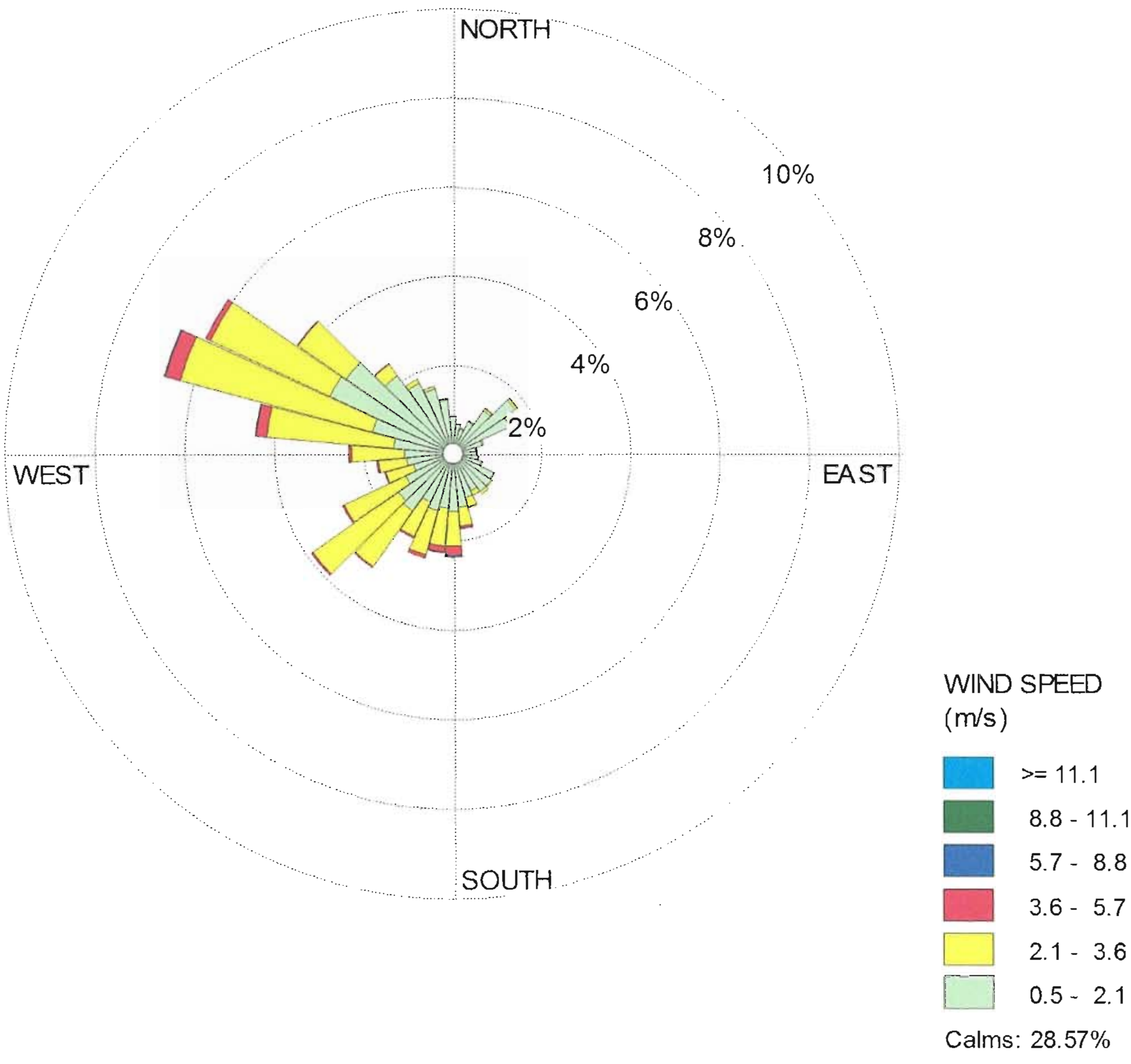


Figure F.2-4b
Kearny Mesa (Overland Avenue) Monitoring Station
Spring Wind Rose (2003-2007)

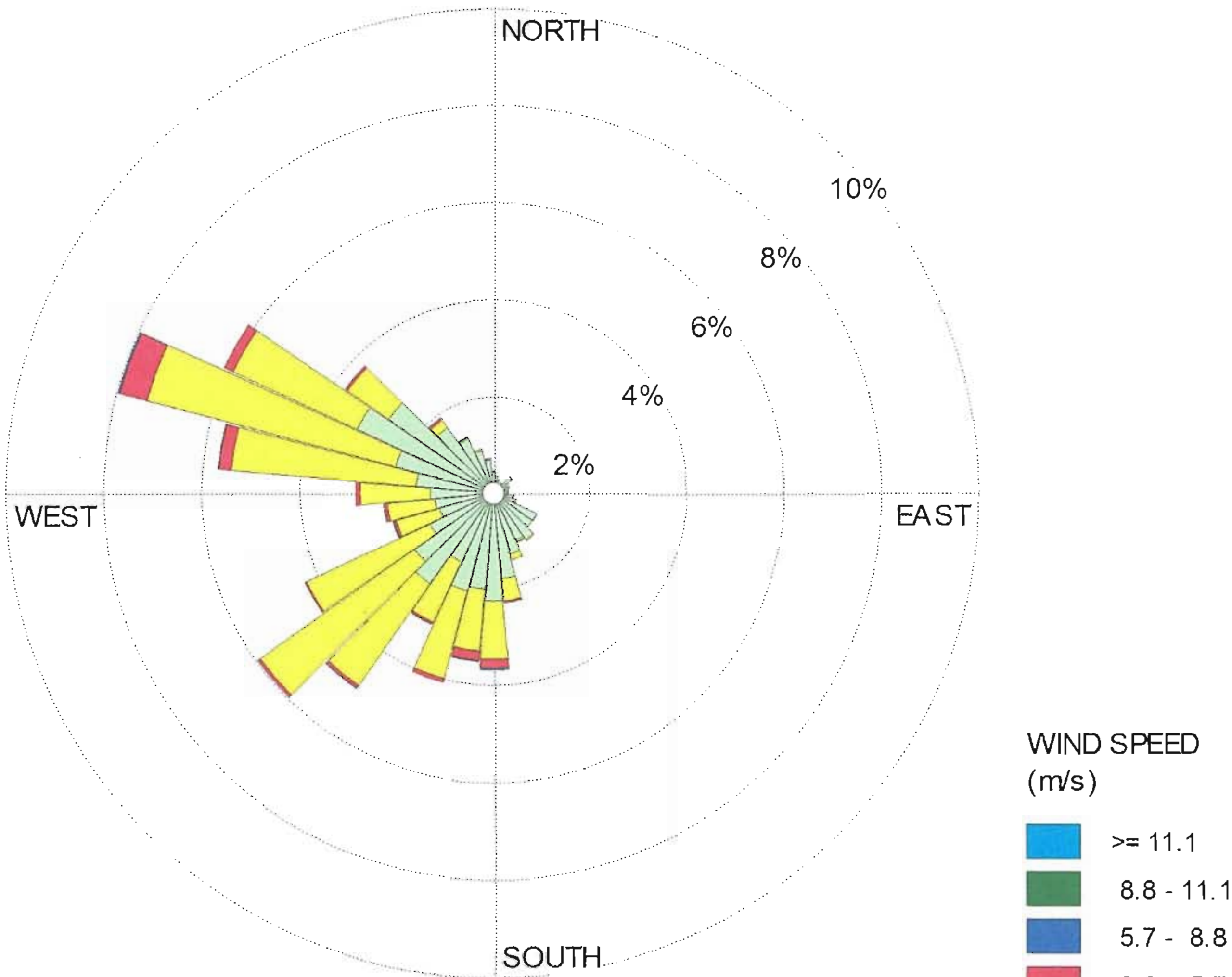


Figure F.2-4c
Kearny Mesa (Overland Avenue) Monitoring Station
Summer Wind Rose (2003-2007)

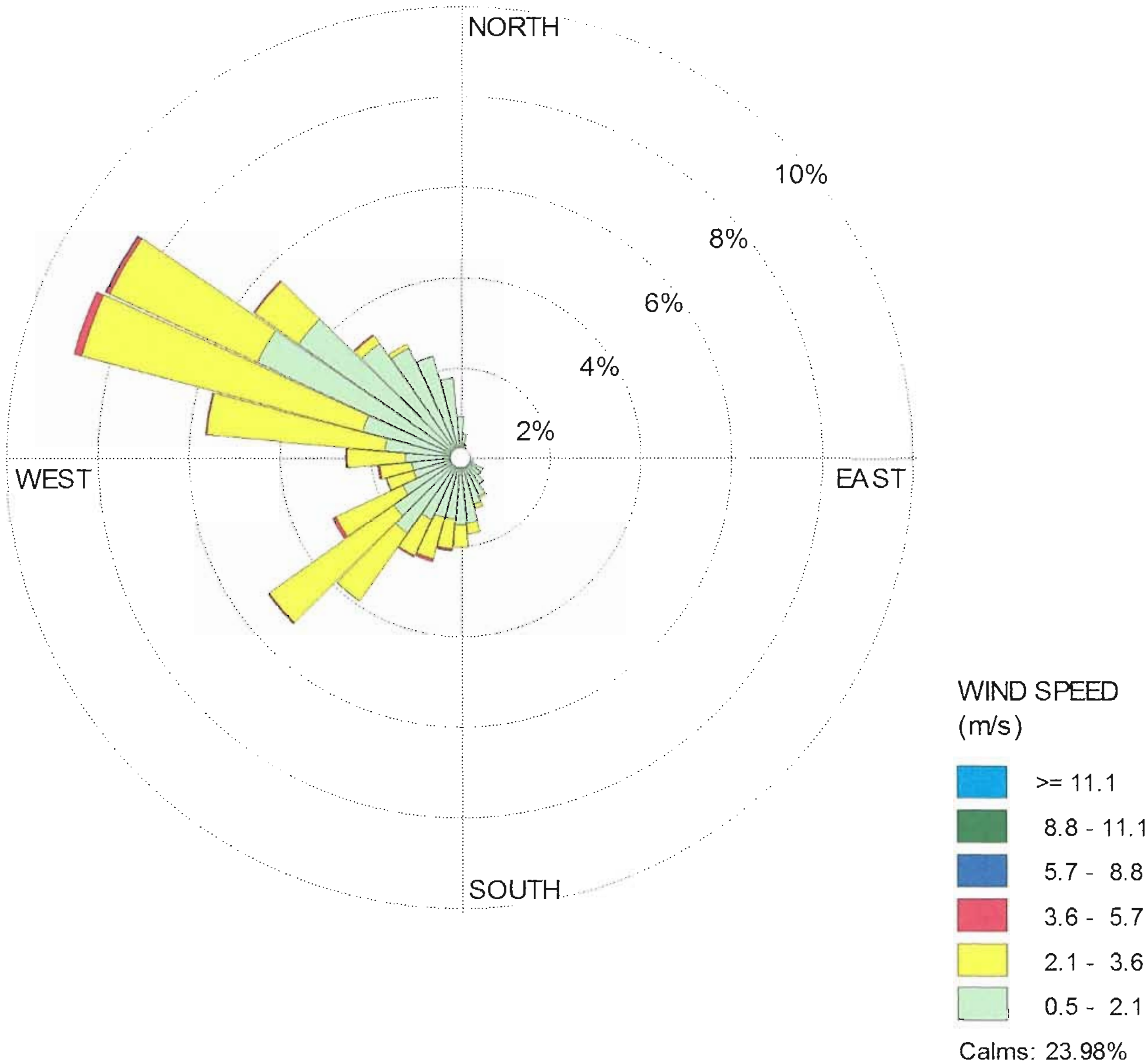


Figure F.2-4d
Kearny Mesa (Overland Avenue) Monitoring Station
Fall Wind Rose (2003-2007)

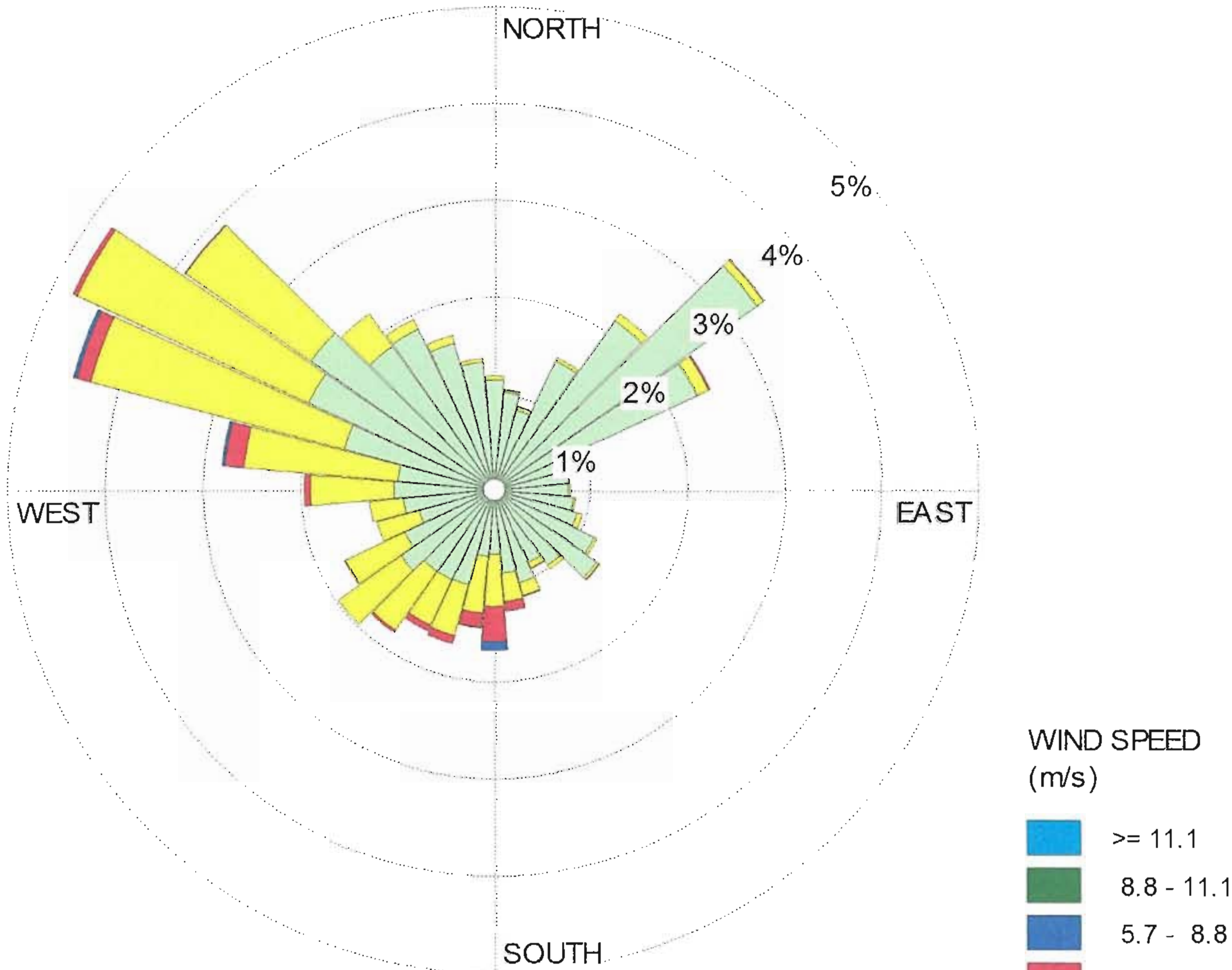


Figure F.2-4e
Kearny Mesa (Overland Avenue) Monitoring Station
Winter Wind Rose (2003-2007)

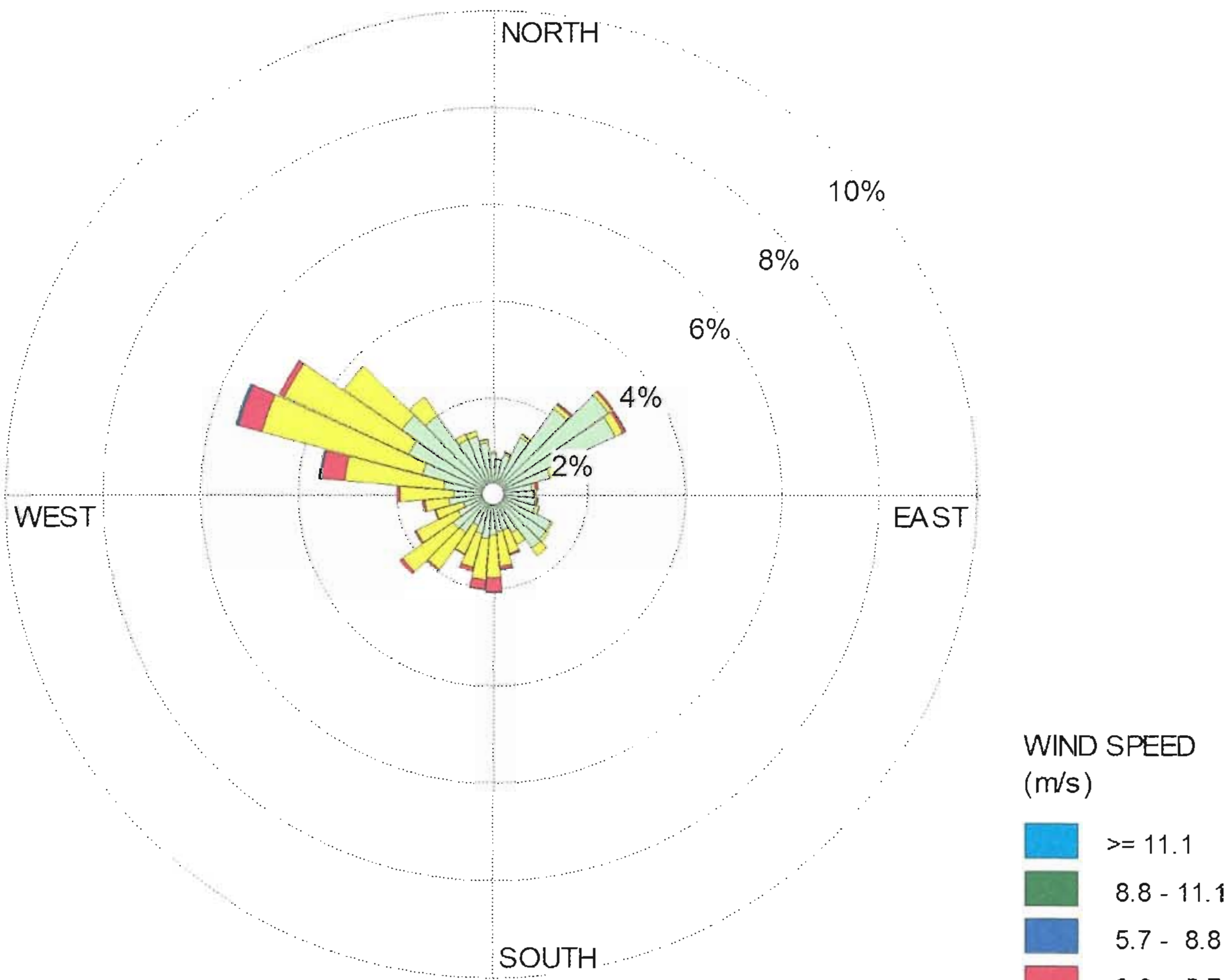
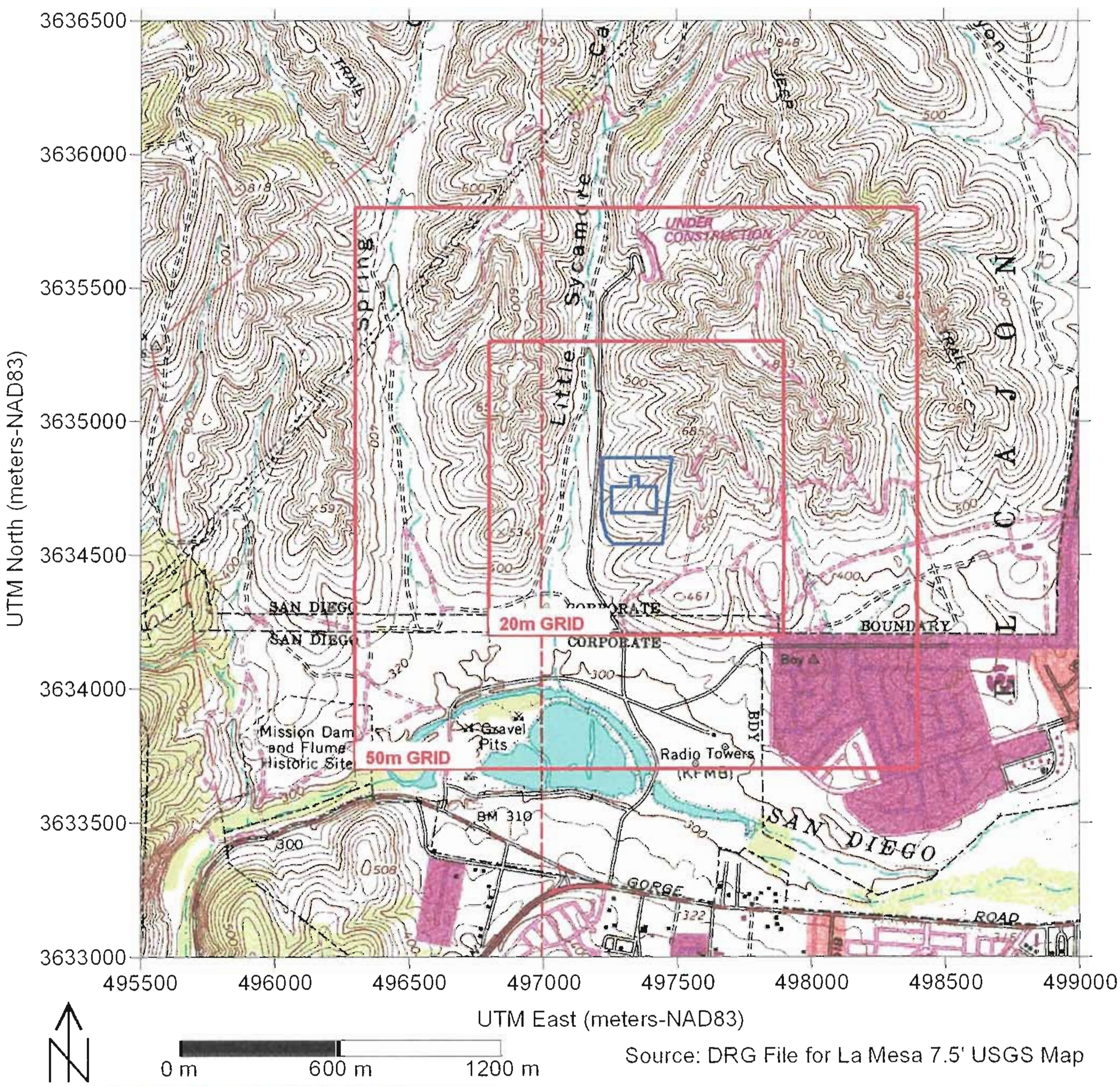


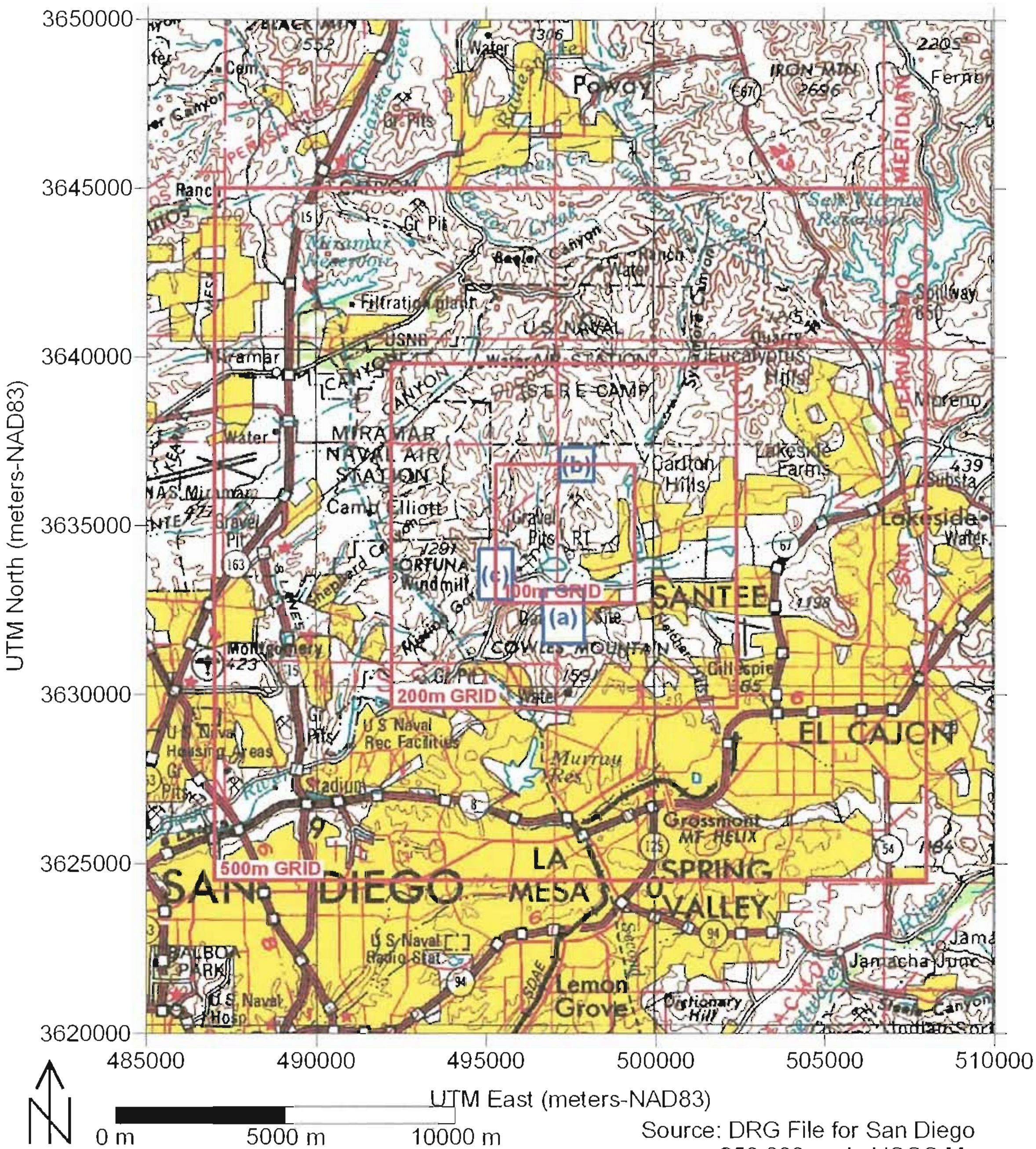
Figure F.2-5
Fine Receptor Grid Delineation



Regular Receptor Grids in red

Facility and Property Fencelines in blue

Figure F.2-6
Coarse Receptor Grid Delineation

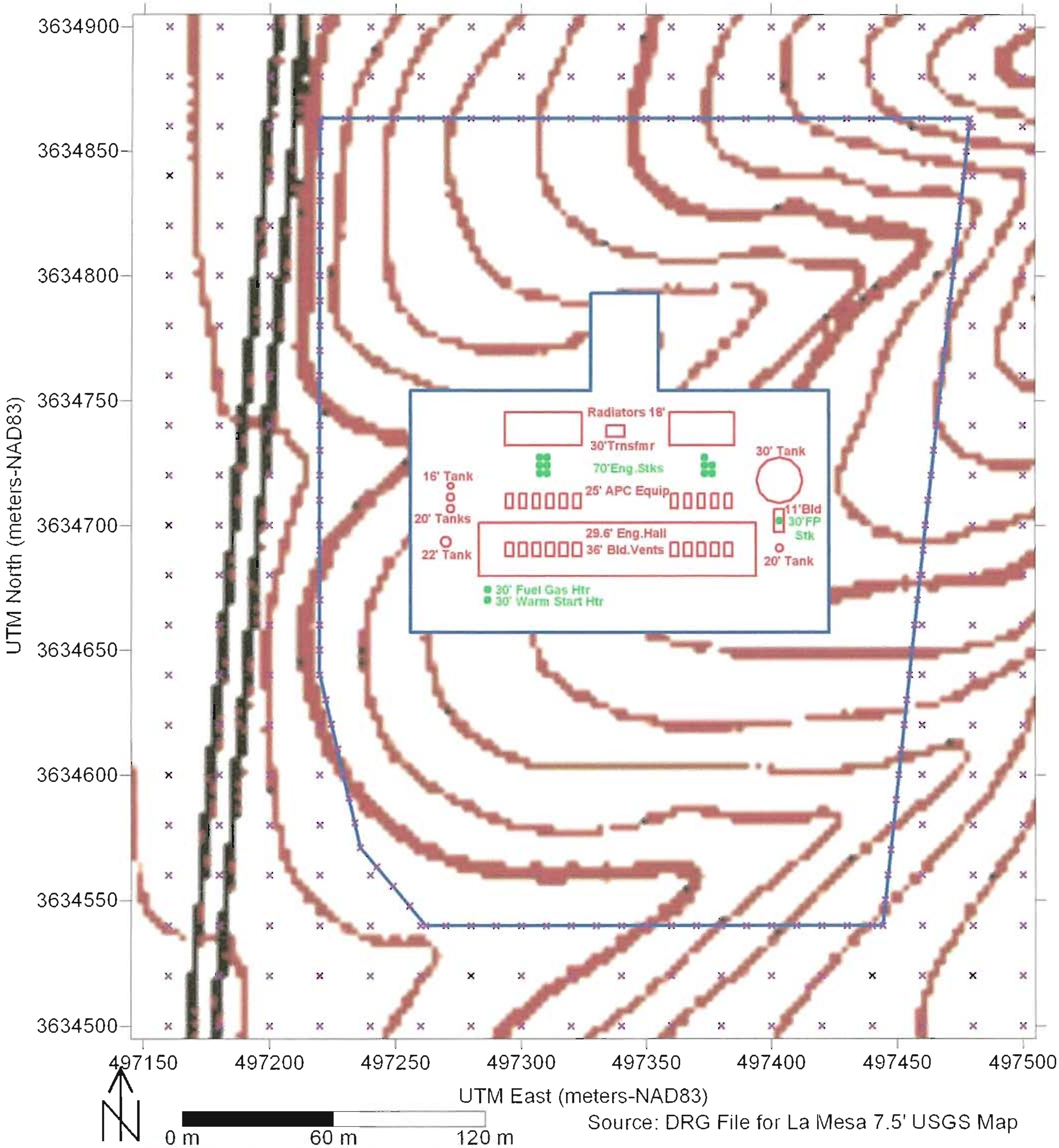


Source: DRG File for San Diego
250,000 scale USGS Map

Regular Receptor Grids in red

Refined Receptor Grids in blue, (a) is 1-hour NO2 startup for NAAQS, (b) is 1-hour NO2 startup for CAAQS, and (c) is 1-hour NO2 normal for CAAQS, 8-hour CO normal/startup, and 24-hour/Annual SO2.

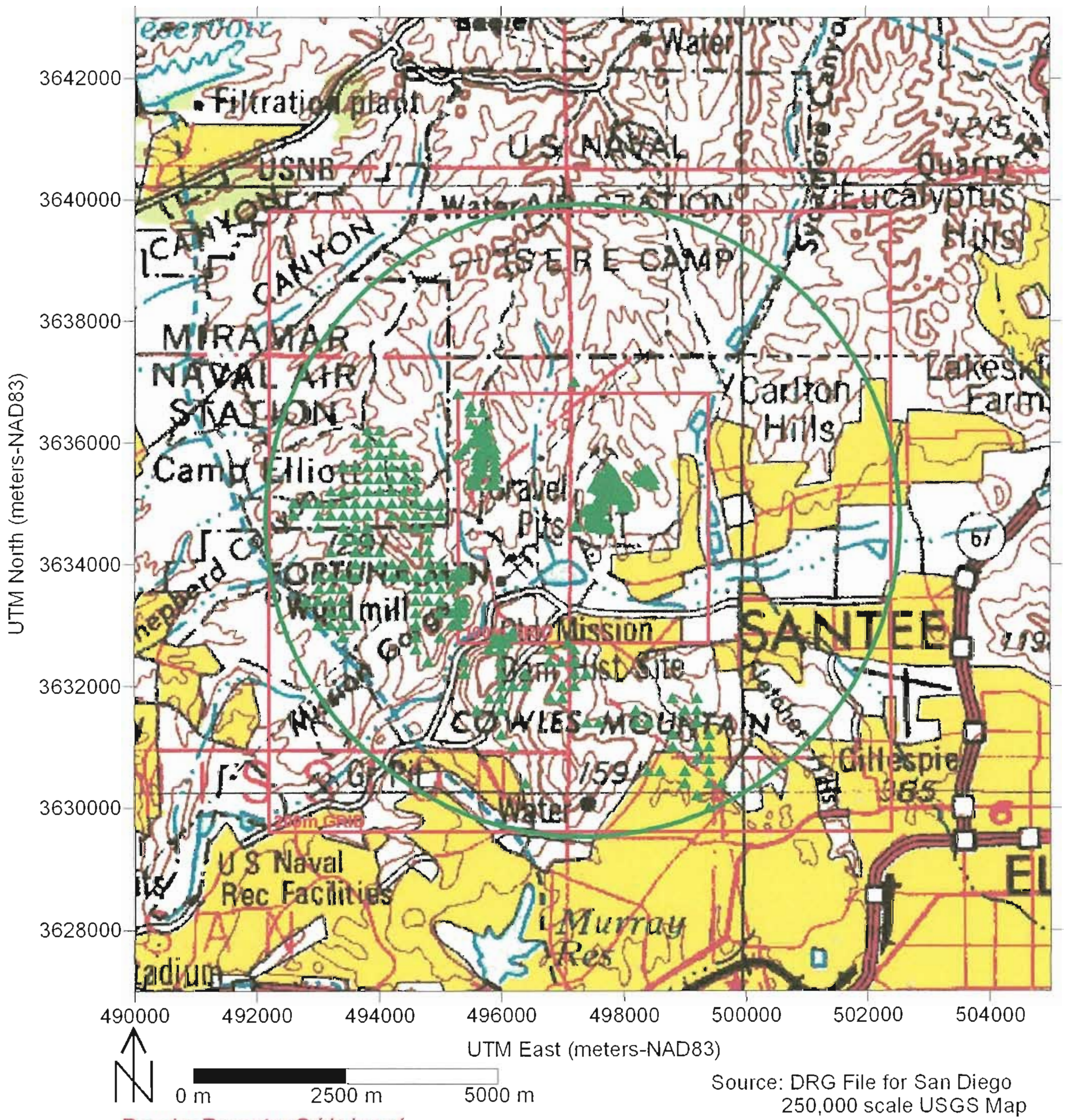
Figure F.2-7
BPIP Site Arrangement



Source: DRG File for La Mesa 7.5' USGS Map

BPIP Structures in red Stacks in green
Facility and Property Fencelines in blue
20m Downwash Grid and 10m Fenceline Receptors in purple

Figure F.2-9
24-Hour PM10 Sig.Impact Area



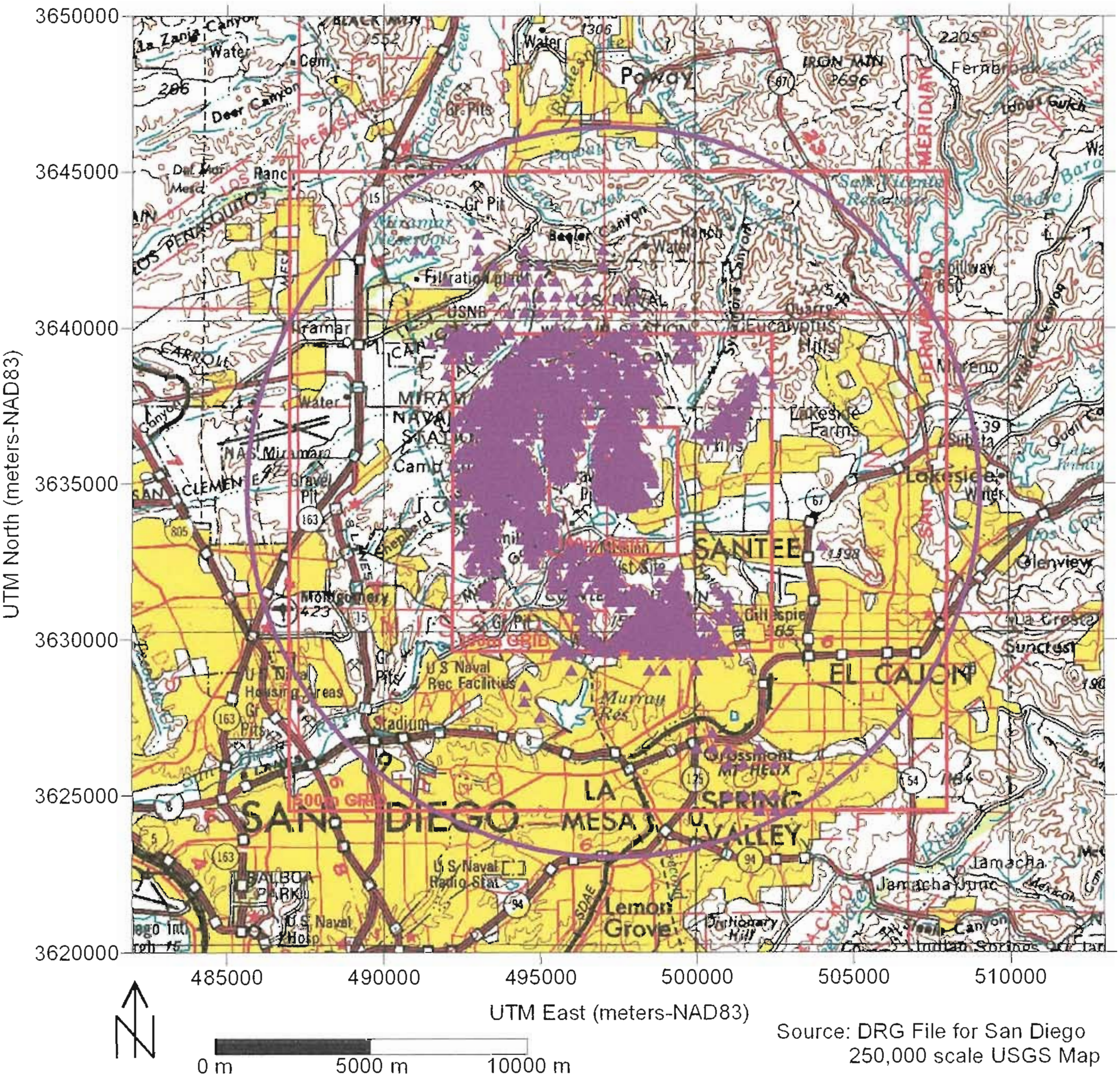
Source: DRG File for San Diego 250,000 scale USGS Map

Regular Receptor Grids in red

Green Triangles are 24-hour maximum PM10 Impacts > 5.0 ug/m3

Green Circle defines SIA Radius of 5.2 km

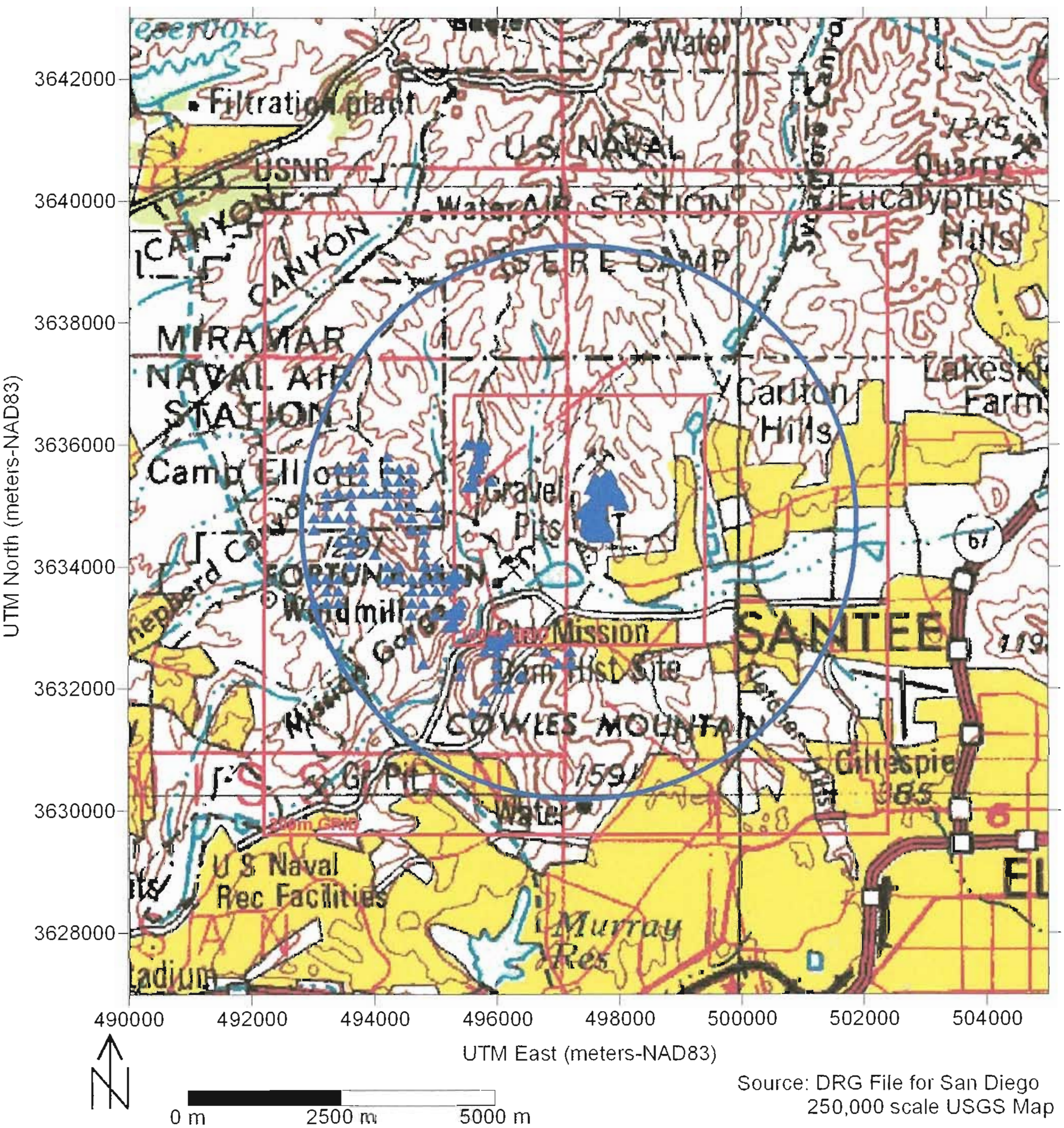
Figure F.2-10
24-Hour PM25 Sig.Impact Area



Regular Receptor Grids in red

Purple Triangles are 5-year averages of annual 24-hour maximum PM2.5 Impacts > 1.2 ug/m3
Purple Circle defines SIA Radius of 11.7 km

Figure F.2-11
Annual PM25 Sig.Impact Area



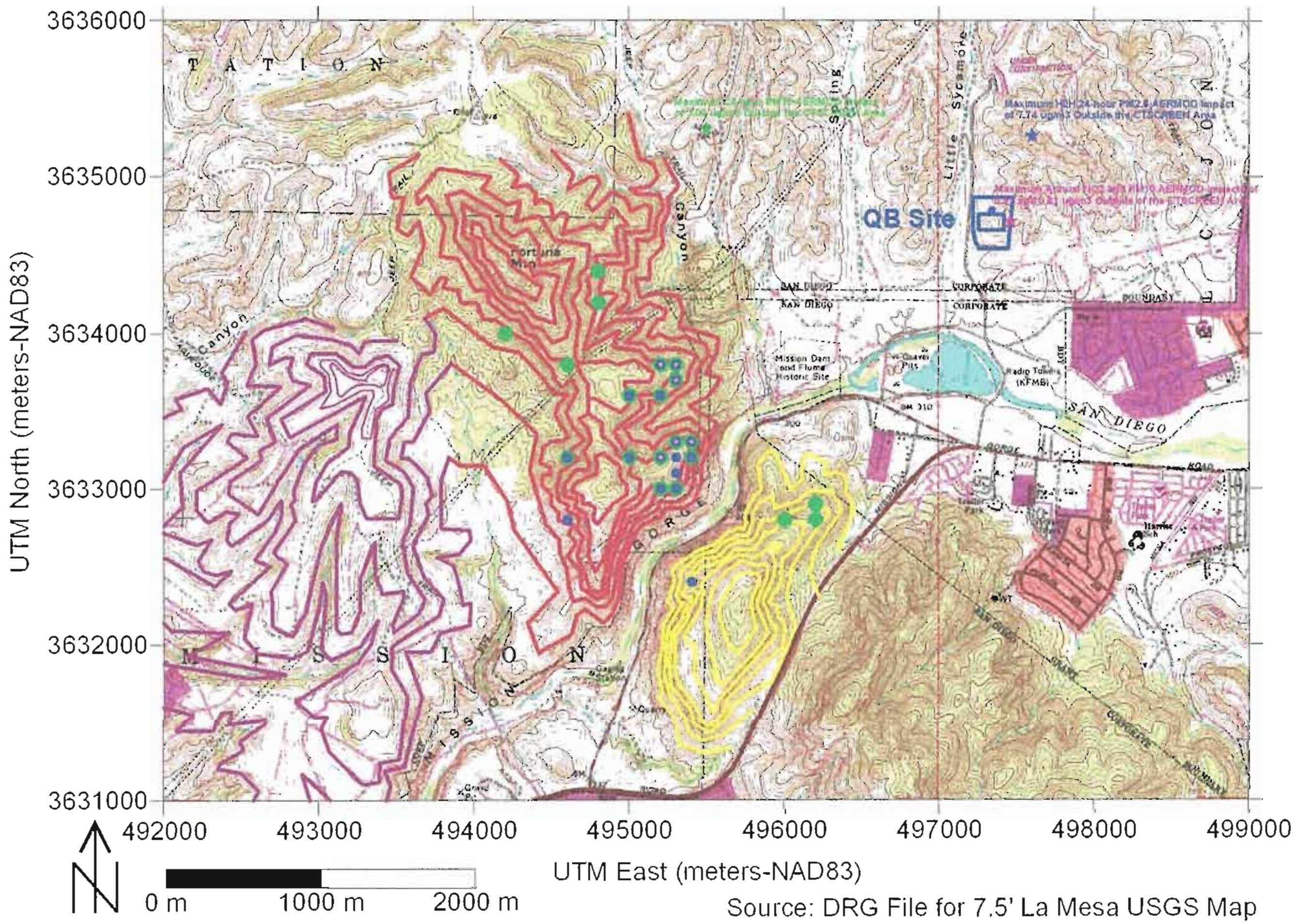
Source: DRG File for San Diego 250,000 scale USGS Map

Regular Receptor Grids in red

Blue Triangles are 5-year averages of annual PM2.5 Impacts > 0.3 ug/m3

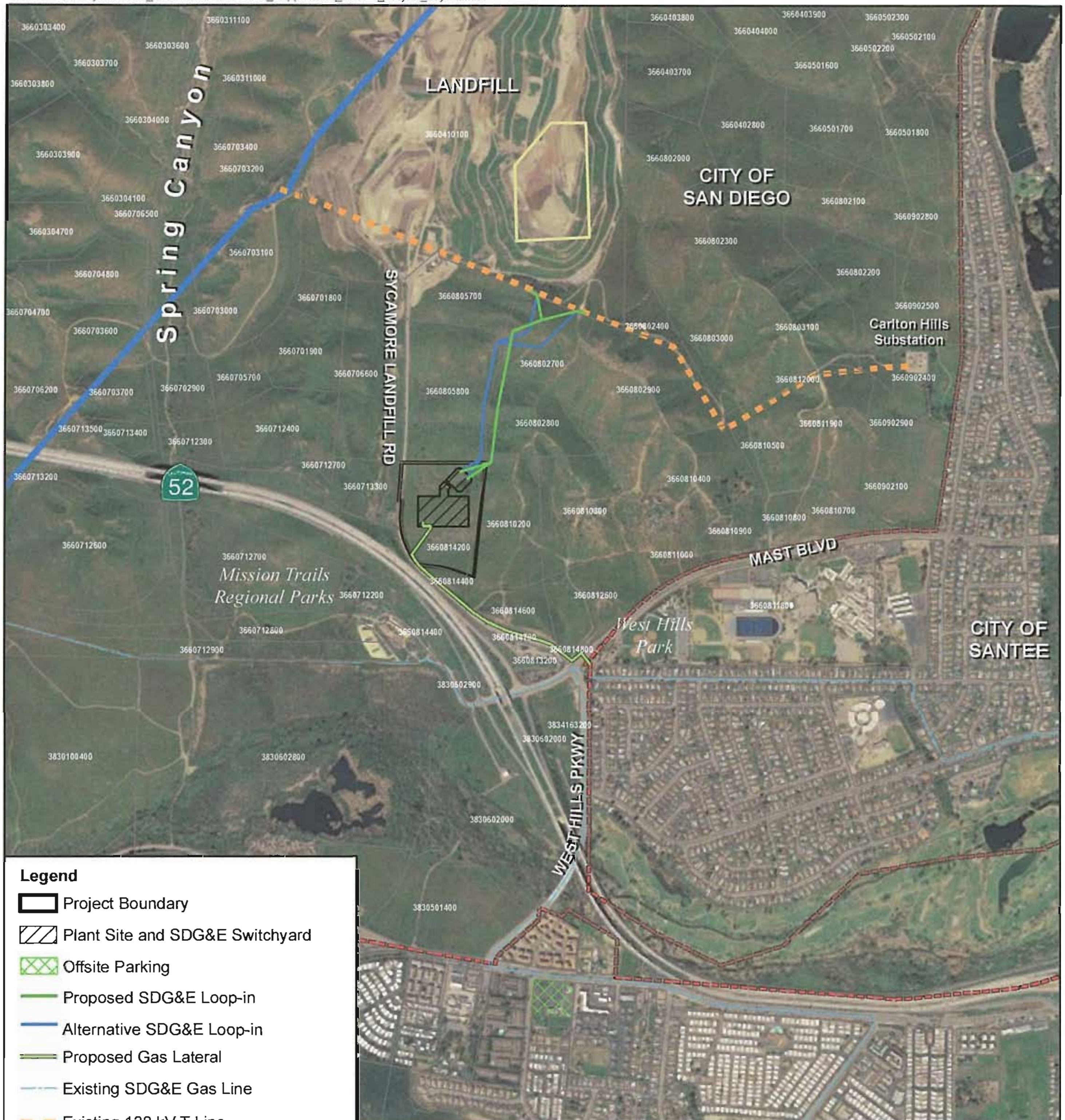
Blue Circle defines SIA Radius of 4.54 km

Figure F.2-12
AERMOD Impacts Remodeled with CTSCREEN and Associated CTSCREEN Contours



Small Pink Circles = Maximum Annual NO2 and PM10 AERMOD Impacts > 1.0 ug/m3 SIL
Medium Blue Circles = High Second-High 24-hour PM2.5 AERMOD Impacts > 9.0 ug/m3 PSD Increment
Large Green Circles = Maximum 24-hour PM10 AERMOD Impacts > 5.0 ug/m3 on 2003 Days w/ Measured CAAQS Exceedances

Printing Date: 6/18/2012 2:28:35 PM
Path: P:\GIS\Projects\4346_QuailBrush\MXD\AFC_Supplement_3\1.1-1_Project_Layout.mxd

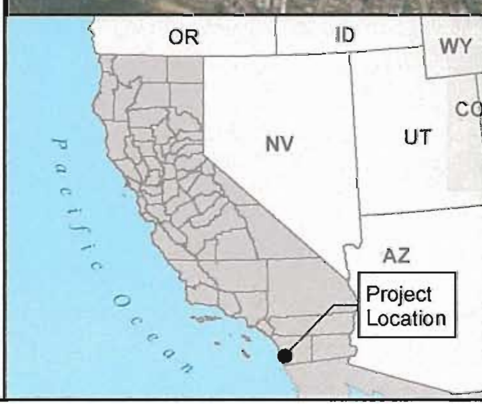


Legend

- Project Boundary
- Plant Site and SDG&E Switchyard
- Offsite Parking
- Proposed SDG&E Loop-in
- Alternative SDG&E Loop-in
- Proposed Gas Lateral
- Existing SDG&E Gas Line
- Existing 138 kV T-Line
- Existing SDG&E 230 kV T-Lines (2)
- Proposed Construction Laydown Area (5 acres within this 20 acre area)
- City Boundary
- Assessors Parcel Number

As the Project is not within a sectioned part of the county, section, township, and range information cannot be provided.

Cogentrix



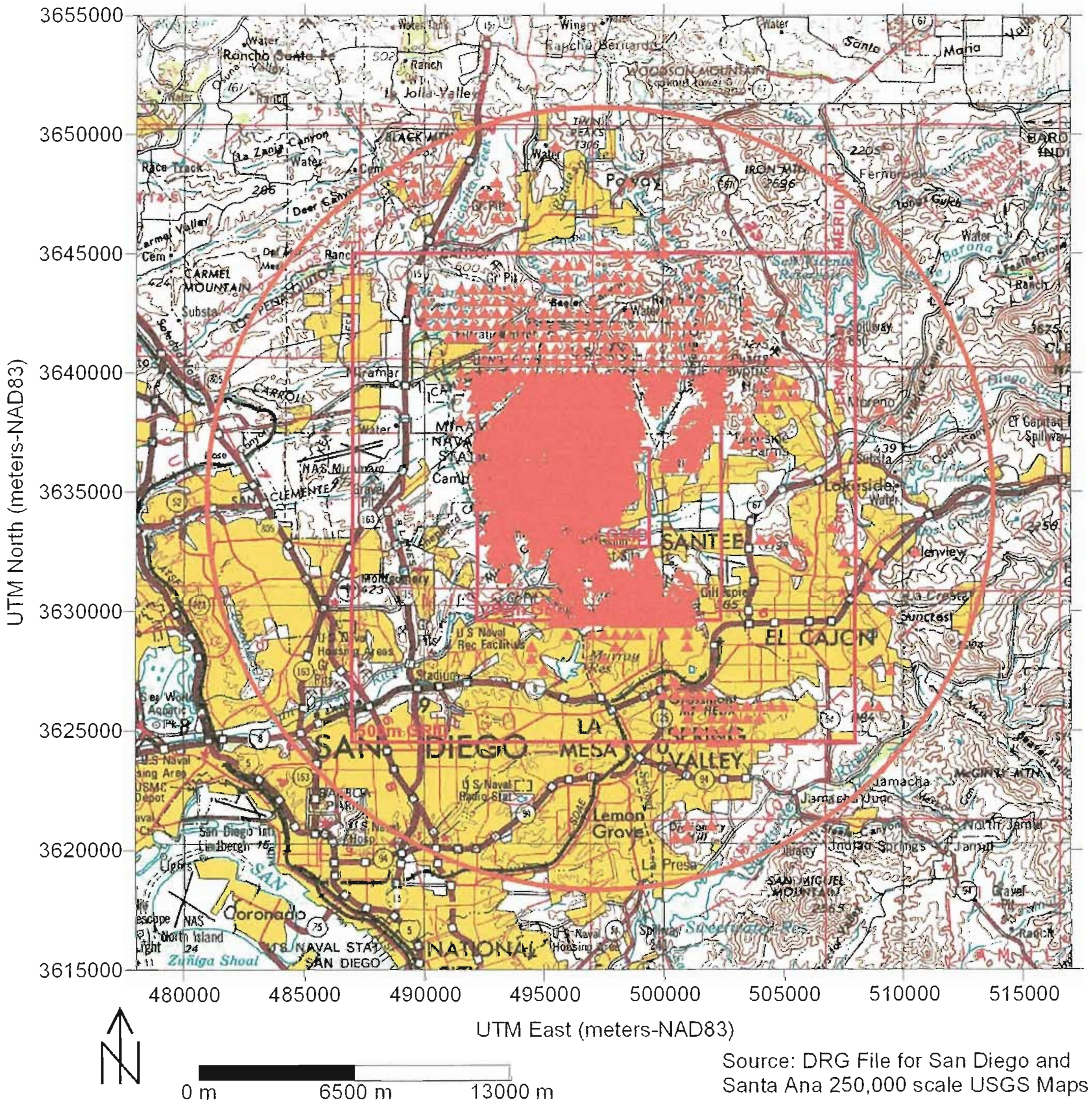
QUAIL BRUSH GENERATION PROJECT

Figure F.2-15
Project Aerial View Map

0 750 1,500 3,000
Feet

TETRA TECH EC, INC.

Figure F.2-16
1-Hour NO2 Sig.Impact Area



Source: DRG File for San Diego and Santa Ana 250,000 scale USGS Maps

Regular Receptor Grids in red

Orange Triangles are 5-year averages of annual 1-hour maximum NO2 Impacts > 7.5 ug/m3
Orange Circle defines SIA Radius of 16.4 km

Replacement Pages for AFC Appendix F.3

Revised Tables 4 and 5

Replacement pages for AFC Appendix F.3, Modeling Protocol.

Table 4 Air quality Summary for Most Recent 4 Years (Revised 3-26-12)

Pollutant	Site	Averaging Time	2008	2009	2010	2011	Background Value, ug/m3	Comments
Ozone, ppm	El Cajon	1 Hr	0.107	0.098	0.102	0.105		
	Del Mar		0.097	0.097	0.085	0.091		
	Escondido		0.116	0.093	0.105	0.098		
	Alpine		0.139	0.119	0.105	0.114		
	Overland		0.1	0.105	0.1	0.097	210 ug/m3	high value most recent 3 years
Ozone, ppm	El Cajon	8 Hr	0.093	0.082	0.078	0.086		
	Del Mar		0.078	0.084	0.072	0.074		
	Escondido		0.098	0.08	0.084	0.089		
	Alpine		0.109	0.097	0.088	0.093		
	Overland		0.093	0.082	0.073	0.086	168.6 ug/m3	high value most recent 3 years
PM10, ug/m3	El Cajon	24 Hr State	40	55	41	-		
	Escondido		82	73	42	-		
	Overland		41	50	33	-	50 ug/m3	3 yr data high
PM10, ug/m3	El Cajon	24 Hr Fed	40	46	36	41		
	Escondido		45	47	35	31		
	Overland		39	41	32	37	41 ug/m3	high 2nd high most recent 3 years
PM10, ug/m3	El Cajon	Annual AM	27	25	21	-		
	Escondido		25	25	21	-		
	Overland		24	25	19	-	25 ug/m3	3 yr data high
PM2.5, ug/m3	El Cajon	24 Hr Fed	30	23	23	22		
	Escondido		28	25	22	22		
	Overland		22	22	16	16	18.8 ug/m3	3 yr avg of 98th percentiles
PM2.5, ug/m3	El Cajon	Annual AM State	14.9	12.2	10.8	-		
	Escondido		12.4	-	-	-		
	Overland		11.4	10.5	8.7	9	10.5 ug/m3	high value most recent 3 years
PM2.5, ug/m3	El Cajon	Annual AM Fed	13.3	12.1	10.8			
	Escondido			13.4	12.2	-		
	Overland		11.4	10.5	8.7	9	10.5 ug/m3	high value most recent 3 years
CO, ppm	Escondido	8 Hr	2.81	3.24	2.46	2	3600 ug/m3	high value most recent 3 years
CO, ppm	Escondido	1 Hr	6	4	4	4	4600 ug/m3	high value most recent 3 years
CO, ppm	Escondido	8 Hr Fed	-	3	2	2	3333 ug/m3	high 2nd high most recent 3 years
CO, ppm	Escondido	1 Hr Fed	-	4	4	3	4600 ug/m3	high 2nd high most recent 3 years

NO2, ppm	El Cajon	1 Hr State	0.063	0.054	0.058	-			
	Overland		0.077	0.06	0.073	0.073	137.5 ug/m3	3 yr data high	
	Escondido		0.081	0.073	0.064	-			
	Alpine		0.047	0.056	0.052	-			
NO2, ppm	El Cajon	1 Hr Fed	0.055	0.048	0.047	0.044			
	Overland		0.06	0.055	0.056	0.051	101.5 ug/m3	recent 3yr avg of 98th percentiles	
	Escondido		0.071	0.057	0.053	0.049			
	Alpine		0.037	0.036	0.037	0.03			
NO2, ppm	El Cajon	Annual AM	0.016	0.014	0.013	-			
	Overland		0.014	0.014	0.013	-	26.4 ug/m3	3 yr data high	
	Escondido		0.018	0.016	0.014	-			
	Alpine		0.008	0.008	0.007	-			
SO2, ppm	Beardsley	Annual AM	0.003	0.001	0	-	3.4 ug/m3	3 yr data high	
	Beardsley	24 Hr	0.007	0.006	0.002	0.003	15.8 ug/m3	high value most recent 3 years	
	Beardsley	24 Hr Fed	0.007	0.005	0.002	0.002	13.1 ug/m3	high 2nd high most recent 3 years	
	Beardsley	1 Hr	-	0.021	0.008	0.008	55 ug/m3	high value most recent 3 years	

References:

CARB-ADAM website, data for year 2008-2010, March 2012.

EPA-AIRS database website, data for years 2008-2011, March 2012.

Table 5 Estimated Background Air Quality Values (Revised 3-26-12)

Pollutant and Averaging Time	Background Value
Ozone – 1 Hour	210 ug/m^3
Ozone – 8 Hour	168.6 ug/m^3
PM_{10} – 24 Hour	50 ug/m^3
PM_{10} – 24 Hour Fed	41 ug/m^3
PM_{10} – Annual	25 ug/m3
$PM_{2.5}$ – 24 Hour Fed	18.8 ug/m^3
$PM_{2.5}$ – Annual Fed	10.5 ug/m^3
$PM_{2.5}$ – Annual State	10.5 ug/m^3
CO – 1 Hour State	4600 ug/m^3
CO – 8 Hour State	3600 ug/m^3
CO – 1 Hour Fed	4600 ug/m^3
CO – 8 Hour Fed	3333 ug/m^3
NO_2 – 1 Hour (based on 98th percentile data analysis) Federal	101.5 ug/m^3
NO_2 – 1 Hour (based on 1st high data analysis) State	137.5 ug/m^3
NO_2 – Annual	26.4 ug/m^3
SO_2 – 1 hr	55 ug/m^3
SO_2 – 24 Hour State	15.8 ug/m^3
SO_2 – 24 Hour Fed	13.1 ug/m^3
SO_2 – Annual	3.4 ug/m^3

Replacement Pages for AFC Appendix F.4

Revised Pages 9-10, New Table F.4-9

Revised Pages 9-10, AFC Appendix F.4

The HARP program is a tool that assists with the programmatic requirements of the Air Toxics Hot Spots Program, and it can be used for preparing health risk assessments for other related programs such as air toxic control measure development or facility permitting applications. HARP is a computer based risk assessment program which combines the tools of emission inventory database, facility prioritization, air dispersion modeling, and risk assessment analysis. Use of HARP promotes statewide consistency in the area of risk assessment, increases the efficiency of evaluating potential health impacts, and provides a cost effective tool for developing facility health risk assessments. HARP may be used on single sources, facilities with multiple sources, or multiple facilities in close proximity to each other.
The receptor grid used in HARP was a combination of the final grid used in the refined modeling as discussed in Section 4.7, with the addition of the sensitive receptor locations as noted in Table F.4-6.

The HARP program results for acute and chronic inhalation and chronic non-inhalation exposures, cancer burden and individual cancer risk (workplace and residential) for the combustion sources are summarized in this Appendix. Separate calculations are shown for each type of exposure and risk, and the results of the calculations are summarized below. All of the modeling and HRA results are contained on the CD included with this document.

The modeling results show that the maximum modeled cancer risk from QBPP is expected to be 1.34×10^{-6}. This risk is well below the SDAPCD significance value of 10 per million for sources employing T-BACT. T-BACT for the Wartsila IC engines is the use of clean fuels (natural gas) and the operation of a CO catalyst. These T-BACT technologies are proposed for the Project, and as such, the significant risk threshold for the Project is 10 in one million. The chronic and acute non-cancer hazard indices are 0.00938 and 0.0802, respectively. Both are well below the significant impact level of 1.0. The total cancer burden was calculated to be zero, which is also well below the state threshold value of 1.0, as well as being below the SDAPCD Rule 1200 significance level of 1.0. Detailed calculations and results for each significant receptor are included in the modeling results, which are being submitted electronically.

TABLE F.4-3 HEALTH RISK ASSESSMENT SUMMARY (WARTSILA ENGINES AND IC HEATERS)		
Total Facility (All Sources)		
Risk Category	**HRA Values**	**Applicable Significance Threshold**
Cancer Risk (MIR) per one million	1.34×10^{-6}	<= 10.0 with T-BACT
Chronic Hazard Index (at cancer MIR)	0.00938	1.0
Acute Hazard Index (at cancer MIR)	0.0802	1.0
Acute Hazard Index at Acute MIR	0.164	1.0
Facility MIR location coordinates are: Cancer and chronic MIR - #4375, 495300, 3633800. Acute MIR - #2240, 497620, 3634920.		

In addition to the standard steady state HRA analysis, the Applicant (at the request of the SDAPCD) also calculated emissions for the non-steady state hours, i.e., cold start and warm start hours, and the maximum hourly emissions during each of the three phases of commissioning. The highest hourly emissions were calculated as the scenario defined as a cold start hour for all engines plus the warm start and fuel gas heaters. These emissions were analyzed for acute HI impacts. The Acute HI for this scenario was 0.306 at receptor 2240 (497620, 3634920). Emissions for these scenarios are presented in Table F.4-9 (new table). The HRA input and output files for these analysis runs are included on the CD noted below.

The calculated health effects as summarized above do not exceed the district significance threshold values, therefore the health effects would be considered "not significant" and may even be "zero". These results are also provided on the air modeling CD.

No health studies prepared by the local San Diego County health department were identified for use in the facility health risk assessment.

The screening risk calculation for construction impacts, i.e., diesel equipment particulate matter emissions and the inhalation pathway assumption is presented in Table F.4-8.

The following tables and figures are presented at the end of this appendix:

- Table F.4-4 Census Tract Numbers, Areas, and Population Data
- Table F.4-5 SDAPCD TAC Summary
- Table F.4-6 Sensitive Receptor Listing for the 6-mile Radius
- Table F.4-7 OEHHA/CARB Risk Assessment Health Values
- Table F.4-8 Construction Diesel PM Screening Risk Calculations
- Table F.4-9 Non-Steady State HAP Emissions Estimates for Acute HI Analysis (New)
- Figure F.4-1 Census Bureau-Tract Map and Site Location
- Figure F.4-2 Sensitive Receptor Map for the 6-mile Radius Distance
- Figure F.4-3 Census Tracts within the 6-mile Radius Distance

Attachment F.4-1 Sycamore Landfill Emissions Inventory

Risk Assessment input and output files are included on the modeling CD.

Table F.4-9 Toxic Pollutant Emissions Factors for Non-Steady State Operations for QBPP

Assumptions:

1. all hours are at maximum rated fuel use for the load scenario identified (see 5, 6, 7)
2. uncontrolled emissions factors derived from Table F.1-3 (AFC, Appendix F.1)
3. CO catalyst control efficiency is 70% (minimum value per Wartsila)
4. NH3 slip, when the SCR is operating is held at 10 ppm (upper permit limit)
5. heat rate at 50% load = 40.09 mmbtu/hr (Table F.1-9, AFC Appendix F.1)
6. heat rate at 75% load = 60.14 mmbtu/hr (Table F.1-9, AFC Appendix F.1)
7. heat rate at 100% load = 80.18 mmbtu/hr (Table F.1-9, AFC Appendix F.1)
8. cold start is 30 mins uncontrolled, 30 minutes controlled
9. warm start is 15 mins uncontrolled, 45 mins controlled

Commissioning assumptions:

1. Phase 1 hour, 50% load, uncontrolled
2. Phase 2 hour, 75% load, uncontrolled
3. Phase 3 hour, 75% load, controlled

		Single Engine		Commissioning-3 Engines			All Engines	
	Uncontrolled EF's	Cold Start	Warm Start	Phase 1	Phase 2	Phase 3	Cold Start	Warm Start
Pollutant	lb/mmbtu	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr
Acetaldehyde	0.0005191	0.0271	0.0198	0.0624	0.0937	0.0281	0.2976	0.2175
Acrolein	0.0000579	0.0030	0.0022	0.0070	0.0104	0.0031	0.0332	0.0243
1-3 Butadiene	0.00036	0.0188	0.0137	0.0433	0.0650	0.0195	0.2064	0.1508
Benzene	0.000214	0.0112	0.0082	0.0257	0.0386	0.0116	0.1227	0.0897
Biphenyl	0.000212	0.0110	0.0081	0.0255	0.0382	0.0115	0.1215	0.0888
Ethylbenzene	0.0000698	0.0036	0.0027	0.0084	0.0126	0.0038	0.0400	0.0292
Formaldehyde	0.00232	0.1209	0.0884	0.2790	0.4186	0.1256	1.3300	0.9719
Methanol	0.0025	0.1303	0.0952	0.3007	0.4511	0.1353	1.4332	1.0474
n-Hexane	0.00111	0.0578	0.0423	0.1335	0.2003	0.0601	0.6363	0.4650
Naphthalene	0.0000246	0.0013	0.0009	0.0030	0.0044	0.0013	0.0141	0.0103
PAH (total)	2.49E-07	0.00001	0.00001	0.00003	0.00004	0.00001	0.00014	0.00010
Toluene	0.000235	0.0122	0.0090	0.0283	0.0424	0.0127	0.1347	0.0985
Xylenes	0.000634	0.0330	0.0241	0.0763	0.1144	0.0343	0.3635	0.2656
Propylene	0.00528	0.2752	0.2011	0.6350	0.9526	0.2858	3.0270	2.2120
Ammonia, lb/hr	1.08	0.54	0.81	0	0	1.08	5.94	8.91

Note: during commissioning, only 3 engines will be undergoing testing in any given hour, not all 11 engines.
See revised Table F.1-11, AFC Appendix F.1.

Replacement Pages for AFC Appendix F.5

Revised Main Site Emissions Calculation Sheet

(with new cut/fill value)

APPENDIX F.5

Construction Emissions and Impact Analysis

Construction Phases

Construction of the Project is expected to last approximately 16 months. The construction will occur in the following two main phases:

- Site preparation-Phase 1,
- Foundation work, construction/installation of major structures, and installation of major equipment-Phase 2.

The site is approximately 21.7 acres in size and is located in gently rolling hills. Only 16 acres of the total 21.7 acres will actually be disturbed during the construction phase, with only 3 acres subject to construction activities on any given day. The site is currently vacant. As such, the site will require moderate grading and leveling prior to construction of the power blocks, support systems, and site buildings. Site preparation (Phase 1) includes initial and finish grading, excavation of footings and foundations, and backfilling operations. Phase 1 will last approximately 1.5 months. After site preparation is finished, the construction (Phase 2) of the foundations and structures is expected to begin. Phase 2 is expected to last for 14.5 months. Once the foundations and structures are finished, installation and assembly of the mechanical and electrical equipment are scheduled to commence.

Fugitive dust emissions from the construction of the Project will result from:

- Dust entrained during site preparation and finish grading/excavation at the construction site;
- Dust entrained during onsite travel on paved and unpaved surfaces;
- Dust entrained during aggregate and soil loading and unloading operations; and
- Wind erosion of areas disturbed during construction activities.

Combustion emissions during construction will result from:

- Exhaust from the Diesel construction equipment used for site preparation, grading, excavation, and construction of onsite structures;
- Exhaust from water trucks used to control construction dust emissions;
- Exhaust from Diesel-powered welding machines, electric generators, air compressors, and water pumps;
- Exhaust from pickup trucks and Diesel trucks used to transport workers and materials around the construction site;
- Exhaust from Diesel trucks used to deliver concrete, fuel, and construction supplies to the construction site; and,
- Exhaust from automobiles used by workers to commute to the construction site.

To determine the potential worst-case daily construction impacts, exhaust and dust emission rates have been evaluated for each source of emissions. Worst-case daily dust emissions are expected to occur during the first 2 months of construction when site preparation occurs. The worst-case daily exhaust emissions are expected to occur during Phase 2 of the construction schedule during the installation of the major mechanical equipment.

Construction related fugitive dust emissions are based on a modified version of the EPA AP-42, Section 13.2.3 procedure, as implemented in the MRI Level II analysis. This procedure essentially uses an emissions factor in terms of tons/acre/month of construction activity. The MRI Level II analysis also includes an estimation procedure for quantifying fugitive dust emissions from construction related cut and fill activities. This procedure is widely used (and approved for use) per the following documents and programs:

- MRI Report No. 95040, SCAQMD Project, March 1996.
- URBEMIS Model, Version 9.2.4, Users Manual, Appendix A, Page A-6.
- CARB Area Source Methodology Manual, Section 7.7, 9/02.
- Western Regional Air Partnership, Fugitive Dust Handbook, 9/06.
- USEPA, AP-42, Section 13.2.3, 2/10.
- Estimating PM Emissions from Construction Operations, USEPA, MRI, 9/99.

This estimation procedure has been used in numerous AFC construction related analyses, as well as a wide range of CEQA and NEPA analyses for projects ranging in size from less than 5 acres to large power (thermal, solar, and wind) and transmission line construction projects involving site or project acreages from 300 to over 6000 acres.

Available Mitigation Measures

The following mitigation measures are proposed to control exhaust emissions from the Diesel heavy equipment used during construction of QBPP:

- Operational measures, such as limiting time spent with the engine idling by shutting down equipment when not in use;
- Regular preventive maintenance to prevent emission increases due to engine problems;
- Use of low sulfur and low aromatic fuel meeting California standards for motor vehicle Diesel fuel; and
- Use of low-emitting gas and diesel engines meeting state and federal emissions standards (Tier I, II, or III based on HP rating and mfg year) for construction equipment, including, but not limited to catalytic converter systems and particulate filter systems.

The following mitigation measures are proposed to control fugitive dust emissions during construction of the project:

- Use either water application or chemical dust suppressant application to control dust emissions from on-site unpaved road travel and unpaved parking areas;
- Use vacuum sweeping and/or water flushing of paved road surface to remove buildup of loose material to control dust emissions from travel on the paved access road (including adjacent public streets impacted by construction activities) and paved parking areas;
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard;
- Limit traffic speeds on all unpaved site areas to 5 mph;
- Install sandbags or other erosion control measures to prevent silt runoff to roadways;

- Replant vegetation in disturbed areas as quickly as possible;
- Use wheel washers or wash off tires of all trucks exiting construction site; and
- Mitigate fugitive dust emissions from wind erosion of areas disturbed from construction activities (including storage piles) by application of either water or chemical dust suppressant.

Estimation of Emissions with Mitigation Measures

Tables F.5-1 through F.5-3 show the estimated daily, period, and annualized heavy equipment exhaust and fugitive dust emissions. Detailed emission calculations are included in Table F.5-6.

Table F.5-1 Fugitive Dust Emissions Estimates	PM10	PM2.5
Fugitive Dust Source	**Lbs/day**	**Lbs/day**
Main Construction Site/Linears Phase I	6.33	1.33
Main Construction Site/Linears Phase 2	.78	.16
Main Construction Site Unpaved Roads	6.63	.66
Main Construction Site Paved Roads	.07	.01
Main Construction Site Trackout	.255	.043
Off Site Paved Roads	3.37	.57
Max Total Onsite Fugitive Dust Emissions-Phase I	*13.03*	*2.0*
Max Total Onsite Fugitive Dust Emissions-Phase II	*7.48*	*0.83*
Max Total Offsite Fugitive Dust Emissions	*3.63*	*.61*
Fugitive Dust Source	**Tons/Period**	**Tons/Period**
Main Construction Site/Linears Phase I	.1238	.026
Main Construction Site/Linears Phase 2	.1315	.0276
Main Construction Site Unpaved Roads	.43	.04
Main Construction Site Paved Roads	.01	.0017
Main Construction Site Trackout	.05	.008
Off Site Paved Roads	.70	.12
Max Total Onsite Fugitive Dust Emissions	*.70*	*.095*
Max Total Offsite Fugitive Dust Emissions	*.75*	*.128*
Fugitive Dust Source	**Normalized Tons/Year**	**Normalized Tons/Year**
Max Total Onsite Fugitive Dust Emissions	*.53*	*.071*
Max Total Offsite Fugitive Dust Emissions	*.56*	*.096*

Table F.5-2 Construction Exhaust Emissions Estimates						
Exhaust Sources, lbs/day	**NOx**	**CO**	**VOC**	**SOx**	**PM10**	**PM2.5**
Main Construction Site/Linears Phase I	174.4	75.6	22.6	.2	9.43	9.34
Main Construction Site/Linears Phase 2	151.2	127.9	25.3	.2	11	10.9
Construction Delivery	39.06	13.2	2.94	.048	1.78	1.76
Construction Worker Travel	3.33	33.24	2.76	.03	.27	.27
Max Total Onsite Exhaust Emissions-Phase I	*174.4*	*75.6*	*22.6*	*.2*	*9.43*	*9.34*
Max Total Onsite Exhaust Emissions-Phase II	151.2	127.9	25.3	.2	11	10.9
Max Total Offsite Exhaust Emissions	*44.2*	*46.4*	*5.7*	*.08*	*2.1*	*2.0*
Exhaust Sources, Tons/Period	**NOx**	**CO**	**VOC**	**SOx**	**PM10**	**PM2.5**
Main Construction Site/Linears Phase I	3.8	1.7	.5	.004	.21	.21
Main Construction Site/Linears Phase 2	28.5	24.1	4.8	.037	2.07	2.06
Construction Delivery	8.3	2.8	.62	.01	.38	.37
Construction Worker Travel	.70	7.0	.581	.006	.057	.057
Max Total Onsite Exhaust Emissions	*32.3*	*25.8*	*5.3*	*.041*	*2.28*	*2.27*
Max Total Offsite Exhaust Emissions	*9*	*9.8*	*1.2*	*.016*	*.44*	*.43*
Exhaust Sources, Normalized Tons/Yr	**NOx**	**CO**	**VOC**	**SOx**	**PM10**	**PM2.5**
Max Total Onsite Exhaust Emissions	*24.2*	*19.35*	*3.98*	*.031*	*1.71*	*1.7*
Max Total Offsite Exhaust Emissions	*6.68*	*7.2*	*.9*	*.012*	*.32*	*.32*

Table F.5-3 presents the estimates of GHGs for the construction phase.

Table F.5-3 GHG Construction Emissions Estimates	
Total CO2e, short tons/period	5179
Total CO2e, metric tons/period	**4708**
Total CO2e, normalized short tons/yr	3884
Total CO2e, normalized metric tons/yr	**3531**

Construction emissions are well below the federal general conformity levels for those pollutants for which the project area is deemed non-attainment, i.e., ozone (NOx and VOC precursors), therefore a conformity determination for construction emissions is not required.

Analysis of Ambient Impacts from Facility Construction

Ambient air quality impacts from emissions during the construction of the Project were estimated using an air quality dispersion modeling analysis. The modeling analysis considers the construction site location, the surrounding topography, and the sources of emissions during construction, including vehicle and equipment exhaust emissions and fugitive dust.

Existing Ambient Levels

As with the modeling analysis of project operating impacts (Section 4.7), monitoring stations delineated in Section 4.7 were used to establish the ambient background levels for the construction impact modeling analysis. Table 4.7-16 showed the maximum concentrations of

NO_x, SO_2, CO, PM10, and PM2.5 recorded for 2008 through 2011 at those monitoring stations.

Dispersion Model

As in the analysis of project operating impacts, the USEPA-approved AERMOD model was used to estimate ambient impacts from construction activities. A detailed discussion of the AERMOD dispersion model is included in Section 4.7.

The emission sources for the construction site were grouped into two categories: exhaust emissions and dust emissions. Exhaust emissions were modeled as point sources with a height of 10 feet (3.048 meters), exit velocity of 64.681 m/s, temperature of 750K, and exit diameter of 0.1524 meters. This is based on survey data derived from several construction equipment manufacturer's websites (7/11) for a wide range of equipment types, which indicated that the average exhaust stack was 3.14m (10.3 ft) above ground level, the average stack diameter varied between 4-6 inches, and the average exhaust temperature was well above 700 deg F. For construction dust emissions, an effective plume height of 0.5 meters was used in the modeling analysis and dust emissions were modeled as a single area source that covered the expected areas of the construction site – a 3 acre area centered on the eventual plant site for short-term impacts and a 16 acre area covering most of the property for annual impacts. The construction impacts modeling analysis used the same receptor locations as used for the project operating impact analysis. Since maximum impacts will occur in close proximity to the property boundary, only the 10-meter fenceline receptors and 20-meter and 50-meter receptor grids were modeled. A detailed discussion of the receptor locations is included in Section 4.7. Due to the runtime requirements for modeling a large number of point sources for exhaust emissions (32 stacks for the 3 acre area and 35 stacks for the 16 acre area) and area sources for fugitive dust emissions, the FASTALL model options was used to reduce model run time

To determine the construction impacts on short-term ambient standards (24 hours and less), the worst-case daily onsite construction emission levels shown in Tables F.5-1 and F.5-2 were used. For pollutants with annual average ambient standards, the annual onsite emission levels were used, based on the worst-case 12-month period (2 months of Phase 1 and 10 months of Phase 2 vs. 12 months of Phase 2, based on average lb/month emission rates). Phase 1 and Phase 2 were both modeled separately and the worst-case reported here (Phase 1 for PM10, PM2.5, and 1-hour NO_2 and Phase 2 for CO, SO_2, and annual NO_2). As with the project operating impact analysis, the meteorological data set used for the construction emission impacts analysis is data collected from the APCD Kearney Mesa station for 2003-2007.

Modeling Results

Based on the emission rates of NO_x, SO_2, CO, PM10, and PM2.5 and the meteorological data, the AERMOD model calculates hourly and annual ambient impacts for each pollutant. As mentioned above, the modeled 1-hour, 3-hour 8-hour, and 24-hour ambient impacts are based on the worst-case daily emission rates of NO_x, SO_2, CO, PM10, and PM2.5. The annual impacts are based on the annual emission rates of these pollutants for each Phase, calculated as described above.

The one-hour and annual average concentrations of NO_2 were computed following the revised USEPA and SDAPCD guidance for computing these concentrations (see AFC

Section 4.7). The annual average was calculated using the ambient ratio method (ARM) with the national default value of 0.75 for the annual average NO_2/NO_x ratio. The 1-hour NO2 impacts for comparison to the CAAQS were calculated based on the maximum 1-hour impact using the ozone limiting method (OLM) with Kearny Mesa ozone data for the same time period as the modeled meteorological data and concurrent background Kearny Mesa NO2 data. Both the ozone and NO2 background data files were supplied by SDAPCD. The 1-hour NO2 impacts for comparison to the NAAQS were calculated based on the 3-year average of the eighth highest 1-hour daily maximum NO2 impact using OLM with Kearny Mesa ozone data and 3-year average of the 3rd highest seasonal background NO2 concentrations by hour of day for Kearny Mesa for 2008-2010 following the latest USEPA guidance and CAPCOA guidance for filling in missing data.

The modeling analysis results are shown in Table F.5-4. Also included in the table are the maximum background levels that have occurred in the last three years and the resulting total ambient impacts. As shown in Table F.5-4, modeled construction impacts for all modeled pollutants are expected to be less than the most stringent state and national standards except for the 24-hour California PM10 standard. Total (i.e., modeled plus background) impacts are also expected to be less than the most stringent state and national standards except for the California 24-hour and annual PM10 standards. It should be noted that these standards are already equaled or even exceeded by background ambient concentrations even in the absence of the construction emissions from the Project.

TABLE F.5-4 MODELED MAXIMUM CONSTRUCTION IMPACTS

Pollutant	Averaging Time	Maximum Construction Impacts ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2[a]	1-hour State 1-hour Fed Annual	- - 7.2	- - 26.3	288 184 33.5	339 - 57	- 188 100
SO_2	1-hour 3-hour 24-hour Annual	0.66 0.27 0.060.01	55.1 55.1 15.7 2.6	55.8 55.4 15.8 2.6	655 - 105 -	196 1300 365 80
CO	1-hour 8-hour	419 76	5039 3894	5458 3970	23,000 10,000	40,000 10,000
PM10	24-hour Annual	87.0 3.05	50 25	137 28.1	50 20	150 -
PM2.5	24 Hour Annual	13.4 0.95	18 10.5	31.4 11.5	- 12	35 15.0

Notes:
[a]ARM applied for annual average, using national default 0.75 ratio. NO2 background already included in 1-hour averages calculated by AERMOD as described above

The AERMOD model is expected over predict construction emission particulate impacts due to the cold plume (i.e., ambient temperature) effect of dust emissions. Most of the plume dispersion characteristics in the AERMOD model are derived from observations of hot plumes associated with typical smoke stacks. For ambient temperature plumes, the AERMOD model assumes negligible buoyancy and dispersion. Consequently, the ambient concentrations in cold plumes remain high even at significant distances from a source. In addition, the AERMOD model as currently executed does not account for particulate deposition between the fugitive dust sources and receptors modeled. The estimated construction site impacts shown here are not unusual in comparison to modeled impacts for most construction sites. In actual practice, construction sites that use good dust suppression techniques and low-emitting vehicles typically would not be expected to cause exceedances of any ambient air quality standards. The input and output modeling files are being provided electronically.

Tables and Figures included in this Appendix are as follows:

Table F.5-11a

Modeling Inputs/Results for QBPP Phase 1 Construction Impacts (Combustion Sources as Point Sources) - FASTALL/20m+50m+Prop.Bdy Recs

Short Term Impacts (24 hrs and less)

	NOx	CO	SOx	PM10	PM2.5
Combustion (lbs/day)	174.4	75.6	0.2	9.43	9.34
Combustion (hrs/day)	10	10	10	10	10
Combustion (lbs/hr)	17.44	7.56	0.02	0.94	0.93
Combustion (g/sec)	2.20E+00	9.53E-01	2.52E-03	1.19E-01	1.18E-01
Construction Dust (lbs/day)				13.03	2.0
Construction Dust (hrs/day)				10	10
Construction Dust (lbs/hr)				1.30	0.20
Construction Dust (g/sec)	3.00 acres			1.64E-01	2.52E-02
AERMOD Inputs	**12,150 m^2**		**32 Pt.Srcs**		
Combustion (g/s/src)	6.867E-02	2.977E-02	7.875E-05	3.713E-03	3.678E-03
Construction Dust (g/s/m^2)				1.351E-05	2.074E-06
AERMOD Results (ug/m^3)					
Combustion Only					
1-hour Max	571.556*	247.762	0.655	30.90467	
3-hour Max			0.271	12.75893	
8-hour Max		44.964		5.60859	
24-hour Max			0.055	2.59801	2.57321
All Particulate Sources					
24-hour Max				87.00673	13.42662
5-yr Avg 8th High Daily 1-hr NO2 Max	184.256**	w/ Seasonal/Hourly NO2 Background for NAAQS			
Max 1-hr NO2 Max	288.488**	w/ Concurrent Hourly NO2 Background for CAAQS			
Background (ug/m^3)					
1-hour Max	N/A	5039	55.1		
3-hour Max			55.1		
8-hour Max		3894			
24-hour Max			15.7	50	18
Total + Background (ug/m^3)					
1-hour Max	N/A	5287	55.8		
3-hour Max			55.4		
8-hour Max		3939			
24-hour Max			15.8	137.0	31.4

Long Term Impacts (annual)

	NOx	CO	SOx	PM10	PM2.5
Combustion (tons/year)	23.49	18.29	0.03	1.64	1.62
Combustion (days/year)***	312	312	312	312	312
Combustion (hrs/day)	10	10	10	10	10
Combustion (lbs/hr)***	12.87	10.02	0.02	0.90	0.89
Combustion (g/sec)	1.62E+00	1.26E+00	2.07E-03	1.13E-01	1.12E-01
Construction Dust (tons/year)	Worst-case 12-month Conditions:			0.777	0.141
Construction Dust (days/year)	Phase 1: 2m Grading + 10m Building			312	312
Construction Dust (hrs/day)	Phase 2: 12 months Building			10	10
Construction Dust (lbs/hr)***	(Based on lbs/month emissions)			0.426	0.077
Construction Dust (g/sec)	16.01 acres			5.36E-02	9.73E-03
AERMOD Inputs	**64,803 m^2**			**35 Pt.Srcs**	
Combustion (g/s/src)	4.634E-02	3.608E-02	5.918E-05	3.235E-03	3.196E-03
Construction Dust (g/s/m^2)				8.278E-07	1.502E-07
Combustion Only					
Annual	9.569		0.012	0.66808	0.65993
All Particulate Sources					
Annual				3.05429	0.95406
Annual NO2 w/ ARM	7.177	based on ARM Ratio of:		75%	
Background (ug/m^3)					
Annual	26.3		2.6	25	10.5
Total + Background (ug/m^3)					
Annual	33.5		2.6	28.1	11.5

*Maximum NOx impact ratioed from PM10 combustion source impact.

**Based on AERMOD Ozone Limiting Method (OLM) keyword with all sources combined in one source group, including background in AERMOD analyses.

***Even for construction projects taking less than 12-months or 7 days/wk, the hourly emissions for modeling are still based on total tons (projects<12 months) or tons/year (projects>12months) divided by 365 days since all days in the met dataset (i.e., all 12 months and all 365 days - i.e., 7 days/week) are modeled.

Table F.5-11b

Modeling Inputs/Results for QBPP Phase 2 Construction Impacts (Combustion Sources as Point Sources) - FASTALL/20m+50m+Prop.Bdy Recs

Short Term Impacts (24 hrs and less)

	NOx	CO	SOx	PM10	PM2.5
Combustion (lbs/day)	151.2	127.9	0.2	11	10.9
Combustion (hrs/day)	10	10	10	10	10
Combustion (lbs/hr)	15.12	12.79	0.02	1.10	1.09
Combustion (g/sec)	1.91E+00	1.61E+00	2.52E-03	1.39E-01	1.37E-01
Construction Dust (lbs/day)				7.48	0.83
Construction Dust (hrs/day)				10	10
Construction Dust (lbs/hr)				0.75	0.08
Construction Dust (g/sec)	3.00 acres			9.42E-02	1.05E-02
AERMOD Inputs	**12,150 m^2**		**32 Pt.Srcs**		
Combustion (g/s/src)	5.954E-02	5.036E-02	7.875E-05	4.331E-03	4.292E-03
Construction Dust (g/s/m^2)				7.757E-06	8.607E-07
AERMOD Results (ug/m^3)					
Combustion Only					
1-hour Max	495.503*	419.146	0.655	36.04852	
3-hour Max			0.271	14.88255	
8-hour Max		76.067		6.54209	
24-hour Max			0.055	3.03043	3.00288
All Particulate Sources					
24-hour Max				50.00573	5.67506
5-yr Avg 8th High Daily 1-hr NO2 Max	175.049**	w/ Seasonal/Hourly NO2 Background for NAAQS			
Max 1-hr NO2 Max	273.424**	w/ Concurrent Hourly NO2 Background for CAAQS			
Background (ug/m^3)					
1-hour Max	N/A	5039	55.1		
3-hour Max			55.1		
8-hour Max		3894			
24-hour Max			15.7	50	18
Total + Background (ug/m^3)					
1-hour Max	N/A	5458	55.8		
3-hour Max			55.4		
8-hour Max		3970			
24-hour Max			15.8	100.0	23.7

Long Term Impacts (annual)

	NOx	CO	SOx	PM10	PM2.5
Combustion (tons/year)	23.59	19.95	0.03	1.72	1.70
Combustion (days/year)***	312	312	312	312	312
Combustion (hrs/day)	10	10	10	10	10
Combustion (lbs/hr)***	12.93	10.93	0.02	0.94	0.93
Combustion (g/sec)	1.63E+00	1.38E+00	2.07E-03	1.19E-01	1.17E-01
Construction Dust (tons/year)	Worst-case 12-month Conditions:			0.658	0.116
Construction Dust (days/year)	Phase 1: 2m Grading + 10m Building			312	312
Construction Dust (hrs/day)	Phase 2: 12 months Building			10	10
Construction Dust (lbs/hr)***	(Based on lbs/month)			0.361	0.064
Construction Dust (g/sec)	16.01 acres			4.54E-02	8.01E-03
AERMOD Inputs	**64,803 m^2**			**35 Pt.Srcs**	
Combustion (g/s/src)	4.653E-02	3.935E-02	5.918E-05	3.393E-03	3.353E-03
Construction Dust (g/s/m^2)				7.010E-07	1.236E-07
Combustion Only					
Annual	9.610		0.012	0.70071	0.69256
All Particulate Sources					
Annual				2.68414	0.90171
Annual NO2 w/ ARM	7.208	based on ARM Ratio of:		75%	
Background (ug/m^3)					
Annual	26.3		2.6	25	10.5
Total + Background (ug/m^3)					
Annual	33.5		2.6	27.7	11.4

*Maximum NOx impact ratioed from PM10 combustion source impact.

**Based on AERMOD Ozone Limiting Method (OLM) keyword with all sources combined in one source group, including background in AERMOD analyses.

***Even for construction projects taking less than 12-months or 7 days/wk, the hourly emissions for modeling are still based on total tons (projects<12 months) or tons/year (projects>12months) divided by 365 days since all days in the met dataset (i.e., all 12 months and all 365 days - i.e., 7 days/week) are modeled.

CONSTRUCTION PHASE- Main Site Activity-Grading
MRI Level 2 Analysis (Refs 1, 3-7)

Acres Subject to Construction Disturbance Activites:	16		
Max Acres Subject to Construction Disturbance Activites on any day:	3	***	
Emissions Factor for PM10 Uncontrolled, tons/acre/month:	0.0144		
PM2.5 fraction of PM10 (per CARB CEIDARS Profiles):	0.21		
Activity Levels: Hrs/Day:	10		
Days/Wk:	5		
Days/Month:	22		
Const Period, Months:	2		0.2 years
Const Period, Days:	44		
Wet Season Adjustment: (Per AP-42, Section 13.2.2, Figure 13.2.2-1, 12/03)			
Mean # days/year with rain > = 0.01 inch:	40		
Mean # months/yr with rain > = 0.01 inch:	1.33		
Adjusted Const Period, Months:	1.78		
Adjusted Const Period, Days:	37		
Controls for Fugitive Dust:			
Proposed watering cycle:	4	times per construction shift	

SCAQMD Mitigation Measures, Table XI-A, 4/07
3 watering cycles/10 hour construction shift yields a 61% reduction, 4 watering cycles/12 hour shift should yield a 70% + reduction.
Speed control of onsite const traffic from 35 to 15 mph yields a 57% reduction.

Calculated % control based on mitigations proposed:	87	% control
Conservative control % used for emissions estimates:	85	% control
	0.15	release fraction

Emissions: Controlled	PM10	PM2.5
tons/month	0.006	0.001
tons/period	0.012	0.002
Max lbs/day	0.6	0.124

Soil Handling Emissions (Cut and Fill): (2)

Total cu.yds of soil handled:	327370	***
Total tons of soil handled:	1693157.64	
Total days soil handled:	37	
Tons soil/day:	45352	
Control Eff. watering, %	80	
Release Fraction:	0.2	

Emissions:	PM10	PM2.5
tons/period	0.11	0.02
tons/month	0.06	0.01
max lbs/day	5.74	1.21

Mean annual wind speed, mph:			6.8
Avg. Soil moisture, %:			4
Avg. Soil density, tons/cu.yd:			1.3
k factor for PM10:			0.35
Number of Drops per ton:			4
Calc 1	wind		1.491
Calc 2	moisture		2.639
Calc 3	int		0.565
Calc 4	PM10	lb/ton	0.0006
PM2.5 fraction of PM10:			0.210

Emissions Totals:

	PM10	**PM2.5**
tons/period	**0.1238**	**0.0260**
tons/month	**0.0696**	**0.0146**
max lbs/day	**6.33**	**1.33**

Methodology References:
(1) MRI Report, South Coast AQMD Project No. 95040, March 1996, Level 2 Analysis Procedure.
MRI Report factor of 0.011 tons/acre/month is based on 168 hours per month of const activity.
For an activity rate of 220 hrs/month, the adjusted EF would be 0.0144 tons/acre/month.
*** includes surface area and trench cut and fill for proposed offsite linears.
(2) Soil Handling (Cut and Fill), EPA, AP-42, Section 13.2.4., 11/06, and Appendix E-2, Palen Solar PP, 8/09.
(3) URBEMIS, Version 9.2.4, User's Manual Appendix A, page A-6.
(4) CARB Area Source Methodology, Section 7.7, 9/02.
(5) WRAP Fugitive Dust Handbook, 9/06.
(6) USEPA, AP-42, Section 13.2.3, 2/10.
(7) Estimating PM Emissions from Construction Operations, USEPA, MRI, 9/99.
(8) Wind speed data for San Diego, US DoC, NOAA, Comparative Climatic Data, 1985.
(9) Soil data: San Diego County Soil Survey-1973, UC Kearney AG Center, Redding Soil Series
4-6% moisture content, avg silt 34.7%, density 1.534 gm/cc

Nitrogen Deposition Analysis Results for QBPP

Air emissions from the proposed project include nitrogen oxides (NO_x), sulfur oxides (SO_x), and particulates (PM_{10}). Nitrogen oxide gases (NO, NO_2) convert to nitrate particulates in a form that is suitable for uptake by most plants. The effect of this nitrogen could be to promote plant growth that could potentially encourage nonnative plant species at the expense of native species. Sensitive habitats that may harbor sensitive plant species susceptible to the effects of nitrogen deposition area located 3 miles southwest of the QBPP site.

To assess nitrogen deposition, AERMOD, which was used in the air quality permitting analysis to evaluate the project's air quality impacts, was also used in the deposition analysis. As described previously in the air quality analysis, AERMOD is a steady-state, mass-conserving, nonreactive (i.e., no chemistry) plume dispersion model. The ability of AERMOD to overestimate impacts was expanded on by including several other assumptions with regards to nitrogen formation and deposition, in order to assess the potential for impacts from the OGS project. These assumptions include:

- 100 percent conversion of oxides of nitrogen (NO_x) and ammonia (NH_3) into atmospherically derived nitrogen (ADN) within the turbine stack(s) rather than allowing the conversion of NO_x and NH_3 to occur over distance and time within the atmosphere
- Depositional rates and parameters were based upon nitric acid (HNO_3) which, of all the depositional species, has the most affinity for impacts to soils and vegetation and the most tendency to "stick" to what it is deposited upon
- Maximum settling velocities to produce maximum deposition rates
- Maximum potential emissions were used rather than actual emissions in the calculation of nitrogen deposition
- And, once it leaves the turbine stack, nitrogen immediately begins to deposit in the surrounding lands.

To produce conservative results (overestimates), modeling assumptions regarding the complex chemistry that occurs to produce nitrogen from NO_X, ammonia, and other pollutants were not used in this modeling analysis. As one example, it was assumed that the pollutants leaving the stack(s) would already be in the form of depositional nitrogen (nitrate and ammonium ions). To do this, the emissions of NO_x and ammonia were summed and then adjusted for the molecular weight of nitrogen. Thus, all impacts would represent 100 percent conversion of combustion emissions into depositional nitrogen. This assumption leads to an exceedingly conservative estimation of nitrogen deposition, because areas with the highest nitrogen emissions do not necessarily experience the greatest deposition effects, which usually occur far from the original nitrogen source. In addition, since mass is conserved in the model, all downwind calculations of nitrogen deposition, regardless of distance and formation rates, are overestimated by the model.

The AERMOD model calculates atmospheric deposition of nitrogen by calculating the wet and dry fluxes of total nitrogen. This deposition is accomplished by using a resistance model for the dry deposition part, and by assigning particle phase washout coefficients for the wet removal process from rainout. As discussed below, depositional parameters are input into the model in order to calculate the deposition of nitrogen. Again, depositional parameters were based on

HNO_3, which is consistent with the conservative modeling assumptions that overestimate the amounts of nitrogen deposition from the proposed project. Nitric acid tends to deposit more readily than most other compounds.

No chemical conversion (which takes place over distance and time) was allowed to occur. In reality, the nitrate aerosol cannot be considered a stable product, such as sulfate typically is. Also, unlike sulfate, the ambient concentration of atmospherically derived nitrogen is limited by the availability of ammonia, which is preferentially scavenged by sulfate. Because of the preferential scavenging of ammonia by sulfate, the available ammonia in the atmosphere is often computed as total ammonia minus sulfate. These effects were not included in the analysis.

The assumption that atmospherically derived nitrogen forms instantaneously in stack and immediately begins to deposit in the surrounding areas leads to an estimation of nitrogen deposition that is unrealistically high, and would likely be several orders of magnitude higher than the actual process itself. This is especially true in the immediate area(s) surrounding the project site.

The other assumptions listed above, along with those inherent in AERMOD, add to the conservative nature of the modeling analysis. All these factors were combined into one modeling study to produce much higher impacts than would be modeled using less conservative assumptions. The goal of the analysis was to combine many conservative assumptions into one modeling analysis in order to overestimate the potential impact from operation of the OGS project.

In order to model gaseous deposition, the model requires land use characteristics and gas deposition resistance terms based on five seasonal categories. The seasonal categories are input into AERMOD on a month by month basis, corresponding to each summer, fall, winter, and spring seasons. Additionally, land use data is input based on wind direction.

For both wet and dry deposition, AERMOD requires the following additional inputs:

- The molecular diffusivity (D_a) for the pollutant being modeled [cubic centimeters per second (cm^2/s)]
- The diffusivity in water (D_w) for the pollutant being modeled [cubic centimeters per second (cm^2/s)]
- The cuticular resistance to uptake by lipids for individual leaves (rcl) for the pollutant (s/cm),
- The Henry's Law coefficient (Pa) for the parameter (m^3/mol)

For this analysis, it was assumed that the deposition parameters would be based on gaseous nitric acid. Nitric acid was chosen to represent total nitrogen deposition since nitric acid has the greatest potential for depositional effects. The deposition parameters were obtained from a draft Argonne National Laboratory report (Wesely, et. al., 2002).

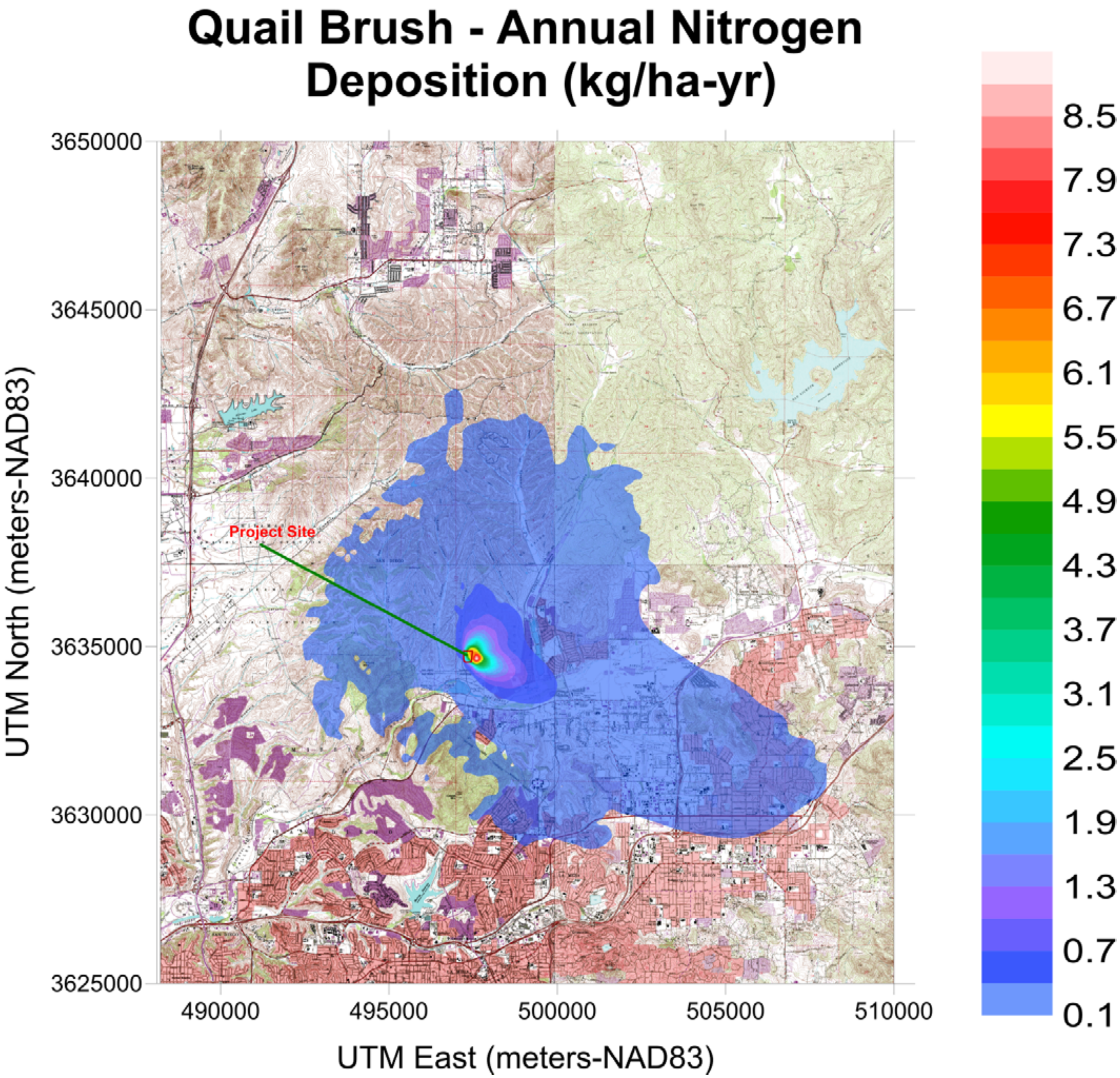
In addition to the above inputs, the dry and wet deposition algorithm also requires surface roughness length (cm), friction velocity (meters per second), Monin-Obukhov length (meters), surface pressure, precipitation type, and precipitation rate. For AERMOD, the meteorology used in this analysis was based on the 2003-2007 data set collected at the Kearny Mesa Monitoring Station This is the same meteorological data set that was used for the air quality permit application.

The QBPP nitrogen deposition rates in kilograms/hectare per year (kg/ha-yr) are presented in Figure 1. The maximum deposition rate would be 12.43 kg/ha-yr immediately adjacent to the proposed project. All deposition rates exceeding 5 kg/ha-yr occur just east of the proposed project location as indicated in Figure 1. The average deposition rate across the entire modeling domain in 0.86 kg/ha-yr.

A threshold at which harmful effects from nitrogen deposition on plant communities has not been firmly established. However, a value of 5 kilograms per hectare per year (kg/ha/yr) is often used for comparing nitrogen deposition among plant communities. Research conducted in the South San Francisco Bay Area indicates that intensified annual grass invasions can occur in areas with nitrogen deposition levels of 11–20 kg/ha/yr, with limited invasions at levels of 4–5 kg/ha/yr (Weiss 2006a and Weiss 2007, as cited in CEC 2007). The levels of nitrogen deposition from the QBPP in the Mission Trails area are estimated less than 0.5 kg/ha-yr, which are below levels necessary to cause adverse effects.

Furthermore, the level of nitrogen deposition from the QBPP on plant-available nitrogen would actually be less than the calculated amount because the deposition will be distributed in small amounts during the year and not all of the nitrogen added to the soil during each deposition event is available for plant use because of losses associated with soil processes. Therefore, it is unlikely that there would be significant impacts to biological resources from nitrogen deposition.

Figure 1


Quail Brush - Annual Nitrogen Deposition (kg/ha-yr)
3650000
3645000
3640000
3635000
3630000
3625000
UTM North (meters-NAD83)
490000
495000
500000
505000
510000
UTM East (meters-NAD83)
Project Site
8.5
7.9
7.3
6.7
6.1
5.5
4.9
4.3
3.7
3.1
2.5
1.9
1.3
0.7
0.1